



Testosterone and attention deficits as possible mechanisms underlying impaired emotion recognition in intimate partner violence perpetrators



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ARTICLE INFO

Article history:

Received 14 November 2015
Accepted 14 January 2016
Available online 26 March 2016

Keywords:

Attention
Cortisol
Emotion recognition
Testosterone
Intimate partner violence

ABSTRACT

Several studies have reported impairments in decoding emotional facial expressions in intimate partner violence (IPV) perpetrators. However, the mechanisms that underlie these impaired skills are not well known. Given this gap in the literature, we aimed to establish whether IPV perpetrators ($n = 18$) differ in their emotion decoding process, attentional skills, and testosterone (T), cortisol (C) levels and T/C ratio in comparison with controls ($n = 20$), and also to examine the moderating role of the group and hormonal parameters in the relationship between attention skills and the emotion decoding process. Our results demonstrated that IPV perpetrators showed poorer emotion recognition and higher attention switching costs than controls. Nonetheless, they did not differ in attention to detail and hormonal parameters. Finally, the slope predicting emotion recognition from deficits in attention switching became steeper as T levels increased, especially in IPV perpetrators, although the basal C and T/C ratios were unrelated to emotion recognition and attention deficits for both groups. These findings contribute to a better understanding of the mechanisms underlying emotion recognition deficits. These factors therefore constitute the target for future interventions.

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La testosterona y los déficits de atención como posibles mecanismos que subyacen a las carencias en el reconocimiento emocional de los hombres que ejercen violencia contra la mujer en las relaciones de pareja

RESUMEN

Diversos estudios hablan de carencias en la descodificación de expresiones emocionales faciales en aquellos sujetos que cometen violencia de pareja (VP). No obstante, no se conocen bien los mecanismos subyacentes al déficit de estas capacidades. A la vista de esta laguna en investigación, hemos intentado establecer si las personas que cometen violencia de pareja ($n = 18$) se diferencian en el proceso de descodificación emocional, capacidad de atención y niveles de testosterona (T), cortisol y cociente T/C, comparados con los controles ($n = 20$), así como analizar el papel moderador del grupo y de las variables hormonales en la relación entre capacidad de atención y proceso de descodificación emocional. Nuestros resultados han demostrado que quienes perpetran violencia de pareja muestran un peor reconocimiento emocional y mayor coste en el cambio de atención que los controles. No obstante, no había diferencias en la atención a los detalles y en las variables hormonales. Por último, la pendiente que predice el reconocimiento emocional a partir de los déficits en el cambio de atención era más pronunciada a medida que aumentaban

Palabras clave:

Atención
Cortisol
Reconocimiento de emociones
Testosterona
Violencia de pareja

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los niveles de testosterona, sobre todo en los sujetos que perpetran violencia de pareja, aunque el cortisol basal y el cociente T/C no guardaban relación con el reconocimiento de emociones y déficit de atención en ambos grupos. Estos resultados contribuyen a explicar los mecanismos que subyacen a los déficits de reconocimiento de emociones. Estos factores son pues el objetivo de intervenciones futuras.

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The ability to recognize the affective content of external cues is crucial to interpersonal interactions and social competence as it allows individuals to accurately process potentially threatening stimuli, and to establish appropriate social interactions by enabling rapid decoding of the affective state of others from their facial expressions (Carton, Kessler, & Pape, 1999; Kinsbourne & Bemporad, 1984; Morrison & Bellack, 1981; Moya-Albiol, Herrero, & Bernal, 2010; Semrud-Clikeman, Guy, Griffin, & Hynd, 2000; Tannock, Martinussen, & Frijters, 2000). Hence, impairments in this ability can lead to interpersonal problems such as violence due to its importance to understanding social cues.

Several studies have reported impairments in decoding emotional facial expressions in intimate partner violence (IPV) perpetrators (Holtzworth-Munroe & Smutzler, 1996; Romero-Martínez, Lila, Catalá-Miñana, Williams, & Moya-Albiol, 2013; Romero-Martínez, Lila, Sariñana-González, González-Bono, & Moya-Albiol, 2013; Romero-Martínez & Moya-Albiol, 2013). In fact, one study reported that IPV perpetrators are less able to recognize standardized neutral and disgust facial expressions than non-violent men, although they did not differ in interpreting other facial expressions conveying, for example, sadness, anger, fear, happiness, and surprise (Babcock, Green, & Webb, 2008), suggesting that IPV perpetrators may present deficits in recognizing their wives' or partners' emotions, thus increasing the risk of violent reactions. In a similar line, another study demonstrated that IPV perpetrators with diminished sensitivity to their wives' or partners' expressions of fear presented a high risk of perpetrating IPV (Marshall & Holtzworth-Munroe, 2010). However, the mechanisms which underlie the impaired emotion recognition skills are not well known.

One possible mechanism underlying impaired emotion recognition could be attention deficits, as has been reported in several studies based on people with attention deficit/hyperactivity disorder (ADHD) (Fuermaier et al., 2014; Noordermeer et al., 2015; Williams et al., 2008). For some emotions, people with ADHD spend less time looking at relevant areas of faces and take longer to detect an emotion compared with people without ADHD (Serrano, Owens, & Hallowell, 2015). This could be partially explained by the fact that individuals with ADHD tend to show substantially larger switch costs and pay less attention to detail than those without ADHD (Cepeda, Cepeda, & Kramer, 2000). In social contexts, subjects must rapidly and accurately switch their attention focus from one side of the face to the other and pay attention to micro facial expressions. For this reason, attention deficits could affect the detection of subtle facial expressions.

ADHD in adults is one of the predictive and treatable risk factors for delinquency, including IPV (Buitelaar, Posthumus, & Buitelaar, 2015; Fang, Massetti, Ouyang, Grosse, & Mercy, 2010; Wymbs, Dawson, Suhr, Bunford, & Gidycz, 2015). Nevertheless, little is known about the role of attention deficits in the emotion decoding process of IPV perpetrators. Only one study has reported deficits in sustained and divided attention in IPV perpetrators (Cohen et al., 2003), but there is a gap in the literature analyzing other attention deficits such as switch costs and attention to detail in IPV perpetrators, and whether these attention deficits could explain their diminished emotion recognition skills.

In addition to attention biases as a possible explanation for emotion recognition deficits, hormonal parameters could modulate neural processes affecting facial emotion processing, which may interfere with social functioning (Little, 2013). Firstly, sex steroids such as testosterone (T) have been related to improvements in male detection of angry faces (Derntl et al., 2009; Stanton, Wirth, Waugh, & Schultheiss, 2009; van Honk & Schutter, 2007a; Wirth & Schultheiss, 2007), but those studies failed to find an association between T levels and faces with a neutral or positive value. However, T levels have been negatively related to the capacity to infer the thoughts and feelings of others (Ronay & Carney, 2013). Indeed, Ronay and Carney (2013) explain these associations as a mechanism to predispose and facilitate the adoption of violence in order to maintain their status. Finally, converging evidence suggests that T levels have a negative relationship with cortisol (C) levels (Terburg, Morgan, & van Honk, 2009). Hence, it seems logical that C levels will present an inverse relationship with emotion recognition. One study in fact demonstrated that people with high C levels oriented their attention away from masked angry faces (van Honk et al., 1998). Nevertheless, there is a gap in the analysis of how these hormones and the ratio between them affect emotion recognition and attention skills in IPV perpetrators.

Bearing all of the above in mind, the main aim of this paper is to confirm whether IPV perpetrators show deficits in emotion recognition and attention (high attention switch costs and less attention to detail) that differentiate them from the general population, and in addition, these variables should be positively related. These hypotheses are congruent with previous studies demonstrating that IPV perpetrators present poor emotion recognition skills (Gracia, Rodríguez, & Lila, 2015; Holtzworth-Munroe & Smutzler, 1996; Romero-Martínez, Lila, Catalá-Miñana et al., 2013; Romero-Martínez, Lila, Sariñana-González et al., 2013; Romero-Martínez & Moya-Albiol, 2013) and attention deficits in comparison with the non-violent population (Romero-Martínez & Moya-Albiol, 2013), and that the two variables are positively related (Fuermaier et al., 2014; Noordermeer et al., 2015; Williams et al., 2008), especially in IPV perpetrators. Additionally, this study investigated the potential moderating effect of group (IPV perpetrators vs. controls) and basal hormonal parameters (T, C and T/C ratio) on the potential relationship of attention deficits with emotion recognition skills. Previous studies have found that violent populations tend to present a bias toward negative faces and that T levels were positively and C negatively correlated with angry faces and unrelated to other kinds of emotional stimuli (Derntl et al., 2009; Stanton et al., 2009; van Honk & Schutter, 2007b; van Honk et al., 1998; Wirth & Schultheiss, 2007). Hence, we hypothesized that high basal T and low basal C levels improve general emotion recognition, and that these associations are significant only in IPV perpetrators.

Method

Participants

The final sample was composed of 38 healthy male volunteers (18 IPV perpetrators and 20 controls). The IPV perpetrators were recruited from participants in the CONTEXTO psycho-educational

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