



# The role of oxytocin in interpersonal communication of people with borderline personality disorder

Rola oksytocyny w komunikacji interpersonalnej osób z borderline<sup>1</sup>

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**Abstract:** The paper outlines the role of oxytocin in regulating interpersonal communication of patients with borderline personality disorder (BPD)<sup>2</sup>. According to the neuropeptide model of borderline disorder, changes in the regulation of the oxytocin secretion system are indicated as a potential mechanism of interpersonal deficits, which are the core of that disorder. Numerous studies have confirmed the reduced level of oxytocin in this group of people. In view of that finding, in the last dozen or so years, there have been attempts at intranasal administration of oxytocin as a potential pharmacotherapy strategy dedicated to reducing the symptoms of BPD in the interpersonal area. However, the conclusions of the research in this field are not definitive to date.

**Keywords:** oxytocin, borderline, neuropeptide model, interpersonal disorders

**Abstrakt:** W niniejszym artykule opisano rolę oksytocyny w regulowaniu komunikacji interpersonalnej osób z borderline. Zgodnie z neuropeptydowym modelem zaburzenia osobowości borderline wskazuje się, iż zmiany w regulacji systemu wydzielania oksytocyny stanowią potencjalny mechanizm deficytów interpersonalnych, będących rdzeniem owego zaburzenia. Liczne badania potwierdzają, iż poziom oksytocyny w tej grupie osób jest obniżony. W związku z tym w przeciągu ostatnich kilkunastu lat pojawiły się próby donosowego podawania oksytocyny jako potencjalnej strategii farmakoterapii dedykowanej redukcji objawów zaburzenia osobowości z ograniczania w obszarze interpersonalnym. Wnioski płynące z dotychczasowych badań w tym obszarze nie są jednak w pełni konkluzywne.

**Słowa kluczowe:** oksytocyna, borderline, model neuropeptydowy, zaburzenia interpersonalne

## Introduction

Oxytocin is a neurohormone produced by the hypothalamus, which is collected and released from the posterior pituitary gland. For many years, oxytocin was seen primarily as a regulator of reproductive, perinatal and maternal behavior, whereas this neuropeptide is an

extremely important mediator of regulating the level of anxiety and aggressive behavior, social cognition processes, as well as establishing and maintaining interpersonal relationships (Striepens et al., 2011; Schneiderman et al., 2014; Bosch et al., 2016; Rutig-

1 Artykuł w języku polskim: <https://www.stowarzyszeniefidesetratio.pl/fer/2023-2Sipo.pdf>

2 The term "borderline personality disorder" is consistent with the DSM 5 nomenclature. An analogous nosological entity in ICD-10 is emotionally unstable personality disorder with impulsive and borderline subtypes. In this paper, the term "borderline" is used to refer to both types of emotionally unstable personality.

liano et al., 2016; Marsh et al., 2021). The importance of oxytocin in the etiopathology of mental disorders is increasingly emphasized nowadays (Turan et al., 2013; Reiner et al., 2015; Afinogenova et al., 2016; Reijnen, Geuze and Vermetten, 2017), also including BPD (Stanley, Siever, 2010; Jobst et al., 2016).

The neuropeptide model of borderline personality disorder (Stanley and Siever, 2010) indicates that changes in the regulation of, among others, the oxytocin secretion system are a potential mechanism of interpersonal dysregulation, which is the core of BPD. The growing interest in the role of oxytocin in regulating processes related to interpersonal communication is an expression of the neurobiological approach to borderline personality, which is related to the ongoing discussion on the possibility of enriching the dedicated psychotherapeutic measures with intranasal administration of oxytocin (Ripoll, 2013; Vancova, 2021).

It is currently indicated that pharmacotherapy does not bring satisfactory results in the case of reduction of axial borderline symptoms in the dimension of interpersonal disorders such as a feeling of emptiness, disintegration of identity or fear of abandonment (Stoffers et al., 2010). On the other hand, the conclusions of the research on the use of oxytocin in the treatment of autism and schizophrenia seem promising (MacDonald, Feifel, 2012; Davis et al., 2014; Domes et al., 2014; Scheele et al., 2014). It turns out that this neuropeptide reduces some of the symptoms of both disorders by improving the processes of social cognition.

## 1. Disorganized pattern of interpersonal functioning in borderline personality disorder

Borderline personality disorder is one of the most widespread mental disorders today. It is estimated to be diagnosed among up to 22% of adults receiving psychiatric treatment (Ellison et al., 2018; Doering, 2019). Research indicates that BPD is associated with significantly reduced quality of life (Botter et al., 2021), frequent co-occurrence, among others, of affective diseases, anxiety disorders and addictions, as well as increased suicidal risk (Tomko et al., 2014; Shah, Zanarini, 2018), and the therapeutic process is fraught with many difficulties (Paris, 2010).

In the International Statistical Classification of Diseases and Related Health Problems (ICD-10), borderline personality disorder has been classified as an emotionally unstable personality disorder (F60.3) with two subtypes: impulsive (F60.30) and borderline (F60.31), which are diagnosed depending on the severity of symptoms and their impact on functioning.

In the latest revision of ICD-11, the typology of personality disorders was abandoned in favor of a differential diagnosis. The new classification is therefore based not on the recognition of the type but on the severity of personality disorders (6D10) through three levels: mild (6D10.0), moderate (6D10.1) and severe (6D10.2), for which significant personality traits or patterns are additionally determined, among which the borderline pattern has been specified.

Table 1. The diagnostic criteria of emotionally unstable personality (F60.3), impulsive subtype (F60.30) and borderline subtype (F60.31) according to ICD-10.

Impulsive subtype	Borderline subtype
<ol style="list-style-type: none"> <li>1. A noticeable tendency to act unexpectedly without considering the consequences.</li> <li>2. A noticeable tendency to quarrelsome behavior and conflicts with others, especially when impulsive behavior is thwarted or criticized.</li> <li>3. Tendency to outbursts of anger and violence, with an inability to control explosive reactions.</li> <li>4. Difficulty in maintaining any course of action that does not bring immediate reward.</li> <li>5. Unstable and capricious mood.</li> </ol>	<p><i>(the presence of at least three symptoms of the impulsive subtype)</i></p> <ol style="list-style-type: none"> <li>1. Distorted and uncertain image of oneself, goals and internal preferences (including sexual ones).</li> <li>2. Tendency to engage in intense and unstable relationships, often leading to an emotional crisis.</li> <li>3. Excessive efforts to avoid abandonment.</li> <li>4. Repeated threats or acts of self-harming.</li> <li>5. Chronic feeling of emptiness.</li> </ol>

Borderline personality disorder is assumed to be the dominant pattern of behavior characterized by three dimensions of symptoms: (1) behavioral dysregulation (including impulsivity, auto-aggressive behavior and suicidal tendencies, substance abuse, recklessness, inadequate expression of anger), (2) affective dysregulation (including emotional lability, strong negative emotional reactions, dysphoria) and (3) abnormalities in interpersonal relationships (including instability of relationships, fear of real or anticipated abandonment/rejection, feeling of inner emptiness, diffusion of identity (Zanarini et al., 2007; Stanley, Siever, 2010; Gunderson, Links, 2014; Amad et al., 2015)).

Specifically, the symptoms associated with the last of the discussed dimensions are both inter- and intrapersonal (Siever, Weinstein, 2009). In the intrapersonal area, characteristic abnormalities regarding social cognition can be observed, among others, disturbed ability to mentalize (reading one's own and other people's mental states), selective concentration of attention on negative social stimuli, constant anticipation of rejection, oscillating between extreme idealization and devaluation of other people (Fonagy, Bateman, 2007; Lazarus et al., 2014; Berenson et al., 2018). On the other hand, in the interpersonal space, there will be directly observed effects of intrapersonal difficulties such as excessive dependence and instability of relationships (Gunderson and Links, 2014).

The optics of the disorganized pattern of interpersonal functioning is the foundation of one of the conceptualizing models of BPD. Many researchers emphasize that interpersonal dysfunction is a specific starting point for the broadly understood symptomatology of borderline (Fonagy, Bateman, 2007; Gunderson, Lyons-Ruth, 2008; Hopwood et al., 2014). Other symptoms such as emotional dysregulation or impulsivity are considered to be secondary (Stanley and Siever, 2010; Brüne, 2016), while also pointing to the potential nature of, for example, auto-aggressive (and even suicidal) behaviors as dysfunctional strategies for communicating or building closeness (Stanley, Siever, 2010; Gunderson, Links, 2014).

In accordance with psychodynamic literature, it is assumed that the pattern of interpersonal dysfunctions characteristic of borderline is a kind of

emanation of the earliest relationship between the child and the caregiver, which are consolidated, creating a psychological structure unique to each person, referred to as the attachment system. This system is formed on the basis of early childhood experiences and is generalized throughout life to all relationships with other people, creating a kind of patterns of experiencing oneself and other people in the context of mutual relationship. The basic elements of this system are internal operating systems consisting of mental representations about oneself, the person who is the figure of attachment and the relationships between them, which to a large extent explains the interdependence of the intra- and interpersonal area of irregularities characteristic of borderline personality disorder (Fonagy et al., 2013; Marszał, 2015).

As indicated by research results, up to 90% of borderline people exhibit an avoidant, anxious-ambivalent, or disorganized attachment style (Shorey and Snyder, 2006; Fonagy et al., 2011; Jobst et al., 2016). The unsatisfying, unstable and even traumatic nature of the child's and caregiver's early relationship results in the formation of a non-secure attachment style, which in turn leads to the development of interpersonal strategies typical of borderline people, which are a kind of conglomerate of the need for closeness and to be noticed and the fear of loneliness while moving away under the influence of fear of intimacy (Jobst et al., 2016).

## **2. The role of oxytocin in the interpersonal regulation of borderline persons**

Oxytocin, as a neuropeptide consisting of 9 amino acids, is a neurohormone produced by the hypothalamus and collected and released from the posterior pituitary gland (Lee et al., 2009; Kumsta, Heinrichs, 2013). For many years, oxytocin was primarily seen as a regulator of reproductive, perinatal and maternal behaviors. However, this neuropeptide has also turned out to play a key role in the regulation of prosocial behavior (Schneiderman et al., 2014; Bosch et al., 2016; Rutigliano et al., 2016).

Oxytocin is crucial for affiliate behavior related not only to the formation and maintenance of attachment between parent and child, but also between romantic relationship partners. In addition, it is involved in the processes of social cognition and mentalization; regulation of the level of anxiety and stress; regulation of aggressive behavior, and even the process of forming memories (especially social and spatial memory) and developing attachment to specific places (Ross and Young, 2009; Schneiderman et al., 2014; Rutigliano et al., 2016; Keech et al., 2018).

The presence of oxytocin receptors is noted primarily in the areas of the brain which are involved in interpersonal behavior: the amygdala and hippocampus, the nucleus accumbens and the dorsal nucleus of the vagus nerve (Meyer-Lindenberg et al., 2011). At the neurobiological level, oxytocin regulates the reactivity of the amygdala to attenuate the action of stress hormones and modulate brain activity at the level of neural networks associated with social cognition (Heinrichs et al., 2003; Evans et al., 2010; Labuschagne et al., 2010; Lancaster et al., 2015).

Currently, it is indicated that dysregulation of the oxytocin system may be the main neurobiological mechanism of borderline personality disorder, explaining abnormalities in the interpersonal area. The assumptions of the neuropeptide model (Stanley and Siever, 2010) are a kind of neurobiological extension of psychodynamic concepts, which see the sources of borderline symptoms in experiences related to the early relationship between the child and the caregiver (Fonagy et al., 2013).

Both the level of oxytocin release and the concentration of oxytocin receptors are determined genetically. Presumably, however, epigenetic processes are crucial here. Negative early childhood experiences in the context of shaping the attachment style may affect the development of the neuropeptide system, as well as cause methylation of the OXTR gene encoding a protein acting as an oxytocin receptor, and thus affect the expression of this gene (Brüne, 2016; Ellis et al., 2021; Herpertz, Bertsch, 2015; Kumsta, Heinrichs, 2013; Reiner et al., 2015; Stanley, Siever, 2010).

Previous studies have demonstrated reduced oxytocin levels among people diagnosed with borderline personality disorder (Seltzer et al., 2014; Jobst et al.,

2016; Ebert et al., 2018; Carrasco et al., 2020; Kartal et al., 2022), with borderline people characterized by a disorganized attachment style exhibiting significantly lower levels of oxytocin than patients with the same diagnosis and secure attachment style (Jobst et al., 2016). Oxytocin levels in this population correlate negatively with the experience of early childhood trauma (in particular, emotional abuse and neglect) (Seltzer et al., 2014) and the severity of borderline symptoms (Bertsch et al., 2013).

A study conducted in the general population indicates that in people characterized by an anxious attachment style oxytocin levels do not have to be lowered, and may even be higher (Weisman et al., 2013), while the association of OXTR gene polymorphism with the attachment style remains insignificant (Roisman et al., 2013). It seems, therefore, that the neuropeptide model of the etiopathogenesis of borderline personality disorder may require further empirical verifications, and although the results of numerous studies indicate that the chosen direction of exploration is right, it may require some kind of expansion. A wider range of factors determining the deregulation of oxytocin, going beyond the framework of attachment style, should probably be considered.

In view of the modern tendency to perceive oxytocin as a neuropeptide of prosocial nature, the results of research on the intranasal administration of oxytocin in the general population may be confusing. Although numerous studies show that exogenous oxytocin stimulates the processes of empathy, mentalization, cooperation, trust and the experience of social reward (Kosfeld et al., 2005; Domes et al., 2007; De Dreu et al., 2010; Bakermans-Kranenburg, van IJzendoorn, 2013; Groppe et al., 2013), it also has the potential to reinforce the feelings of jealousy and envy and a readiness to defensive behaviors (Shamay-Tsoory et al., 2009; Striepens et al., 2012). It should therefore be emphasized that the role of oxytocin in shaping social behaviors is certainly complex and ambiguous.

Due to the attractiveness of the use of oxytocin as a potential pharmacotherapy strategy for BPD, a number of studies exploring the effect of intranasal neuropeptide on individual interpersonal difficulties characteristic of this disorder have been conducted. To the knowledge of

the authors of this paper, the research presented below fully reflects the state of the art in the exploration of this area. Due to the relatively small number of empirical studies, and at the same time the inconclusiveness of their findings, it seems reasonable to emphasize the need for further research in this area.

The use of intranasal oxytocin to treat borderline personality disorder was first attempted by Simeon et al. in 2011. The study demonstrated that exogenous oxytocin significantly reduced the dysphoric response to stress after the first administration, which would indicate a beneficial effect of oxytocin on the regulation of emotions in the group of borderline people. It also turned out that the difference between the response to oxytocin and placebo is conditioned by the experience of early childhood trauma.

A study conducted using eye-tracking and fMRI showed that intranasal administration of oxytocin to borderline individuals reduced the selective focus of attention on negative social stimuli. The reduction of speed and number of eye movements in response to observing a face expressing anger seems particularly important. In parallel, a decrease in the activity of the amygdala, i.e. the area hypersensitive to emotional stimulation, was also noted in this group (Bertsch et al., 2013).

Brüne et al. (2013) demonstrated that the administration of oxytocin to borderline subjects significantly reduces the avoidance response when exposed to facial expressions of anger, with the strength of this type of behavioral response correlated with the severity of early childhood trauma. Presumably, this effect is achieved by reducing the stress response as a result of the administration of oxytocin. A way to cope with the stress associated with interpersonal communication typical of people with BPD is to actively direct attention beyond the social stimulus perceived as threatening (e.g. avoidance reaction in response to the emotion of anger perceived when observing the face of the interlocutor). The administration of oxytocin therefore eliminates the emotional context in which these maladaptive social stress-coping strategies appear.

In turn, neuroeconomic studies have revealed a reduction in the level of trust and cooperation among borderline individuals with avoidant/ambivalent attachment style after intranasal administration

of oxytocin (Bartz et al., 2011), and, additionally, a negative correlation of the level of trust and emotional neglect during childhood (Ebert et al., 2013).

A study on the importance of exogenous oxytocin in the regulation of non-verbal communication of borderline persons has demonstrated that the administration of this neuropeptide does not increase the number of affiliative (prosocial) behaviors (Brüne et al., 2015a). Ramseyer et al. (2020) report that intranasal administration of oxytocin in this group of people may cause a decrease in the level of non-verbal synchrony, which is a mutual coordination of behavior between interaction partners.

## **Conclusion**

This paper is an attempt to outline the results of all previous explorations concerning the role of oxytocin in non-verbal communication of borderline individuals, but it is not a systematic review, or a meta-analysis.

The conclusions of the research carried out so far do not seem to be conclusive. They do not clearly answer the question of the legitimacy of using nasal oxytocin in the treatment of borderline patients (Eckstein and Hurlemann, 2013; Brüne et al., 2015b; Vancova, 2021). A neuropeptide model of borderline personality disorder (Stanley and Siever, 2010) linking interpersonal dysfunction to deregulation of the oxytocin system seems to be extremely attractive due to its practical implications. The existing strategies of borderline pharmacotherapy remain insufficient in the case of symptoms associated, among others, with the fear of abandonment, the sense of inner emptiness or disturbed identity (Stoffers et al., 2010).

It would seem, therefore, that the administration of oxytocin may be an excellent psychopharmacological intervention aimed at reducing interpersonal relationship disorders. Although studies conducted in the general population, with few exceptions, indicate an increase in prosocial behavior after intranasal administration of oxytocin, the effect of this neuropeptide in the group of borderline people remains much more complex and requires in-depth research, while the direction of exploration determined by the neuropeptide model seems to be extremely promising.

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