



# Combining oxytocin administration and positive emotion inductions: Examining social perception and analytical performance



Lauren J. Human<sup>a,\*</sup>, Katherine R. Thorson<sup>b</sup>, Joshua D. Woolley<sup>c</sup>, Wendy Berry Mendes<sup>c</sup>

<sup>a</sup> Department of Psychology, McGill University, Canada

<sup>b</sup> Department of Psychology, New York University, United States

<sup>c</sup> Department of Psychiatry, University of California, San Francisco, United States

## ARTICLE INFO

### Article history:

Received 24 November 2015

Revised 19 February 2017

Accepted 1 March 2017

Available online xxxxx

### Keywords:

Oxytocin administration

Positive emotion inductions

Social perception

Analytical performance

## ABSTRACT

Intranasal administration of the hypothalamic neuropeptide oxytocin (OT) has, in some studies, been associated with positive effects on social perception and cognition. Similarly, positive emotion inductions can improve a range of perceptual and performance-based behaviors. In this exploratory study, we examined how OT administration and positive emotion inductions interact in their associations with social and analytical performance. Participants ( $N = 124$ ) were randomly assigned to receive an intranasal spray of OT (40 IU) or placebo and then viewed one of three videos designed to engender one of the following emotion states: social warmth, pride, or an affectively neutral state. Following the emotion induction, participants completed social perception and analytical tasks. There were no significant main effects of OT condition on social perception tasks, failing to replicate prior research, or on analytical performance. Further, OT condition and positive emotion inductions did not interact with each other in their associations with social perception performance. However, OT condition and positive emotion manipulations did significantly interact in their associations with analytical performance. Specifically, combining positive emotion inductions with OT administration was associated with worse analytical performance, with the pride induction no longer benefiting performance and the warmth induction resulting in worse performance. In sum, we found little evidence for main or interactive effects of OT on social perception but preliminary evidence that OT administration may impair analytical performance when paired with positive emotion inductions.

© 2017 Elsevier Inc. All rights reserved.

## 1. Introduction

Biological and psychological manipulations can both influence a wide range of affective, social, and cognitive outcomes. For example, some neuroendocrine products, such as the neuropeptide oxytocin (OT), may have positive effects on social behavior (e.g., Taylor et al., 2000; Zak et al., 2007). Further, there is evidence that experiencing positive emotions can improve a range of perceptual and performance-based behaviors (Fredrickson, 2001; Isen, 2000). However, research is accumulating to suggest that OT administration can be less beneficial or even detrimental in some contexts (e.g., Campbell, 2008; Shamay-Tsoory et al., 2009; De Dreu et al., 2010) and when administered at higher concentrations (e.g., Cardoso et al., 2013). Similarly, it has been argued that high levels of positive emotions can be detrimental in some contexts (Gruber et al., 2011; Oishi et al., 2006). The current study examined whether combining acute increases in OT and positive emotions together would result in a similar, potentially detrimental,

pattern. We addressed this question by experimentally manipulating OT levels via intranasal administration of OT (vs. placebo) and by inducing one of two positive emotions, social warmth or pride (vs. neutral affect), and then examining performance on social perception and cognitive tasks.

OT is a neurohypophyseal hormone that plays a role in social interactions and bonding (Taylor et al., 2000; Zak et al., 2007). Initial work on OT administration suggested that it may promote more positive social behavior, such as greater trust and generosity (Kosfeld et al., 2005; Zak et al., 2007), and more accurate social perception (Bartz et al., 2010a; Domes et al., 2007; Guastella et al., 2010). There has been less examination of the effects of OT on cognitive processes, but one study found that OT administration promoted greater holistic thinking and creative performance, but decreased analytical reasoning (De Dreu et al., 2013).

Of note, however, the positive social effects of OT administration have not been entirely reliable (see Conlisk, 2011; Nave et al., 2015, for critical reviews). This is likely in part because the statistical power of OT administration studies tends to be very low and there are likely publication and reporting biases within the field (Lane et al., 2016; Walum et al., 2016), but may also be in part because the effects of OT

\* Corresponding author: Department of Psychology, McGill University, 1205 Dr Penfield Ave, Office W8/33, Montreal, QC H3A 1B1, Canada.

E-mail address: [lauren.human@mcgill.ca](mailto:lauren.human@mcgill.ca) (L.J. Human).

administration may be highly context-dependent (Bartz et al., 2011; Bakermans-Kranenburg and Van IJzendoorn, 2013; Guastella and MacLeod, 2012; Van IJzendoorn and Bakermans-Kranenburg, 2012). For example, OT administration has been shown to selectively improve the accuracy of social perception for men who are less socially proficient (Bartz et al., 2010a) and on more difficult social perception items (Domes et al., 2007). There is also evidence that OT administration is more beneficial for people with alexithymia (Luminet et al., 2011), autism and Asperger's disorders (Andari et al., 2010; Guastella et al., 2010; Hollander et al., 2007), and schizophrenia (Woolley et al., 2014). Further, OT administration has been found to have antisocial effects in negative social contexts, such as those that involve conflict (e.g., De Dreu et al., 2010). It remains unclear, however, whether and how OT administration would interact with experimentally induced positive social-emotional states to influence behavior and cognition, such as social perception and analytical thinking.

A large body of work has examined how emotion inductions influence a host of social and cognitive outcomes. In particular, positive emotion inductions can broaden mind-sets (Fredrickson, 2001), resulting in more flexible, creative solutions (Isen, 2000) and improve performance on social perception tasks, analytical problem solving tasks, and decision-making (see Isen, 2000 for review; Reed and Aspinwall, 1998). These effects appear to be due, in part, to increased motivation (Forgas and Vargas, 2000). In the current study, we compared two positive emotion inductions: social warmth, which may be more other-focused and socially engaging, and pride, which may be more self-focused and socially disengaging (Kitayama et al., 2006). Given that OT administration is argued to be particularly relevant to social processes, it is possible that potential interactive effects would be stronger for emotions such as social warmth than pride. Alternatively, if the broadening and motivating effects of positive emotions have similar effects on social and analytical outcomes, we may not see emotion-specific effects.

How might OT administration and positive emotion inductions interact with each other? On the one hand, it is plausible that combining OT administration with positive emotion states would accrue additive benefits. Indeed, there is some evidence that OT administration can be beneficial in more positive contexts. For example, individuals with more supportive family backgrounds have more positive social responses to OT administration (e.g., Bartz et al., 2010b; Van IJzendoorn et al., 2011). Further, individuals in a more supportive social context experience greater stress-reducing effects after OT administration (Heinrichs et al., 2003) and those lower in loneliness demonstrate better cardiac control after receiving OT administration (Norman et al., 2011). There is also evidence that OT administration can have adverse consequences for those who tend to experience more negative emotional states, such as those with elevated levels of depression (Ellenbogen et al., 2013) and major depressive disorder (MacDonald et al., 2013). Thus, it is possible that OT administration and positive emotion inductions combined could be more beneficial for social and cognitive outcomes than either OT administration or positive emotion inductions alone.

On the other hand, it is possible that positive emotion inductions combined with OT administration could be detrimental. Indeed, there are studies that underscore the limits of beneficial effects of very high levels of positive emotion (see Gruber et al., 2011; Oishi et al., 2006). For example, while moderate levels of positive emotion can promote creativity, very high levels do not (Davis, 2008). Further, moderate levels of happiness are associated with more successful achievement outcomes than very high levels of happiness (Oishi et al., 2006). Similarly, recent dose response work has found that at with higher dosages of intranasal OT there is less attenuation of cortisol reactivity to physical stress (Cardoso et al., 2013) and less effective enhancement of the positive valence engendered by social memories (Cardoso et al., 2014). Further, women, who tend to be higher in endogenous levels of OT (Altemus et al., 1999), sometimes show more negative responses to OT administration. For example, OT administration (vs. placebo) in

women has been shown to decrease neural activity in regions associated with social bonding and reward (Rilling et al., 2014) and enhance anger following social evaluation (Kubzansky et al., 2012).

Overall, then, both positive emotions and OT may be less beneficial or even detrimental at high levels. In turn, it is possible that combining OT administration with positive emotion inductions would have similarly detrimental effects on social and cognitive outcomes. In the first study that we are aware of to do so, we test this possibility by experimentally manipulating both OT administration and positive emotions, to examine their independent and interactive effects on both social perception and analytical performance.

## 2. Method

### 2.1. Overview

In the current study, participants received a single intranasal dose of either OT (40 IU) or placebo in a double-blind, randomized design. Orthogonal to the OT/placebo manipulation, participants were randomly assigned to one of three emotion inductions: social warmth, pride, or a neutral affect (control) condition. Participants reported their positive affect prior to and after the positive emotion inductions and then completed two social perception tasks and an analytical performance measure.

### 2.2. Participants and design

Participants between the ages of 18 and 35 who spoke English as their first language were recruited from the San Francisco community through flyers and advertisements on Craigslist. Prior to scheduling a lab appointment, participants were pre-screened and excluded if they were pregnant, lactating, or in poor mental or physical health.<sup>1</sup> A total of 126 participants arrived for their lab appointment, of which 2 chose to discontinue their participation due to discomfort from the nasal spray. The final dataset included 124 participants (60 female, 64 male;  $M_{age} = 24.99$ ,  $SD_{age} = 4.11$ ), although there were additional missing data on individual items due to lack of participant response, technical difficulties, or experimenter error. Upon arrival, participants were randomly assigned to a 2 (intranasal spray: oxytocin administration vs. placebo, double-blind)  $\times$  3 (emotion induction: social warmth vs. pride vs. neutral) between subjects design. The gender distribution was similar across conditions (see Table 1 for a full breakdown by condition). FDA approval (IND #111906) was obtained for the use of oxytocin and all study procedures were approved by the University of California San Francisco Committee for Human Research.

### 2.3. Procedure

#### 2.3.1. Arrival and nasal spray administration

Upon arrival at the lab, participants were given a brief overview of the procedure and informed consent was obtained (see Fig. 1 for an overview of the study procedures timeline). The experimenter then confirmed a negative test for pregnancy for all female participants via a urine sample. Next, participants were taught how to self-administer

<sup>1</sup> These data come from a larger project that also assessed individual differences and other outcome measures in the lab. Analyses with these individual difference measures and other outcome variables can be found elsewhere (Human et al., 2016) and do not overlap with or influence the results presented in the current manuscript. Specifically, Human et al., examined the interactive effects between OT administration and extraversion on social connection and prosocial tendencies – extraversion did not significantly interact with OT administration or positive emotion inductions in its associations with the dependent variables examined in the current manuscript and controlling for extraversion does not alter the results of the current manuscript. In addition, the positive emotion inductions did not significantly relate to or interact with extraversion or OT administration in their associations with the dependent variables in Human et al., 2016. Additional details can be found in the online supplemental materials corresponding to Human et al., 2016: <http://spp.sagepub.com/content/7/7/735/suppl/DC1>.

Download English Version:

<https://daneshyari.com/en/article/4931045>

Download Persian Version:

<https://daneshyari.com/article/4931045>

[Daneshyari.com](https://daneshyari.com)