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Understanding the Development of Borderline Personality Disorder from an Evolutionary Perspective

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Abstract: Patients with borderline personality disorder (BPD), a type of personality disorder, typically experience extreme mood swings, leading to unstable personal relationships, severe morbidity, and high social costs. Given that natural selection is known to optimize survival gains, how are there still individuals whose ability to manage social relationships is broken, maintain personal relationships, and sustain survival? The current study proposes two possible hypotheses to answer this question. Hypothesis A predicts that mental disorders are caused by an inevitable genetic mutation that affects human behaviors. In this case, there were no adaptive designs of BPD. Hypothesis B suggests that BPD may be once helpful to one's survival in some environments, leading to its gene adaptation. If this hypothesis holds, BPD can be found in certain circumstances more commonly than others. The study concluded that the BPD prevalence rates found between different ethnic groups (Asian, Hispanic, and Caucasian) are inconsistent, suggesting that there was an adaptive purpose for developing BPD. It also implied that the aspects attributed to the variety of BPD prevalence rates among societies might be found based on different social values. Further investigations are needed to investigate the adaptive mechanisms of BPD to help with BPD diagnoses and treatments for BPD patients in various cultural settings.

Keywords: borderline personality disorder, prevalence, adaptive design, ethnic groups

1. Introduction

In psychology, the Theory of Mind refers to the human's "mindreading" ability – how one perceives other people's minds [1]. It allows one to predict others' future behaviors based on past "unobservable entities" like "intentions" and "beliefs" [1], which may help interpret in what cases such evidence will contribute to a particular generalization (e.g., "Someone will do this because they always did that before"). It is a skill commonly shared among human beings [1].

Furthermore, this ability was suggested to evolve in two original scenarios. One was 'predator-prey interaction,' implying that "mindreading" developed initially to enhance comprehension of how predators detect humans to stay undetected. It later evolved into a more flexible hunting pattern, where humans reacted differently toward each situation facing a predator or prey [1]. Another scenario was 'social intelligence,' which also allowed the development of coalitional alliance and friendship. It was first formed as an "insurance policy" to ensure the security of one's resources in the wild [1]. In this case, individuals with high social intelligence are more likely to achieve adaptive

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benefits, including successful reproduction and support for their offspring to survive. They have a more complex intentional psychology system which assists their proficiency in dealing with social interactions and forming social bonds in larger groups, leading to more stable exchanges and cooperation that help secure resources [1].

However, given that natural selection is known to optimize personal adaptations and survival gains through a complex adaptation process, how are there still individuals whose ability to manage social relationships is broken, lacking this crucial societal competency, maintain personal relationships, and sustain survival? For instance, patients with borderline personality disorder (BPD).

BPD is a type of personality disorder (PD), typically experiencing extreme mood swings and being sensitive to "perceived interpersonal slights" [2]. They tend to feel insecure in relationships and constantly try to regain security by "testing out" their loved ones using harmful words and behaviors to push them away [3]. Their volatile emotionality can quickly lead them to self-destructive impulsive behaviors and unstable relationships [2]. With a reputation of being untreatable, it challenges the clinical system with severe morbidity and high social costs [2,4]. In many cases, even when patients gradually enter symptomatic remission with psychosocial treatments, they are usually left with severe social disabilities due to self-harming behaviors [2]. In addition, although BPD can be reliably diagnosed as early as 11 years old, the term definition for BPD is still under debate due to its ambiguous history and nature [2], which puts a heavier burden on the diagnostic system. Those who self-harm frequently and repeatedly are, in most cases, automatically diagnosed with BPD [4].

The concept of BPD was first explained by the Diagnostic and Statistical Manual of Mental Disorders, the fifth version (DSM-V) officially, in 1980. It was a translation of the broader psychoanalytic concept known as borderline personality organization (BPO), which was referred to as an "état limite" (borderline state) by French-speaking authors [5]. BPD is characterized by observable criteria, one of many PDs that can manifest as a BPO. Initially rooted in psychoanalytical work, the understanding of BPD has also been explored from neuroscientific and genetic perspectives for over a decade [5].

Therefore, investigating BPD's evolutionary purpose becomes crucial to help create better therapeutic approaches to target the natural causes of this mental disorder. The question is, then, how did such a disorder develop in the first place from an evolutionary perspective?

To answer this question, the current study proposes two possible hypotheses. The polygenic mutation-selection balance theory helps explain hypothesis A that mental disorders were caused by an inevitable genetic mutation that affected human behaviors [6]. This theory refers to a state of equilibrium in a population's deleterious alleles, where the rate at which these alleles are generated through mutation matches the rate at which they are eliminated through selection [6]. In this case, there were no adaptive designs of BPD. It was purely the mutation itself that influenced human development.

On the other hand, hypothesis B suggests that BPD may have developed with an adaptive purpose. In this scenario, BPD was once helpful to one's survival in some environments, leading to its gene adaptation. If this hypothesis holds, BPD can be found in certain circumstances more commonly than others, making BPD more predictable and approachable in clinical settings.

2. Current Study Plan

To test these hypotheses, this study compares the BPD prevalence rates and how common the BPD gene appears among a population between three ethnic groups with discrete cultural values and social structures. A distinct BPD prevalence rate would indicate an adaptive purpose of BPD. On the other hand, if all groups have similar BPD prevalence rates, it can be concluded that an inevitable genetic mutation causes BPD.

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It is presumed that cultures with varied social structures and conditions will result in different BPD prevalence rates. Societies with other social systems should provide distinct solutions to respond to BPD as they hold separate values in viewing and treating this mental disorder. In this case, if there was indeed an adaptive purpose for the development of BPD, societies with a system more like the ancestral world should have a significantly lower BPD prevalence rate than other societies, as they may receive more adaptive benefits from BPD. Hence, hypothesis B looks for a significant difference in these countries' BPD prevalence rates under this assumption.

In contrast, hypothesis A predicts that the BPD prevalence rates of the three cultures will remain similar. Assuming that the development of BPD was entirely due to random genetic mutation despite the various social conditions, the mutation rate (the likelihood that the gene will mutate) of BPD should be consistently spontaneous across cultures. Because there were no adaptive designs of BPD, there wouldn't be any adaptive process where the gene occurs more often in one culture than another. In addition, no civilization could provide a better solution to dealing with BPD since the societal structure wouldn't play a part in the random mutation process. Therefore, in this case, all cultures' BPD cases should appear consistently.

The selected groups in this study include the Caucasian, Asian, and Hispanic populations. The Caucasians represent Western societies where people embrace individualism and a greater sense of emotional expression. They prioritize personal goals and encourage self-disciplinary actions [7]. On the contrary, Asian ethnic groups that typically live in a rather collectivist social structure value family and community ideals [8]. People tend to inhibit their emotional expressions and reveal feelings of shame more often [7]. Lastly, the Hispanic groups lie between the two cultures. These people strongly emphasize families with a collectivist ideal while having a stronger sense of emotional expression than most Asian cultures [8].

3. Reported Data on BPD Prevalence Rates in Different Cultural Groups

Conforming to previously reported data, it has been concluded that the BPD prevalence rates found between different ethnic groups are inconsistent. Depending on the research method, data on BPD prevalence rates was mainly collected under two settings – among the whole population or within psychiatric patient groups.

Among the Caucasian cultures, a study conducted in the Netherlands on BPD reported a BPD prevalence rate of 1.1% out of the 11 million adults surveyed [9]. The estimated BPD prevalence rates in the United States ranged from 1.6% to 5.9% of the general population [10]. Interestingly, the same study also found a positive relationship between the unemployment rate and BPD prevalence rate and that age and education were negatively related to BPD [10]. It is also worth noticing that the BPD prevalence rate of adolescents alone makes up about 3% of the general population [5]. In another cross-cultural study, among the people of the included Western European countries (England, Sweden, and Poland) who were screened positively for a personality disorder (PD), the overall PD rates ranged from 8.9% to 13.4% [7]. In particular, BPD was one of the most frequent PDs, with rates ranging from 2.4% to 7.0% [7].

Similarly, this study also reported the PD rates of the US general population ranging between 9.0% to 15.7%, with BPD appearing as the most frequent in psychiatric settings [7]. Accordingly, BPD had a 10% prevalence rate in psychiatric outpatients and 20% in US patients in 2012 [11]. Six years later, data in 2018 demonstrated that the BPD prevalence rate increased to about 15 to 28% of all the patients going to psychiatric clinics or mental health facilities seeking help for psychological problems [2]. Nevertheless, some scholars still argued that this occurrence of BPD in clinical settings varied, with prevalence rates ranging from 11% among adolescents seeking outpatient care to as high as 78% among suicidal adolescents who visited emergency departments [5].

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The same cross-cultural study mentioned previously also revealed a lower BPD prevalence rate in Asian societies than in Caucasian groups, although no specific percentage was reported [7]. It also suggested that BPD has not yet been identified in some Asian countries, such as China [7]. However, Wang and his colleagues conducted a cross-sectional investigation of BPD frequency among psychiatric outpatients in the Shanghai Mental Health Center [11]. Their results showed a 5.8% BPD prevalence rate among Chinese psychiatric outpatients [11]. Their study proved that BPD was diagnosable in China, yet it was not uniformly accepted as a unique personality disorder category [11]. In addition, they compared the BPD prevalence rates among psychiatric outpatients between China and the US. The US was reported to have an overall higher prevalence rate (10%) than China [11]. Another systematic review of PD prevalence rates in Clinical Asian (Chinese, Indian, Japanese, and South Korean) populations also revealed that "four of five comparative studies found lower prevalence rates of PD in Asians compared with the overall Western sample," with BPD being one of the most common subtypes [12]. In sum, all the studies mentioned above showed consistent results on BPD prevalence rates in the Asian and Caucasian cultural settings, where Asian populations had a generally lower prevalence rate.

In a Spanish study on BPD prevalence rates between the indigenous (Spanish) and immigrant (Western, African, and Asian countries) participant groups in the psychiatric setting [8], the immigrant groups had a significantly lower BPD prevalence rate compared to the indigenous group: 5.7% vs. 9.5%. However, the Western countries subgroup had a closer BPD prevalence rate to the indigenous group (6.3% vs. 9.5%) than the Asian subset, with a BPD prevalence rate of 2.9% (see Figure 1).

		Immigrant subgroup				
Variable	Indigenous group (*n*=9983)	North Africa (*n*=395)	Sub-Saharan Africa (*n*=51)	South America (*n*=475)	Asia (*n*=105)	Western countries (*n*=319)
Age, years:[a] mean (s.d.)	41.38 (15.6)	31.33 (10.3)***	29.75 (8)***	35.06 (12.1)***	34.77 (11.2)***	32.45(10.5)***
Male,[b] %	46.4	71.6***	68.6**	34.9***	66.7***	52.0*
Previous psychiatry history,[b] %	81.5	61.7***	52.9***	59.2***	54.3***	69.6***
Previous psychiatry service contact,[b] %	75.4	53.1***	51.0***	46.1***	41***	54.5***
Drug misuse,[b] %	30	43***	30	21.1**	25.3	32.8
Referral source,[b] %						
Self	55.9	41.6***	31.4***	58.3	41.9**	49.2*
Ambulance	34.2	39.3**	56.9***	32.2	46.7***	36.4
Police	2.0	10.7***	5.9	2.7	1.0	6.6***
Others	7.9	8.4	5.9	6.7	10.5	7.5
Reason for referral, %						
Depression	20.1	9.9***	5.9**	22.5	10.5*	16.3
Anxiety	27.1	29.1	17.6	32.8**	31.4	28.5
Psychosis	8.8	12.4*	29.4***	8.4	15.2*	10.7
Disruptive behaviour	14.2	22.8***	21.6	14.9	21.9*	14.1
Drug misuse	8.7	9.1	9.8	4.2***	4.8	10.0
Others	21.1	16.7*	15.7	17.1	16.2	20.4
Hospitalisation,[b] %	15.8	21.9***	49.0***	14.5	29.5***	18.2
Borderline personality disorder diagnosis,[b] *n* (%)	948 (9.5%)	25 (6.3%)*	1 (2%)***	27 (5.7%)**	3 (2.9)***	20 (6.3%)*

a. *t*-test.
b. Chi-squared test.
*$P<0.05$; **$P<0.01$; ***$P<0.001$.

Figure 1: Comparisons of clinical characteristics (BPD prevalence rates) between Western countries and Asia subgroups and the Hispanic indigenous participant group [8].

Another study examined the effect of the level of acculturation on the lifetime prevalence rate of PD among Mexican Americans in Los Angeles, emphasizing the importance of considering cultural factors and acculturation when addressing mental health disparities in immigrant populations [13]. The findings suggested that higher levels of acculturation were associated with increased psychiatric

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disorders among Mexican Americans in Los Angeles [13]. Mexican Americans who held more Caucasian cultural values were more likely to be diagnosed with a type of PD [13]. Nevertheless, as reported by the National Comorbidity Survey, Mexican Americans exhibit lower lifetime psychiatric disorder rates despite facing challenges such as low education and income levels than the general US population [14]. It was suggested that Mexican-American psychiatric disorders were primarily influenced by cultural differences rather than factors like socioeconomic status or whether they resided in urban or rural areas [14].

Based on the collected data comparing three cultural groups, it was found that the Asian cultural group had the lowest prevalence of BPD, followed by the Hispanic cultural group with the second lowest rate, and the Caucasian group with the highest prevalence rate of BPD.

4. Conclusion and Discussion

The inconsistency found in the BPD prevalence rates between different ethnic groups supports hypothesis B that there was an adaptive purpose for developing BPD. However, the underlying evolutionary mechanism of BPD development, of what advantages it originally brings to human beings, remains paradoxical in the psychology field [6].

Some scholars hold that BPD helps one survive adversity and obtain social aid in the short term but turns out maladaptive as time progresses [15]. The "live hard, die young" mentality becomes especially beneficial in highly competitive environments with many traumatic events [15]. This ability may be significantly helpful to one's survival in a certain period, which eventually loses its functional value as civilization gets to the next stage.

Livesley proposed another conceptual framework on the evolutionary mechanism of BPD, arguing that BPD traits originated from the feeling of anxiousness [16]. He suggests an essential aspect of BPD in the dysregulation of the threat management system, resulting in generalized fearfulness and unstable emotions [16]. The interpersonal traits linked to BPD are believed to be heritable characteristics that have evolved to cope with interpersonal threats that emerge from living in social settings. The potential for unstable and conflicted interpersonal relationships inherent to the disorder is thought to arise from the interaction between the adaptive structure of personality and psychosocial challenges [16]. However, as the symptoms progress and evolve, they lead to other side effects of unstable emotions, disruptive personal relationships, and even suicidality [16].

The variability of BPD prevalence rates among different cultures also revealed an adaptive purpose of BPD. As the current study hypothesized, a society with a more similar structure to the ancient world should be able to deal with BPD more efficiently, resulting in a lower BPD prevalence rate. In this case, it is suggested to be the Asian group.

A sociological study revealed that social integration, the strength, and quality of individuals' connections with others, is crucial in affecting one's psychological well-being and distress [17]. The researcher discovered that individuals who possessed strong social bonds had the lowest probability of engaging in suicidal behaviors [17]. Social groups with higher 'social regulation,' where people commonly share collective experiences and control individual expectations for people to reach constant happiness, have a lower chance of suffering psychological distress [17]. Moreover, socially integrated people contact their family, friends, and neighbors more frequently, reporting a higher level of psychological well-being and more capabilities in dealing with stressful situations [17]. These findings suggest that socially integrated people are more emotionally stable, possibly lowering their chance of suffering from disorders like BPD. Yet social integration is closely related to the factor of "cultural values" [17].

According to Horwitz, cultural groups with "clear and attainable goals" can significantly promote mental well-being [17]. On the other hand, groups that impose expectations that a significant number of individuals cannot meet are characterized by widespread frustration and discontentment, leading

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to a higher level of distress [17]. For instance, American society once stressed the ideal of working hard to achieve material success regardless of background. In real life, however, only a few individuals will achieve highly lucrative, esteemed, and personally fulfilling positions. Those who fall short of their aspirations often attribute their lack of success to personal shortcomings rather than questioning the societal values that prioritize achievement or the structural barriers that restrict the number of individuals able to attain such levels of accomplishment, which can easily lead to adverse psychological outcomes [17]. More importantly, it is also emphasized that members of ethnic groups that promote cohesion under collective belief systems [17], such as the Asian group, tend to have better mental health than those of groups that value individualism, in this case, the Caucasian populations [8].

To conclude, cultures that prioritize collectivist values, placing importance on family bonds and strong interpersonal connections, tend to have lower rates of psychological distress [17]. This finding helps explain the lower BPD prevalence rates in Asian ethnic groups. These results also imply the relatedness of the social structures between the Asian and traditional societal structures, where corporations and the sense of group belonging are strongly emphasized.

It is also worth noticing that BPD appears to be more prevalent among women than men in most of the studies conducted in the field [10]. As suggested by Wang and his colleagues, among the psychiatric outpatients diagnosed with BPD, whose occurrence rate was 5.8%, the frequency was 3.5% among males and 7.5% among females [11]. The frequency of BPD in females is twice as high as the frequency in males.

In their study, Molina and colleagues further explained the higher BPD prevalence rate among females with the “live hard, die young” mentality [15]. Accordingly, despite continuing to experience problematic interpersonal relationships, women who survive with BPD for 15 years may exhibit impulsiveness and manipulative behaviors that can be useful in competitive environments where resources are limited, as long as these behaviors are not excessively intense [15]. In addition, women with BPD tend to have fewer partners, change partners more frequently, and have significantly fewer offspring than healthy women [15]. The emotional dysfunction resulting from interactions with peers during the fertile period may lead to a sexual strategy that avoids conflict-ridden intimate relationships. In this case, it could be a promising strategy in specific circumstances, such as environments characterized by a high prevalence of trauma. Therefore, in extreme events, BPD traits can be adaptive and may persist in some individuals [15].

Nevertheless, the current study still holds some inevitable limitations. Because there was not a single study using a consistent measurement, data analysis, or diagnostic system to measure the BPD prevalence rates of different cultures, the data may be biased to a certain degree. A study conducted in Shanghai, China, compared two diagnostic systems (one was the multi-axial DSM-IV and the other the uni-axial CCMD-3) on the prevalence of PD among 3,075 psychiatric outpatients [18]. As shown in the results, the overall prevalence of any type of PD in the entire sample indicated by the DSM-IV was 31.93%. This estimate was approximately 110 times higher than the prevalence estimate based on the CCMD-3 [18]. According to the CCMD-3, only nine outpatients received a PD diagnosis [18]. This suggested that PD was often overlooked when diagnosed using the uni-axial diagnostic system of CCMD-3, as the DSM-IV classification system revealed a high prevalence of PD within the Chinese psychiatric community [18]. Thus, adopting a multi-axial diagnostic approach in psychiatric practice may provide significant advantages, especially for the Chinese PD diagnostic system.

With the scarce focus on the study of BPD, its related data is usually found in a more general analysis that includes other personality disorders, which also tend to receive greater attention from scholars and the public. It is also vital to notice that when there are many psychological diagnoses of BPD reported from one culture, it indicates that its people may have more access to psychological clinics to seek help. The culture may also emphasize the advantages of psychiatric practices, making

its people more willing to attend such applications. This may contribute to the high BPD prevalence rates in Caucasian societies. However, patients from Asian countries typically do not perceive depressive symptoms as an illness and rarely seek treatment for such disorders. Instead, they may turn to alternative medicine practices like acupuncture or herbal medicine [8]. Therefore, to understand an adaptive design of BPD, further investigations are needed to understand the developing mechanisms of BPD to help with more straightforward BPD diagnoses and potential treatments for BPD patients in different cultural settings in the future.

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