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Empathy Differences: A New Description of Autism and Borderline Personality Disorder

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Borderline Personality Disorder is a personality disorder characterised by impulsivity, as well as instability in interpersonal relationships, self-image, and affect. Although not explicitly mentioned in the diagnostic criteria, empathy seems to play a role in the symptomatology of the disorder. The "borderline empathy paradox" (Dinsdale & Crespi, 2013) is one description of empathy in individuals with borderline personality disorder and is the idea that these individuals are extremely sensitive to other people's mental and emotional states but are not able to use this to form stable concepts of self and other. Furthermore, this enhanced sensitivity could cause misinterpretations of social cues which lead to emotional instability and interpersonal distress, two of the main challenges faced by those with the disorder. Research on empathy in borderline personality has found variable results and the present article reviews these findings, specifically in the context of differences in and dissociations between affective and cognitive empathy. This article will also review this alongside the findings around empathy in autism spectrum disorders, which is a disorder that has been described as having deficits in empathy at its core, and research on the overlaps in the two conditions. Finally, this paper proposes a new diagnostic criteria that centres empathy to account for the importance of empathy in both conditions. The limitations of the findings are considered, as well as possible explanations for the variability in findings, such as the use of self-report measures, differences in what tasks are measuring, and heterogeneity of the samples. In addition, the clinical implications for the findings are considered and other future directions for research are suggested.

INTRODUCTION

The categorisation of personality disorder is undergoing significant changes, with the new *International Classification of Diseases* (ICD-11) removing discrete personality disorder categories in favour of a singular dimensional category (World Health Organisation, 2019). The *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5; American Psychiatric Association [APA], 2013) describes personality disorders as 'an enduring pattern of inner experience and [behaviour] that deviates markedly from the expectations of the individual's culture, is pervasive and inflexible' (p. 645), beginning in adolescence or early adulthood and leading to 'distress or impairment' (ibid.). Borderline personality disorder (BPD) is one type of personality disorder in the DSM-5, and its key features are unstable 'interpersonal relationships, self-image, affects, and marked impulsivity' (ibid., p. 663).

The diagnostic label of "borderline personality disorder" has been shown to impact the judgements made by clinicians—they have been seen to overlook positive signs when they believe someone has BPD and have more negative attitudes towards them (Lam et al., 2016; McKenzie et al., 2022). Remedies attempting to reduce stigma attached to the term "personality disorder" include renaming it "adaptation disorder", which may indeed better reflect the nature of the disorders (Bendelow, 2010; Svrakic et al., 2009). Aside from stigma, BPD may not meet an important criterion for being a personality disorder: namely, persistence. A 10-year follow up in BPD patients showed remission rates reaching more than 85% in several symptoms (Zanarini et al., 2007).

One feature of BPD that has been described is the "borderline empathy paradox": an 'uncanny sensitivity' (Dinsdale & Crespi, 2013, p. 172) to other people's mental states even though they cannot use this to form stable concepts of self and other. This increased sensitivity has been described as a response to parenting that was neglectful or inconsistent, and when combined with a lack of trust in "conscious behaviour", it is said to lead to impairments in interpersonal functioning (Dinsdale & Crespi, 2013). Empathy—the response and understanding to others' mental and emotional states—is also a concept that has consistently been related to autism spectrum conditions.

Autism spectrum conditions (ASC), which includes autism spectrum disorder (ASD) in the DSM-5, is a neurodevelopmental disorder. ASC is characterised by deficits in social communication and interaction including deficits in reciprocity and maintaining relationships (APA, 2013). In addition, it is characterised by restricted or repeated behaviours, interests, or activities; inflexibility regarding routines; and intense fixated interests (ibid.). "Asperger's disorder" (or Asperger syndrome) and "autism disorder" were terms in the DSM-IV (APA, 2000) but not the DSM-5; however, they can still be found in literature (for example, see Rueda et al., 2015).

Overlaps have been seen in ASC and BPD (Dudas et al., 2017) and, given the central nature of empathy in ASC and the potential role of empathy in BPD, these may be related disorders. BPD has been described as a potential differential diagnosis to ASC and that it could be a misdiagnosis in women who actually have ASC (Lai & Baron-Cohen, 2015). BPD

has been described as more prevalent in females (Sansone & Sansone, 2011), whereas ASC is diagnosed in more males than females (Lai & Szatmari, 2020). While this may reflect innate sex differences, which the extreme male brain theory of autism proposes (Baron-Cohen, 2002), gender stereotypes may also play a role in this. It has been proposed that in adult women, traits like independence and assertiveness, which may be encouraged in men, may increase the likelihood of being diagnosed with BPD (Nehls, 1998). Furthermore, it has been described that more autistic traits in females are needed for autism diagnosis and that gender stereotypes in society may place limitations on accurate recognition of autism in females (Lai & Szatmari, 2020).

Given the stigma associated with a diagnosis of BPD, as well as the overlaps with ASC, an investigation into the role of empathy in BPD could lead to a new diagnostic description of BPD. This review aims to reflect on the previous literature around empathy in BPD and its overlap with autism, and to consider whether BPD could be conceptualised as part of a new category of disorder.

THE DEFINITION OF EMPATHY

Kalisch described empathy as 'borrowing the feelings of another in order to really understand them, but never losing your own identity' (1973, p. 1548) and generally to perceive someone else's feelings and their meanings. Empathy is often still described in this manner, but the definition of empathy is more complex and can be split into cognitive and affective aspects.

Affective empathy

Affective empathy is the way in which an individual has an emotional response to the affective state of someone else (Perry & Shamay-Tsoory, 2013). Affective empathy, or "emotional empathy", may involve several underlying processes such as emotion recognition, emotional contagion (sharing an emotion with someone without realising the other person's emotion was the trigger; Frith & Singer, 2008), and shared pain (Perry & Shamay-Tsoory, 2013).

Cognitive empathy

Cognitive empathy refers to being able to understand another person's mental state and is often used synonymously with "theory of mind" (ToM), "mindreading", and sometimes "social cognition" (Baron-Cohen & Wheelwright, 2004; Dziobek et al., 2006; Smith, 2006). These terms could be distinguished from cognitive empathy by their definitions explicitly including metacognitive processes. Frith and Frith (2005) describe ToM as enabling one to recognise when their mental state differs from the person being observed, implying recognition of one's own mental state. However, to recognise another's mental state, one would have to notice how it is different to their own—meaning that cognitive empathy also includes the understanding of one's own mental state, thus making differentiating between the terms "cognitive empathy", "mindreading", and "theory of mind" redundant. A related concept to cognitive empathy is mentalising: "seeing ourselves from the outside and others from the inside" (Bateman & Fonagy, 2006, p. 4). More generally, it is described as 'perceiving and interpreting behaviour as explained by intentional mental states' (ibid., p. 3) in terms of thoughts, feeling, wishes, and desires. Most importantly, mentalising includes the ability to recognise one's own and other's behaviour as organised and influenced by mental states and helps develop a sense of self.

THE IMPORTANCE OF EMPATHY IN BORDERLINE PERSONALITY DISORDER

Empathy, and the related concept of mentalising, may play a major role in the development of and the symptomatology seen in BPD, where differences in mentalising have been described as a core element (Fonagy & Bateman, 2007). The aforementioned "borderline empathy paradox" proposes that despite the inability to integrate the mental content and states of others into stable concepts of themselves and others and impaired interpersonal functioning, people with BPD actually have enhanced affective, empathic abilities (Dinsdale & Crespi, 2013). However, this over-awareness of others' emotional states may result in the over-interpretation of others' social cues and, where a negative interpretation is formed, this leads to emotional stability and interpersonal distress (Salgado et al., 2020).

Conversely, it has been proposed that many of the difficulties individuals with BPD face are due to impairments in mentalising and cognitive empathy (Fonagy, 1991). One theory is that those with the condition are innately vulnerable or have been exposed to psychological trauma, and that this interferes with the development of mentalisation which may be mediated by neglect in early relationships (Bateman & Fonagy, 2010). The theory also suggests that this leads to an impaired ability to cognitively represent affect which could have an impact on affective empathy in those with BPD as well as emotion regulation (ibid.).

Despite the theories on the role of empathy in BPD, studies of empathy in borderline personality have seen inconsistent results with some showing increased empathic abilities (for example, Fertuck et al., 2019) and others showing differing results (for example, Baez et al., 2015). Several studies have shown increased cognitive empathic abilities such as those by Fertuck and colleagues (2009) and Frick and colleagues (2012). These studies found that patients with BPD performed better than healthy controls in the Reading the Mind in the Eyes Task (RMET)—a task that involves discerning mental states from a picture of someone's eyes—indicating that they may have enhanced cognitive empathy skills.

However, other studies using the RMET have seen differing results with many concluding there are no differences between healthy controls and individuals with BPD. These include studies conducted by Baez and colleagues (2015) and Preißler and colleagues (2010) which both utilised other measures of cognitive empathy in addition to the RMET and, using these other measures, found that patients with BPD had poorer cognitive empathy skills. The Baez and colleagues (2015) study additionally used the faux pas test (Baron-Cohen et al., 1999) and The Awareness of Social Inference Test (TASIT; McDonald et al., 2003). Here, it was concluded that individuals with BPD may have a cognitive empathy deficit, but also that the faux pas test and TASIT were more sensitive to assessing this than the RMET. Furthermore, the difference in results between studies using the RMET and those using other measures could be due to the ecological validity of the measures. The RMET has been described as not having any personal relevance (Fertuck et al., 2009) as well as being visual and static, making it unlikely to be representative of real situations where cognitive empathy is required. Alternatively, upon inspection, the RMET may not be measuring ToM but instead measuring emotion recognition.

It has been theorised that ToM—which can be regarded as the same as cognitive empathy—also has affective and cognitive aspects. Affective ToM involves understanding someone else's emotional state, whereas cognitive ToM is understanding someone else's beliefs and intentions (Shamay-Tsoory et al., 2007). Thinking about ToM as composed of two components could also explain the differences in results across measures. As it involves inferring an emotional state, the RMET would be a measure of affective ToM, whereas TASIT involves aspects of both cognitive and affective ToM. This could mean that affective ToM in BPD remains mostly intact, but cognitive ToM is impaired.

A dissociation between affective and cognitive ToM in BPD was the conclusion of a study of adult inpatients with BPD alongside healthy controls (Zabihzadeh et al., 2017). This study used the RMET and the faux pas task which were respectively described as measures of affective and cognitive ToM. It found that affective ToM in those with BPD was better than that of the healthy controls, but cognitive ToM was impaired, and a similar pattern was seen in a study by Petersen and colleagues (2016).

Cognitive empathy as a whole and affective empathy have also been shown to dissociate. Harari and colleagues (2010) described this in their study using the Interpersonal Reactivity Index (IRI; Davis, 1983) and the faux pas test in individuals with BPD and healthy controls. Here, impaired performance in the cognitive empathy-related subscales of the IRI, the Perspective Taking (PT), and Fantasy subscales, was seen in the individuals with BPD. However, they did not show impaired performance in the affective empathy-related subscales, the Empathetic Concern (EC), and Personal Distress (PD). A similar pattern was seen in a study conducted by New and colleagues (2012) in which individuals with BPD and individuals with avoidant personality disorder were compared to

healthy controls on their performance on the IRI, as well as the Toronto Alexithymia Scale (TAS; Bagby et al., 1994). Alexithymia is the inability to recognise one's own emotions or describe them and, as well as showing significantly more alexithymia than the healthy controls, those with BPD rated lower on the IRI-PT and higher on the IRI-PD indicating that there could be a dissociation between affective and cognitive empathy.

However, this separation between cognitive and affective empathy has not been seen in all studies using the IRI. Dziobek and colleagues (2011) found no significant differences in cognitive and affective empathy in individuals with BPD compared to control subjects when using this measure. They also used the Multifaceted Empathy Test (MET; Dziobek et al., 2008)—a test designed as a more naturalistic measure of cognitive and affective empathy—to test cognitive and affective empathy in individuals with BPD and found decreased performance in both. Despite this, another study using the MET saw no impairments in cognitive or affective empathy in non-stressful situations in individuals with BPD (Wingenfeld et al., 2018). However, in stressful situations, lower emotional empathy scores were seen which aligns with Bateman and Fonagy's (2010) description that stressful situations make it harder for individuals with BPD to reflect on or understand situations. Using a different self-report measure, Grzegorzewski and colleagues (2019) saw decreased cognitive empathy skills in comparison to healthy controls and intact affective empathy skills. However, self-report measures require introspection which would likely be impaired if there was an empathy deficit.

Although findings on empathy in BPD can vary, overall it appears that BPD is associated with at least intact affective empathy. Additionally, it appears that individuals with BPD show impaired cognitive empathy overall which is potentially the combination of intact affective ToM and impaired cognitive ToM.

OVERLAPS IN BPD AND AUTISM SPECTRUM CONDITIONS (ASC)

Some studies have indicated that the prevalence of ASC in BPD may be higher than the prevalence of ASC in the general population. Nanchen and colleagues (2016) found that almost half the individuals with BPD in their study met the cut-off for ASC on the Autism Spectrum Quotient (AQ; Baron-Cohen et al., 2001)—a measure of autistic traits. Although this study's estimate is quite high, other studies, such as that by Rydén and colleagues (2008), have still indicated an elevated prevalence of ASC in individuals with BPD compared to the estimated prevalence of 1.1% in UK adults (National Institute for Health and Care Excellence [NICE], 2020).

Relatively few studies have directly compared symptomology and traits in individuals with ASC and individuals with BPD. Dudas and colleagues (2017) compared responses on the AQ, as well as the Systemising Quotient (SQ-R; see Baron-Cohen et al., 2003; Wheelwright et al., 2006) and the Empathy Quotient (EQ; see Baron-Cohen & Wheelwright, 2004) which looked at systemising ability and general empathising ability respectively, and in individuals with ASC, BPD, both ASC and BPD (ASC+BPD), and controls. The control group scored lowest on the AQ whilst scores in the ASC group, the BPD group, and the ASC+BPD group were significantly higher. Additionally, there was no significant difference between the scores in the ASC group and in the BPD group. Furthermore, the group with both ASC and BPD scored significantly higher than the group with just ASC. While the BPD group did not differ significantly from the control group on EQ scores, they scored significantly higher on the SQ-R. In addition, the scores on the SQ-R in the BPD group were comparable with the scores in the ASC group. Overall, it was concluded that BPD patients have elevated autistic traits. However, it is worth noting that the generalisability of this study is limited due to its small sample size.

Dell'Osso and colleagues (2018) have also looked at the occurrence of autistic traits in individuals with BPD, using the AQ and the Adult Autism Subthreshold Spectrum (AdAS; Dell'Osso et al., 2017). A significantly higher score on the AQ and the AdAS was seen in the individuals with BPD compared to healthy controls. In addition, the AdAS Spectrum domains of 'adherence to routine and inflexibility' (Dell'Osso et al., 2018, p. 9) and 'restricted interests and rumination' (ibid.) were found to be significant predictors of a diagnosis of BPD. Additionally, Mentalisation-Based Treatment—a treatment for BPD (see Bateman & Fonagy, 2016)—has also been seen to improve the mentalising abilities in patients with ASC (Krämer et al., 2021). In tandem, these studies indicate there may be a relationship between BPD and ASC.

COGNITIVE AND AFFECTIVE EMPATHY IN AUTISM SPECTRUM CONDITIONS

Several theories on ASC focus on empathic impairments, most notably the mindblindness theory (Baron-Cohen, 1997), the empathising-systemising theory (and the idea of the "extreme male brain"; see Baron-Cohen, 2009, p. 75). Compared to BPD, empathy deficits in ASC have been extensively studied and many of the measures used in studies of empathy, such as the faux pas task and the RMET, were developed to study autism.

Despite deficits in cognitive empathy, usually described as a ToM deficit, being frequently described in ASC (see Baron-Cohen, 2009), there is much less research on affective empathy in the condition. In the research that does currently exist, some trends do appear, although with some variability.

Rogers and colleagues (2007) found that the individuals with ASC scored significantly lower on the IRI-PT and IRI-FS, the subscales proposedly testing cognitive empathy, and reduced performance on the strange stories task (Happé, 1994), a task providing another measure of cognitive empathy. However, they found no significant difference to controls on the IRI-EC and increased scored on the IRI-PD. Therefore, while cognitive empathy is impaired in those with ASC, affective empathy, as measured by the IRI-EC and IRI-PD, could be intact or enhanced. However, as the IRI-PD measures anxiety and discomfort in tense social settings, this increase in personal distress could instead be a result of individuals with ASC finding social situations stressful, rather than reflecting increased affective empathy. Some other studies using the IRI have also suggested deficits in cognitive empathy and intact affective empathy (Dziobek et al., 2008; Rueda et al., 2015). Mathersul and colleagues (2013) found that individuals with "high-functioning" ASC had lower scores on both the IRI-EC and IRI-PT which could be an indication that both affective empathy and cognitive empathy were impaired. However, its exclusion of the IRI-FS and IRI-PD makes it harder to directly compare it to Rogers and colleagues' (2007) study.

A study conducted by Vilas and colleagues (2021) in adolescents with ASC and typically developing adolescents looked at empathic accuracy—successfully inferring others' thoughts and feelings—and affective empathy. Using an adapted version of the Empathic Accuracy Task (EAT; Zaki et al., 2008, 2009), the study found that individuals with ASC did not differ on empathic accuracy, a behavioural measure of cognitive empathy. The study also used the Questionnaire of Cognitive and Affective Empathy (QCAE; Reniers et al., 2011): a self-report measure designed to assess cognitive and affective empathy. The cognitive empathy measure is made up of perspective taking and online simulation subscales, where online simulation is the capacity to put oneself in someone else's position by imagining what they are feeling. The results of this questionnaire found that individuals with ASC had intact affective empathy but impaired cognitive empathy. However, this was only seen in the perspective taking measure and not the online simulation measure. Although the online simulation and perspective taking were both seen as measures of cognitive empathy, the online simulation subscale had a greater focus on emotion. This result could also be showing a dissociation between cognitive ToM and affective ToM, with them respectively being impaired and intact. This would be like that seen in individuals with BPD. However, autistic individuals tend to perform lower on the RMET (see Baron-Cohen, 2009) and if this task is considered as a measure of affective ToM, then it would still appear that autistic individuals have impaired affective ToM.

Santiesteban and colleagues (2021) used an extension of the EAT called the Continuous Affective Rating and Empathic Response (CARER) task to study individuals with ASC and those without. The study also used self-report measures of empathy and alexithymia, specifically the IRI and the TAS. It was concluded that ASC was associated with difficulties in retrospectively inferring an affective state and that, therefore,

autistic people may not show an affective empathy deficit. In addition, the individuals with ASC scored significantly higher on alexithymia than the control group which has also been seen in other studies, like that of Mul and colleagues (2018).

Alexithymia could play a role in self-report rating of affective empathy. Trimmer and colleagues (2017) looked at physiological and psychological responses to emotionally distressing videos in individuals with ASC and controls. The participants' skin conductance, heart rate, and facial muscle activity were measured whilst a video stimuli played, consisting of emotional and neutral clips. Following each clip, the participants undertook a visual self-assessment rating of mood and arousal. In addition, the participants also completed the IRI-PT, the IRI-EC, and the EQ. Individuals with ASC rated significantly lower on the IRI-PT and IRI-EC and rated significantly lower on the EQ indicating both impaired cognitive and affective empathy. On the self-ratings of mood and arousal, the ASC group had reduced mood responses to the emotional and neutral clips. However, the perceived arousal rating to the emotional clips did not differ from controls. Furthermore, there were no significant differences between the physiological arousal responses between the individuals with ASC and the control group. This may indicate that individuals with ASC find it difficult to identify the content or valence of the stimulus which could be explained by alexithymia; an argument posited by Bird and Cook (2013) in their "alexithymia hypothesis".

Overall, while individuals with ASC do show impaired cognitive empathy, their affective empathy skills may be intact. Where these individuals do show impairments in affective empathy, this could be better explained by alexithymia.

DISCUSSION

Summary

While studies of empathy in BPD have shown variable results, research suggests that individuals with BPD have a deficit in empathy but that this is only related to cognitive empathy and that affective empathy is intact. For example, these individuals often perform worse than controls in realistic and ecologically valid tests of cognitive empathy such as the faux pas test and the TASIT. In addition, it has been suggested that cognitive empathy can be split into a more affective and cognitive component which could be called affective ToM and cognitive ToM respectively (Shamay-Tsoory et al., 2007; see **Appendix A**). Alternatively, the term "cognitive empathy" could solely refer to what is thought of as affective ToM, and the term "theory of mind" could solely refer to what is thought of as cognitive ToM (see **Appendix B**). This would lead to both "empathy" terms having a relationship to affective states which aligns with the common definition of empathy, whereas "theory of mind" would only relate to cognitive states. Further to this, there is an indication that there is also a dissociation between affective and cognitive ToM in individuals with BPD such that they are able to understand another's emotional state but not their beliefs and intentions.

It appears that there is an overlap in BPD and ASC, with individuals with BPD showing higher autistic traits than those without psychiatric diagnoses, and there potentially being higher levels of comorbidity with ASC in individuals with BPD.

Studies in ASC consistently show a deficit in cognitive empathy but, similarly to studies in BPD, show variability when assessing affective empathy. Overall, it appears that individuals with ASC have intact affective empathy and, where it appears impaired, this could be due to alexithymia impairing the recognition of changes in affect despite the expected physiological change. If cognitive empathy can be split into affective and cognitive ToM, it appears that, unlike in individuals with BPD, individuals with ASC are impaired in both. This would mean they are not able to understand another's emotional state (affective ToM) or their beliefs and intentions (cognitive ToM) but are able to have an emotional response to someone else's affective state (affective empathy).

A New Description of Borderline Personality Disorder

These findings indicate that a dissociation between cognitive and affective empathy is present in individuals with BPD, as well as individuals with ASC. While empathy differences are reflected in the diagnosis of ASC, these differences are not reflected in the assessment and diagnosis of BPD at present. Furthermore, neither its name nor its categorisation as a personality disorder reflect the importance empathy may play in BPD, for example, its potential role in reduced interpersonal functioning.

Given the role empathy appears to play in BPD, a new category of disorder revolving around empathy could provide a better description of the disorder. However, the link between empathy and the other symptoms seen in BPD is unclear and until this is accounted for, a personality disorder may provide a better description. In addition, empathy differences occur in several other disorders such as psychopathy (Blair, 2005), which can be classified as antisocial personality disorder using the DSM-5, and schizophrenia (e.g., Bonfils et al., 2016). However, ASC would also come into this category of empathy differences, and given the relationship between ASC and BPD, this could be an apt description. Alternatively, since ASC is a developmental disorder and there is a relationship between BPD and ASC, BPD could potentially be conceptualised as a developmental disorder, although more research would need to be done for this to be a viable option.

Limitations

There are several limitations that have been seen in the studies of empathy in BPD, ASC, and their overlap. Many studies had a small sample size, for example: Dziobek and colleagues' (2008) study had 17 individuals with ASC and 18 controls. In this study, the score on the IRI-EC in individuals with ASC was not significantly different from the controls; however, there was a trend towards it being lower. Mathersul and colleagues' (2013) study had a larger sample size with 40 individuals with ASC and 37 controls. This study did find a significantly lower score on the IRI-EC in individuals with ASC compared to controls. In addition, the samples both within and across studies were heterogeneous and the split between sexes varied significantly across samples. For example, Petersen and colleagues' (2016) study used BPD patients, mostly female, from the community, whereas Zabihzadeh and colleagues (2017) used inpatients and approximately half were male.

Another limitation in many of the studies was the lack of ecological validity in the measures where many of the self-report measures relied on metacognitive abilities which may have led to inaccurate reporting. In addition, the use of self-report measures introduced the possibility of bias as empathy could be considered a positive trait that an individual would want to have. Furthermore, it could be contested that some of the measures used were measuring something different to what they intended. For example, the IRI is commonly used to measure cognitive and affective empathy, but this has questionable validity (Chrysikou & Thompson, 2016) and the RMET could be measuring emotion recognition suggesting that higher levels of alexithymia could account for lower scores.

A limitation of this review is the focus on behavioural data, as it only considers self-report and performance data. Neuroimaging studies have been conducted in both BPD and ASC, with some showing similar results. For example, findings show enhanced and intact processing of empathic pain in individuals with BPD (Flasbeck et al., 2019) and individuals with ASC respectively (Hadjikhani et al., 2014).

Clinical Implications and Future Directions

The diagnostic criteria and categorisation of BPD currently does not consider empathic abilities, even though evidence suggests a dissociation between cognitive and affective empathy is present. A change in diagnostic criteria or categorisation to reflect this could be a viable option. Further research would need to be done to explore whether this reclassification would explain all BPD symptomatology. In addition, this dissociation could represent a new basis for treatment of BPD, and this is something that could be explored further.

Autistic traits could have an impact on the symptomology in BPD. There is already evidence that higher autistic traits are associated with increased suicidality (Dell'Osso et al., 2018). In addition, autistic traits may have an impact on the effectiveness of current treatments of BPD (see Kaltenegger et al., 2020). More research needs to be done to see the impact that the presence of autistic traits in individuals with BPD has

on the effectiveness of treatment.

Generally, larger studies on empathy in BPD and the overlaps between BPD and ASD could be carried out to obtain more valid results, and these studies should contain measures that reflect realistic situations. Further to this, studies should explore the role alexithymia plays in mediating performance on tasks of empathy and, if there is a consistent effect, measures of empathy that account for this could be developed. As cognitive empathy has been seen to be made up of a more affective component and more cognitive component, more research could be done to further explore the differences between these and to create measures that directly assess them.

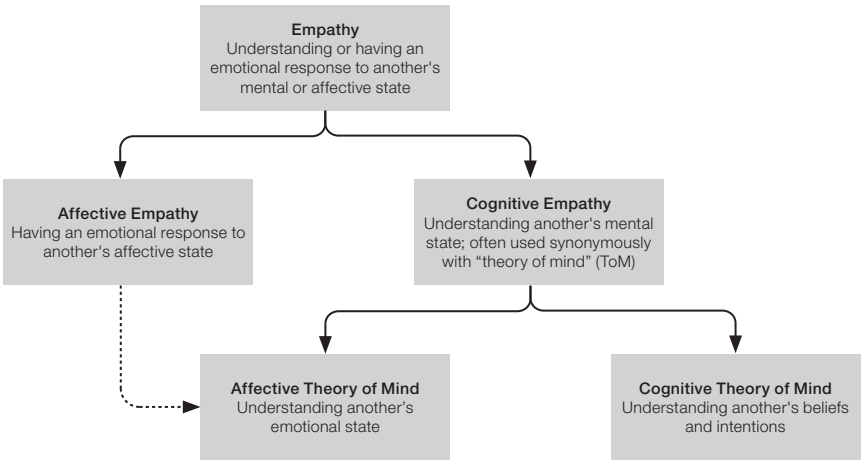
Finally, as a disorder with significant comorbidity, as well as several different combinations of symptoms, more work could be done to see how empathy manifests in different profiles of BPD and whether this accounts for the variability seen within the studies.

CONCLUSIONS

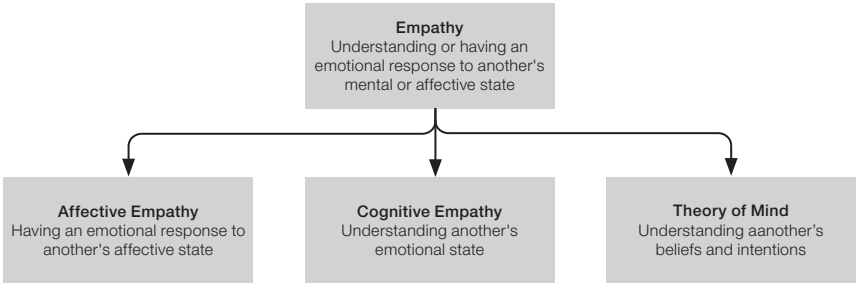
Overall, this review has shown that, despite the variability in the results when considering empathy in BPD, a dissociation between cognitive and affective empathy is likely to be present. Furthermore, this dissociation is present in ASC, although there may still be a difference in how the affective component of cognitive empathy presents in this condition and BPD. In addition, other overlaps and similarities can be seen in autism spectrum disorder and borderline personality disorder. These similarities in empathy in BPD and ASC could suggest that these are related disorders, potentially warranting a new diagnostic category related to empathy. However, more research would need to be done on the validity of this proposal.

Appendix

A. An original framework describing the relationship between empathy and theory of mind using Shamay-Tsoory and colleagues' (2007) distinction between affective and cognitive theory of mind.



B. Proposed relationship between empathy and theory of mind



Interdisciplinary Commentary

NATURAL SCIENCES

Why do we feel empathy? An evolutionary history

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Empathy—the ability to understand and take on the emotions of others—is often thought of as a uniquely human trait; however, it appears to be present in many species throughout the mammalian class. Here, I aim to present some of these examples of apparent empathy in the animal kingdom, before considering the biological basis of empathetic traits. Finally, I discuss the evolutionary reasons for which empathy may have evolved, considering largely the impacts of familial relationships, group living, and social interaction.

Introduction

Chitwa's article discusses the overlap between BPD and autism spectrum disorder in regard to empathy deficits as a shared symptom. Empathy—the ability to understand others' emotions, take these emotions on as if they were our own, and work to alleviate those involving discomfort and distress (Zahn-Waxler & Radke-Yarrow, 1990)—is perhaps the trait that we as a species look on with the most pride. We prize this trait so much, in fact, that we have named its portrayal after ourselves: humanity. But what is empathy, in a biological sense? How do we feel it? And how did we develop this trait, which at first blush seems so contradictory to the Darwinian values of selfishness presented in his theory of "Survival of the Fittest"?

Empathy among mammals

The ability to show empathy develops extremely early among human children. Carolyn Zahn-Waxler, who has conducted extensive research on this subject, found that children as young as two years old were able to understand the physical and psychological states of others (cognitive empathy), experience these states themselves (affective empathy), and also take action to attempt to alleviate others' perceived suffering—the latter of which she argues as being a key component of empathic behaviour (Zahn-Waxler & Radke-Yarrow, 1990). When parents feigned crying or other forms of distress, their children would attempt to comfort them, usually by way of physical touch.

However, studies have shown that empathy, far from being a purely human trait, can be found in some form across many mammalian species. Importantly, this is meant in the sense of empathetic *behaviours* shown by animals, which appear to suggest a feeling of empathy; it is rather difficult to know what animals actually feel. Pet dogs have often been observed to respond to the emotions of their owners in a similar fashion to the aforementioned children, with attempts often made to provide comfort when the owners show signs of distress (Sanford et al., 2018). Such empathy and prosocial behaviour have also been documented in rats, who acted intentionally to free captive compatriots and share food with them rather than keeping it for themselves (Bartal et al., 2011). This is seen as well in Rhesus monkeys who refused to take food when doing so caused an electric shock to be given to another individual (Wechkin et al., 1964), with the likelihood of altruism being higher when the monkey had experienced the shock before themselves, and when the two monkeys had previously been cage-mates (Masserman et al., 1964).

Our closest relatives, chimpanzees and bonobos, have also both been found to show empathic behaviours such as consolation of individuals who have just lost a fight: typically via physical touch and hugging—similar to humans—and is more likely to occur in the absence of reconciliation between the two conflicting individuals (Palagi et al., 2004; Romero et al., 2010). Overall, it is clear that empathy is a trait found throughout various different mammal species, indicating an evolutionary history extending further back than we might have previously imagined.

The biology of empathy

One question we might ask next is: how does empathy work in a biological sense? What are the components required to feel empathy? What are the biochemical processes which occur when we feel it? This is, of course, not yet entirely understood. Empathy, like any other emotion or behaviour, is complex and there are likely a number of factors which contribute to it. However, some relevant components have been identified.

One of these is a type of neural cell known as a mirror neurone. These are neurones which are activated both when an individual performs motor actions themselves, and when they observe another performing these same actions. They were first discovered in monkeys (Rizzolatti et al., 1996), and have since been identified in other animals, including rodents. In these studies, they have been shown to be linked to emotional contagion, a phenomenon in which expressions of pain, fear, and distress will trigger the same emotions in individuals who witness them. For example, in a study on mice, it was found that inactivating the region of the brain which is known to be home to the mirror neurones (viz., the anterior cingulate cortex) caused a decrease in empathic responses—in this case, freezing (a sign of fear) upon witnessing the electrical shocking of another—while conversely, instances of this observed empathetic response increased with electrostimulation of the same area (Kim et al., 2012).

We see this type of response in humans: wincing ourselves at another's pain, feeling anxious when we witness another do something dangerous, and the infamous contagion of yawning. While the mirror neurones themselves have not yet been found in humans, there is still some evidence that the mirror-neurone system exists in humans: brain imaging experiments have shown that the motor cortex is activated by observation of a motor action by another, even when the subject is not performing the action themselves (Cochin et al., 1998). Overall, the research seems to suggest that we feel empathy by responding in our neural circuitry to actions that we see as if we had done them ourselves; in other words, by living vicariously through those around us.

Why has empathy evolved?

Having answered, to some degree, the proximate question of *how* we feel empathy, we can now turn to the ultimate question: *why?* For such a trait to have evolved and developed to the extent that we feel it as humans today, there must be selective pressures that have favoured its existence among mammalian species. Indeed, there are a number of species in which empathy, understanding, and affectively feeling the emotions of others, can be beneficial to an individual.

Many believe that empathy has its origins in parental care, allowing parents to better understand and fulfil their offspring's needs (Decety, 2015). It is easy to see how this would be favoured evolutionarily: those parents who had more empathy for their children would provide better care to them; these children would hence be more likely to survive; and as they are likely to have inherited their parents' predisposition for empathy, they will also be better caregivers towards their own offspring than their less empathic counterparts.

From this origin, the capacity for empathy may have developed further to include close kin and hence gain inclusive fitness (**Equation 1**; Hamilton, 1964), before being again expanded to enable cooperation between non-kin individuals, which was likely necessary for the evolution of group living and the benefits which individuals can derive from it (Sachs et al., 2004). Empathy would facilitate this cooperation by allowing members of the group to understand each other's needs, intentions, and

also their positions within the group and relationships with others—all necessary for group living.

$$rB > C$$

Equation 1 | Hamilton's rule of inclusive fitness (Hamilton, 1964), where r = relatedness between the altruist and the recipient of the altruism; for example 0.5 between full siblings, B = benefit to the recipient in terms of the resulting increase in inclusive reproductive success (from kin), and C = cost to the altruist in terms of the resulting decrease in direct reproductive success (from own offspring).

Aside from cooperation with and altruism towards other individuals, kin and non-kin, there are also more selfish motives for acquiring the ability to empathise. Take, for instance, the mice who showed fear (freezing) when witnessing the electric shock of another. Here, the mice can learn fear of a dangerous situation and/or stimulus simply by observing another, without needing to experience that danger for itself (Jeon et al., 2010). In essence, this type of empathy is akin to learning from others' mistakes in order to avoid making them themselves. Thus empathy, normally associated with altruism and care for others, may also be utilised for purely selfish purposes.

While these examples illustrate some specific instances in which empathy can be a beneficial trait to have, the issue can also be analysed from a more general perspective. Predicting the actions of another individual, referred to as 'mind-reading', is often necessary when two individuals interact. However, behaviours are highly complex and difficult to predict based on observation alone. Nonetheless, this can be somewhat simplified by the use of the subject's own complexity: the presence of a mirror-neurone system allows them to adopt the opponent's state themselves, and hence more easily predict the response (Gallese & Goldman, 1998). In other words, in order to "read their mind", they must put themselves in their shoes. Indeed, the evolutionary game theory model put forward by Mafessoni and Lachmann (2019) suggests that the ability to simulate a situation in one's mind is extremely advantageous in complex social situations.

Conclusion

In the article which this commentary accompanies, Chitwa discusses the similarities between BPD and autism in terms of the lack of empathy that characterises them both to some degree, with the aim of better understanding the nature of the former disorder. Here, I have presented the biological side of empathy, from both proximate and ultimate perspectives, and considered the shared evolutionary history with our fellow mammals. This, too, is in the hopes of providing a better understanding of this trait we hold so dear, and in the same measure, the relevance of its deficit within the context of personality and neurodevelopmental disorders.

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