Psychoneuroendocrinology (2013) 38, 2820—2825

Available online at www.sciencedirect.com

SciVerse ScienceDirect

journal homepage: www.elsevier.com/locate/psyneuen

SHORT COMMUNICATION

Face or body? Oxytocin improves perception of emotions from facial expressions in incongruent emotional body context

Anat Perry [a,*], Hillel Aviezer [b], Pavel Goldstein [a], Sharon Palgi [a,c], Ehud Klein [c], Simone G. Shamay-Tsoory [a]

[a] Psychology Department, University of Haifa, Israel
[b] Psychology Department, The Hebrew University of Jerusalem, Israel
[c] Department of Psychiatry, Rambam Health Care Campus, Haifa, Israel

Received 28 January 2013; received in revised form 1 July 2013; accepted 10 July 2013

KEYWORDS
Oxytocin;
Social hormones;
Emotion recognition;
Emotion perception;
Facial expressions;
Body context

Summary The neuropeptide oxytocin (OT) has been repeatedly reported to play an essential role in the regulation of social cognition in humans in general, and specifically in enhancing the recognition of emotions from facial expressions. The later was assessed in different paradigms that rely primarily on isolated and decontextualized emotional faces. However, recent evidence has indicated that the perception of basic facial expressions is not context invariant and can be categorically altered by context, especially body context, at early perceptual levels. Body context has a strong effect on our perception of emotional expressions, especially when the actual target face and the contextually expected face are perceptually similar. To examine whether and how OT affects emotion recognition, we investigated the role of OT in categorizing facial expressions in incongruent body contexts. Our results show that in the combined process of deciphering emotions from facial expressions and from context, OT gives an advantage to the face. This advantage is most evident when the target face and the contextually expected face are perceptually similar.

1. Introduction

Over the past decade, the neuropeptide oxytocin (OT) has been of great interest due to findings of its essential role in the regulation of social behavior and social cognition in humans (see Meyer-Lindenberg et al., 2011; Van IJzendoorn and Bakermans-Kranenburg, 2012 for reviews). It has been suggested that OT affects social behavior by enhancing the perceptual salience and/or processing of social cues, such as subtle facial expressions (e.g. Shamay-Tsoory et al., 2009). Since one of the fundamental aspects of social behavior is the understanding of emotions, it is not surprising that OT was found to enhance the recognition of emotions from facial expressions (Domes et al., 2007; Fischer-Shofty et al., 2010;

* Corresponding author. Tel.: +972-4-8288778.
E-mail addresses: aperry@campus.haifa.ac.il, anat.perry@mail.huji.ac.il (A. Perry).

0306-4530/$ — see front matter © 2013 Elsevier Ltd. All rights reserved.
http://dx.doi.org/10.1016/j.psyneuen.2013.07.001

Marsh et al., 2010). These studies mainly investigated whether emotion recognition is improved following the administration of OT for all emotions or specifically for positive (e.g. Marsh et al., 2010) or negative ones (Fischer-Shofty et al., 2010). While some studies show that OT increases gaze to the eye region (e.g. Guastella et al., 2008) and that OT enhances the ability to infer mental states from subtle cues around the eye region (Domes et al., 2007), others showed enhanced emotion recognition following OT administration, with no difference in participants' eye gaze (Lischke et al., 2012a). Notwithstanding the importance of these studies, they were all limited by relying primarily on isolated and decontextualized emotional faces.

Recent evidence, however, has indicated that the perception of basic facial expressions is not context invariant and can be categorically altered by context, especially affective body context, at early perceptual levels (e.g. Aviezer et al., 2008, 2011). Body context is broadly defined to comprise extra-facial information that includes body language, manipulation of affective paraphernalia, and situational context. Importantly, context has a strong effect on our perception of emotional expressions, especially when the actual target face and the contextually expected face are perceptually similar (Aviezer et al., 2008). Specifically, these authors show that in a body context of anger, a typical facial expression of disgust is *barely recognized* as such, and is instead, perceived as anger. This is less so in contexts of sadness and fear, which are perceptually less similar to disgust. Notably, this effect is so strong that it occurs even when participants are explicitly told and motivated to ignore the context and focus on the facial expression alone, suggesting that facial expressions and body contexts are integrated in an unintentional and uncontrollable manner (Aviezer et al., 2011). Disgust is an ideal emotion for testing contextual malleability of expressions of basic emotions. On the one hand it is highly recognizable when perceived in isolation (Ekman and Friesen, 1976a), yet at the same time it is differentially confusable with a range of face expressions (Aviezer et al., 2008). Hence, focusing on a single well characterized expression[1] has an advantage when systematically testing the influence of context on basic facial expressions with a new experimental manipulation (OT).

If indeed OT affects the recognition of emotion, and specifically from facial expressions, intranasal administration of OT is expected to reduce the profound effect of context, resulting in more accurate categorization of facial expressions in incongruent contexts. On the other hand, if OT has a general effect on improving emotion recognition, its administration will not have an effect on reducing the context effect. To examine these contrasting hypotheses, we carried out a within-subject, double-blind OT and placebo study. We manipulated the similarity between the face from which the facial expression is to be judged and the face typically associated with the emotional context, and asked participants to categorize the facial expression.

[1] In a recent research study the aforementioned context effect was demonstrated in a fully crossed design with a host of basic expressions (Aviezer et al., 2011) so it is clear that the effect is not specific to disgust.

2. Methods

2.1. Participants

30 participants (19 male) ranging in age from 21 to 59 (mean age 38.9, SD = 10.6) participated in the experiment in exchange for payment. All participants reported normal or corrected to normal visual acuity and had no history of psychiatric or neurological disorders, as confirmed by the Hebrew version of the Mini International Neuropsychiatric Interview (MINI) as a screening interview (Sheehan et al., 1998). The Helsinki committee of Rambam Health Care Campus approved the study protocol, as well did the Israel Ministry of Health.

2.2. Design

Participants were invited to two appointments, around one week apart, on the same day of the week and time of day. All participants gave their signed informed consent before participation. During each appointment, each participant randomly received either 24 international units (250 ml) of intranasal OT (Syntocinon-Spray, Defiante, Sigma) or sterile saline as placebo treatment (PL, consisting of the same saline solution in which the hormone was dissolved but without the hormone itself). Both treatments were administered by the experimenter using a nasal spray, three puffs per nostril, with each puff containing 4 IU. Neither the experimenter nor the participant knew whether the participant was receiving OT or the placebo. Following administration, participants were asked to wait 45 min from the time of administration to ensure that the OT levels in the central nervous system would reach a plateau. At the end of these 45 min, the participants began the experiment.

2.3. Stimuli

The experimental stimuli and design were identical to those described in Aviezer et al. (2008) for experiment 1. Briefly, portraits of ten individuals presenting the basic facial expression of disgust were placed on body images of models in emotional contexts to form four levels of perceptual similarity between the facial expression of disgust and a body posture typically associated with one of the following four contexts: (a) disgust (full similarity); (b) anger (high similarity); (c) sadness (medium similarity); and (d) fear (low similarity; see Fig. 1). The body postures were taken from a set developed by Aviezer et al. (2008), and the faces were taken from Ekman and Friesen (1976b). The face-context composites were presented in random order for each participant. Ten isolated facial expressions and eight isolated emotional contexts (with blank ellipses covering the faces) served as control stimuli and were presented in a separate block. Each of the face-context composites appeared once, so that with the control stimuli the experiment comprised a total of 58 stimuli.

The stimuli were presented on a computer monitor one at a time. Participants were instructed that for each trial they should press a button indicating the category that "best describes the facial expression." They were to choose from a list of six basic emotion labels (sadness, anger, fear, disgust,