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Social Motivation as The Extreme Female Brain:

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Borderline, Dependent, and Histrionic Personality Disorders

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Abstract

10 Baron-Cohen's *Extreme Male Brain* theory of autism has generated a novel perspective of
11 psychological disorders: the depiction of clinical behavioral patterns as extreme expressions of
12 normal sex differences. Consistent with this view, this review suggests that histrionic, borderline,
13 and dependent personality disorders are the best candidates to represent the extreme female brain,
14 as they are all characterized by excessive social or empathizing needs, and are related to
15 feminization.

16 *Keywords:* borderline personality disorder, histrionic personality disorder, dependent
17 personality disorder, autism spectrum disorders, extreme male brain theory

18 The Extreme Female Brain

19 From the moment species have evolved as sexual, females and males have gone through
20 differential selection processes, in response to different roles involved in the continuation of the
21 species (Buss & Schmitt, 1993). In humans, as in most species, males provide a group with
22 resources vital to group functioning, while females bear and nurture children. As such, their
23 respective physiology and psychology are designed to fulfill this purpose (Trivers, 1972).
24 Women are highly dependent on others' input and collaboration to get the necessary material to
25 ensure the survival of both themselves and their children, since their evolutionary purpose is the
26 upbringing of children. As evolutionary processes retain those who have a spontaneous drive to
27 accomplish what is beneficial for them, this dependence on social ties must result in considerable
28 gratification when fulfilled, and considerable distress when unfulfilled. As a result, socialization
29 would entail greater gratification for women when successful, and greater distress when
30 unsuccessful. The basic and ultimate need of women is to socialize, or empathize (Baron-Cohen,
31 2002), and they would then compete with each other on socialization processes. Different
32 behavioral presentations represent different strategies to fulfill a social need, with differential
33 outcomes and tactics. This review will suggest that some psychological disorders might be
34 extreme forms of what defines a feminine psychology.

35 **Theoretical Background**

36 Baron-Cohen (2002) provided the first spectrum to account for psychological sex
37 differences. The empathizing/systemizing theory suggests that males have a higher spontaneous
38 drive to construct systems, and women have a higher drive to empathize. This model is the
39 reasoning behind the *Extreme Male Brain* theory of autism (Baron-Cohen, 1997), based on a
40 suggestion of Hans Asperger in 1944. People with autism spectrum disorders, theorized to be an

41 extreme form of the male brain, have an unusually high drive to construct systems, and have an
42 extremely low ability to understand others and create and maintain interpersonal relationships.
43 They are considered to be *mind-blind*. On the other hand, the female brain would be
44 characterized by a lesser drive to construct systems, but would be highly motivated to create and
45 maintain social bonds. In this way, the extreme female brain would be extremely empathetic, but
46 unstimulated by system construction. This model postulates that an extreme female brain would
47 be *system-blind*, but extremely skilled at creating social bonds.

48 There are important shortcomings to Baron-Cohen's theory. First, there is an underlying
49 assumption that an extreme brain necessarily results in functional impairment, and in only one
50 behavioral pattern. Some people with an extreme male brain score quite low on autistic
51 symptoms (Auyeung et al., 2009). This introduces the second point; many other behavioral
52 presentations are seen within those with a hyper-masculinized brain, such as individuals with
53 attention deficit and hyperactivity disorder and psychopathy (Hanoch, Gummerum, & Rolison,
54 2012). While they do not share the cognitive empathy impairments (Charman, Carroll, & Sturge,
55 2001; Meffert, Gazzola, den Boer, Bartels, & Keysers, 2013; Richell et al., 2003), they show the
56 same low drive for socialization *in itself*, and often prefer status gains over well-functioning
57 (Melnick & Hinshaw, 1996) and use instrumental interpersonal strategies respectively (APA,
58 2013). In this way, there is not a *single* extreme male brain presentation, and other presentations
59 do not necessarily have cognitive empathy deficits, although there seems to be a generalized
60 asocial tendency, or a low social motivation. Psychological theorists have previously suggested
61 that autism is defined by a decreased social motivation (Chevallier, Kohls, Troiani, Brodtkin, &
62 Schultz, 2012). In a similar vein, individuals with an extreme female brain are believed to have
63 poor empathetic skills. Lastly, Baron-Cohen's suggestion assumes that there is only one type of

64 social drive. This no doubt led to the ambiguity that supposedly socially unmotivated autistic
65 women are as social as non-autistic males (Head, McGillivray, & Stokes, 2014), and are even
66 clingy inasmuch as they can be misdiagnosed with borderline personality disorder (Attwood,
67 2007). Even females who are thought to have a non-empathic brain have the clinginess that is
68 here suggested to be a feminine trait. Consequently, it could be argued that systemizing and
69 empathizing are *needs* rather than skills. In this way, the extreme female brain would be defined
70 by an extreme social *need*, and may have *multiple* presentations, rooted in different strategies to
71 fulfill a social dependency need.

72 **Candidates of the Extreme Female Brain**

73 Behavioral presentations that involve an excessive social need will be explored.
74 Psychological disorders are useful in this regard, because clinical categorization classifies
75 individuals into stable, pervasive, and delimited behavioral patterns, for which empirical data has
76 been gathered extensively. In contrast, correlating femininity, life strategies, and pathology
77 would be a colossal endeavor, based on statistical approximations. The prevalence of males in
78 the described disorders does not mean that it is not a predominantly female behavior, as
79 individuals act out on a need, but assuming that men and women live in roughly the same
80 environment, more often this environment will be perceived as socially unstimulating.

81 Numerous personality disorders appear to be rooted in an excessive social motivation.
82 Dependent personality disorder, borderline personality disorder, and histrionic personality
83 disorder are all characterized by an excessive sensitivity to the social world. All have historically
84 been linked to women. Among clinically-naïve participants reading the diagnostic criteria,
85 histrionic and dependent personality disorders were seen as female disorders (Rienzi & Scrams,

86 1991). Importantly, the epidemiology and definition of these disorders are biased towards
87 women.

88 **Borderline Personality Disorder**

89 Borderline personality disorder is perhaps the most interesting candidate for the extreme
90 female brain. It is defined in the DSM-5 as a “pervasive pattern of instability in interpersonal
91 relationships, self-image, and affects, and marked impulsivity, beginning by early adulthood and
92 present in a variety of contexts” (APA, 2013, p. 663). People with borderline personality disorder
93 typically make frantic efforts to avoid real or imagined abandonment, their interpersonal
94 relationships tend to be intense and characterized by an alternation between extremes of
95 idealization and devaluation, they feel empty and have a self-image that depends on others,
96 People with borderline personality disorder have high rates of compulsive buying (Maraz, Urbán,
97 & Demetrovics, 2016), and use Facebook excessively (Delfour, Moreau, Laconi, Goutaudier, &
98 Chabrol, 2015). Some theorists have suggested that people with borderline personality disorder
99 are socially insatiable, in the sense that they expect extreme inclusion from others (De Panfilis,
100 Riva, Preti, Cabrino, & Marchesi, 2015). Interestingly, borderline symptoms correlate positively
101 with the number of piercings and tattoos (D'Ambrosio, Casillo, & Martini, 2014), and
102 anecdotally, with hair dying frequency.

103 The hypothesis stating that females with borderline personality disorder represent an
104 extreme form of female typical behavior has been informally suggested following Baron-
105 Cohen’s Extreme Male Brain theory of autism. A recommendation for research was also
106 expressed by Larson and colleagues, including Baron-Cohen (2015). Recently, the hypothesis
107 was experimentally tested by Dinsdale, Morkkonen, and Crespi (2016). Using the results of the
108 Reading the Mind in the Eyes Test (RMET), they concluded that the extreme female brain may

109 be what is known as borderline personality disorder and subclinical depression. Further evidence
110 shows that borderline traits are linked to *hormonal* femininity, and are magnified by oral
111 contraception use. DeSoto, Geary, Hoard, Sheldon, and Cooper (2003) found that borderline
112 traits were linked to fluctuations in estrogen levels, by conducting three studies. First, borderline
113 symptoms were most common in the period of the menstrual cycle in which estrogen is at its
114 highest, and in women using oral contraceptives. Second, across a menstrual cycle, the presence
115 of borderline traits was predicted by estrogen levels, even when a generalized increase in
116 negative mood was statistically controlled for. In a sample of forty women, estrogen and
117 progesterone influenced borderline traits (Eisenlohr-Moul, DeWall, Girdler, & Segerstrom,
118 2015). Lastly, for women with pre-existing borderline traits, use of oral contraceptive
119 exacerbates the symptoms of the disorder. Additional indirect evidence for hormonal influence
120 on borderline symptoms comes from premenstrual dysphoric disorder (PMDD). PMDD occurs
121 when estrogen levels are increasing before ovulation. The symptoms of PMDD are nearly
122 identical to the borderline behavioral profile. The DSM-5 provides the following symptoms to
123 illustrate PMDD:

124 markedly depressed mood, feelings of hopelessness, or self-deprecating thoughts; marked
125 anxiety, tension, feelings of being “keyed up” or “on edge”; marked affective lability
126 (e.g., feeling suddenly sad or tearful or experiencing increased sensitivity to rejection);
127 persistent and marked anger or irritability or increased interpersonal conflicts (APA, 2013,
128 p. 171).

129 Thus, fluctuating levels of estrogen play a role in borderline traits. Similarly, fluctuations
130 in estrogen trigger depressive episodes in women (Payne, 2003), and women with PMDD tend to
131 have high estradiol levels during the follicular phase (Redei & Freeman, 1995).

132 Borderline traits are also related to *brain femininity*. 2D:4D finger length ratios, the
133 preferred biomarker for the evaluation of brain masculinity/femininity, is positively correlated to
134 emotional instability (Lindová, Hrušková, Pivoňková, Kuběna, & Flegr, 2008). This means that
135 the most feminized a brain is, the most emotionally unstable a person is. 2D:4D ratios correlate
136 positively with neuroticism scores (Austin, Manning, McInroy, & Mathews, 2002; Fink,
137 Manning, & Neave, 2004). Neuroticism is the trait of the Big Five on which men and women
138 differ the most globally (Schmitt, Voracek, Realo, & Allik, 2008), and unsurprisingly, girls with
139 borderline are acutely neurotic. 2D:4D ratios correlate with borderline characteristics: estrogen,
140 neuroticism, and correlates negatively with autistic symptoms (which is the diametrical opposite
141 of borderline interpersonal tendencies; extreme unresponsiveness to social stimuli; Putz, Gaulin,
142 Sporter, & McBurney, 2004). 2D:4D ratios significantly predicted overall borderline traits, and
143 the affective component of the borderline presentation more specifically (Evardone, Alexander,
144 & Morey, 2008). In short, converging methods have provided evidence that borderline
145 personality disorder is related to a pronounced femininity.

146 A large body of psychoanalytic literature suggests that borderline traits are caused by
147 sexual, physical, or psychological abuse during childhood. In the academic literature,
148 questioning participants on their abuse is an ongoing ethical debate. The cost-benefit analysis of
149 asking about child abuse is often ignored, and researchers are often left with important research
150 decisions that are ultimately based on individual beliefs on prevalence and effects of child abuse.
151 The costs of not asking about abuse may actually be more significant than not asking (Becker-
152 Blease & Freyd, 2006). Some have insisted for borderline personality to be relabeled as PTSD,
153 as they can be confused for each other (McLean & Gallop, 2003). There is, however, a
154 meaningful absence of confirmed reports in regards to the post-traumatic model. The hypothesis

155 that borderline traits result from abuse is based on self-reports of people with the diagnosis, who
156 are known to lie compulsively (Snyder, 1986), and to be exactly the type of people who would
157 benefit from the nurturing and professional care that would ensue. Paris (1998) found that most
158 victims of childhood trauma are resilient, personality is heritable, and traumatic childhood
159 experiences do not consistently lead to psychopathology. Moreover, women are *more* resilient to
160 childhood traumatic events than men (McGloin & Widom, 2001). Bierer and colleagues (2003)
161 did not find childhood sexual abuse to be a predictor of borderline in adulthood. The only
162 significant predictor was emotional abuse, but was only significant in men. Girls with borderline
163 have been identified for being at risk for false rape accusations (O'Donohue & Bowers, 2006).
164 Bailey and Schriver (1999) questioned experienced psychiatrists and found that "patients with
165 borderline personality disorder were rated as especially likely to misinterpret or misremember
166 social interactions, to lie manipulatively and convincingly, and to have voluntarily entered
167 destructive sexual relationships, possibly even at young ages" (p. 45). The validity of the
168 childhood trauma is at best anecdotal, and one should remain cautious towards any claim of
169 victimization from people with borderline personality disorder. If anything, this literature could
170 be interpreted as a strategy to evoke nurturance.

171 Borderline personality disorder is diagnosed three times more often in women. Yet, it
172 was originally related to the concept of female hysteria, which was believed to originate in the
173 womb. However, psychiatry as a whole does not seem to condemn major tweaks to psychiatric
174 diagnostic criteria to equalize gender statistics, as is the case with ADHD and autism. It is then
175 debatable if this ratio can be interpreted rationally. Regardless of the sex ratio, the diagnosis of
176 men with borderline is based on the widespread faulty assumption that characteristics of one sex
177 can be equally applicable to the other (Cahill, 2006). Although the female-to-male ratio is 3:1,

178 there is a range of phenomena that apply mostly to women, for which borderline traits are the
179 norm. The following section will explore that assertion.

180 **The Ramifications of Borderline Personality Disorder**

181 Regardless of the clinical ratio, borderline traits are often seen in other phenomena that
182 are predominantly seen in women, which certainly undermines the true ratio. Furthermore, these
183 phenomena often have little to no supporting objective evidence, and can be suspected that
184 people with a borderline personality disorder diagnosis simply malingering nurturance. In terms of
185 cost/benefit analysis, it is undeniable that many of these strategies represent opportunities to
186 garner attention for little cost. That does not necessarily mean, however, that people with a
187 borderline personality are aware of the motivations behind these actions.

188 Females with a borderline personality disorder diagnosis, like those with histrionic
189 personality disorder, have been identified as being more prone to press false rape charges
190 (O'Donohue & Bowers, 2006). False rape charges offer interesting opportunities to obtain
191 nurturance from others, as they are often accepted at face value, at least in psychiatry. While
192 people that were sexually abused are indistinguishable from controls on measures of depression,
193 post-traumatic stress, fantasy proneness, and dissociation; patients with repressed memories
194 recovered through psychoanalytic hypnosis scored higher (McNally, Clancy, Schacter, & Pitman,
195 2000). Hence, those with rape experiences recovered through flimflamming techniques often
196 have borderline traits. Those with presumably legitimate memories of the abuse do not.

197 Factitious disorder is a condition that is typically seen in women. In a sample of 88
198 borderline patients, Links, Steiner, and Mitton (1989) found that 13% had factitious psychotic
199 symptoms. Factitious disorders are usually thought to be motivated by regressive needs, fear of
200 abandonment, need for caring, and nurturing. Feldman (cited by Adams, 2008) found borderline

201 traits in patient with factitious symptoms: self-destructiveness, itinerancy, problems developing
202 and maintaining relationships, hostility, and pseudologia fantastica. Goldstein (1998) found that
203 borderline traits are commonly found in patients with factitious disorders. Undiagnosed
204 borderline traits, such as insecure attachment, are the norm behind factitious presentations.
205 Noyes and colleagues (2003) found that hypochondriasis is associated with insecure attachment
206 that in adults gives rise to abnormal care-seeking behavior. Hypochondriacal and somatic
207 symptoms were positively correlated with all of the insecure attachment styles, especially the
208 fearful style. These same symptoms were positively correlated with self-reported interpersonal
209 problems and negatively correlated with patient ratings of satisfaction with, and reassurance
210 from, medical care. Hypochondriacal and somatic symptoms were also positively correlated with
211 neuroticism. When under stress as adults, somatizers use physical complaints to elicit
212 care (Stuart & Noyes, 1999). Poor self-esteem and poorly defined self-concepts are other
213 characteristics common to both factitious disorders and borderline personality disorder
214 (Hamilton & Janata, 1997). Phillips, Ward, and Ries (1983) found that their sample with
215 factitious bereavement presented with depression and suicidal ideation secondary to reported
216 multiple dramatic deaths for which there was no available verification, and many had histories of
217 factitious physical symptoms, manipulative suicide attempts, substance abuse, and sociopathy.
218 Factitious symptoms can better be understood as one form of dysfunctional care-eliciting
219 behavior.

220 Pseudologia fantastica is often seen in people with borderline (Snyder, 1986). This
221 pathological need for lying is used to garner attention and caring.

222 People with borderline are at great risk of self-harming, insofar that it is part of the
223 diagnostic criteria. One of the motivation for self-harm is expressing distress to obtain nurturance
224 (Linehan, 1993; Paris, 2005).

225 Munchausen Syndrome by Proxy (MSBP) is a type of factitious disorder in which the
226 mother secretly inflicts harm to her child to obtain medical care. This phenomenon is especially
227 likely when the surroundings offer nurturance and praise in response to the brave mother of a
228 sick child. Moreover, it is widely believed that perpetrator mothers use the child to pursue a
229 relationship with charismatic and care providing physicians (Cramer, Gershberg, & Stern, 1971).
230 Borderline features are often seen in MSBP, to the extent that MSBP has been suggested to be a
231 subtype of borderline pathology (Nadelson, 1979). Ehlers and Plassmann (1994) found that half
232 of their sample of 18 MSBP patients had borderline personality disorder, and that one third had
233 narcissistic personality disorder, which has comorbidity rates of 32.2% with borderline (Grant et
234 al., 2008). Adshead and Bluglass (2005) found that 82% of their sample of 67 MSBP mothers
235 had insecure childhood attachments, and 60% had unresolved trauma or loss reactions. Gray and
236 Bentovim (1996), based on a sample of 37 families, found that all the perpetrator mothers had
237 suffered at least one of the following: privation, child abuse, psychiatric illness, or significant
238 loss or bereavement, and that 40% had serious marital problems.

239 Conversion disorders are by definition any unfounded neurological symptom. Reported
240 childhood abuse, neglect, dissociative symptoms, abuse, self-harm, and suicide attempts—which
241 are typical of people with borderline—are frequently seen in those with conversion disorders
242 (Şar, Akyüz, Kundakçı, Kızıltan, & Doğan, 2004).

243 As for many phenomena associated with borderline, multiple personalities (now
244 dissociative identity disorder; DID) is highly controversial, as it has very weak and inconsistent

245 support in terms of validity. Two thirds of DID cases also fit the borderline personality criteria
246 (Horewitz & Braun, 1984). The association is so strong that Benner and Joscelyne (1984) have
247 argued that it should be classified as a borderline personality disorder. The existence of “multiple
248 personalities” is highly questionable (Giesbrecht, Lynn, Lilienfeld, & Merckelbach, 2008; Lynn,
249 Lilienfeld, Merckelbach, Giesbrecht, & van der Kloet, 2012), as its core assumptions are violated
250 (e.g., Huntjens, Verschuere, & McNally, 2012). There is no study to this date that used verified
251 claims of trauma from a representative sample of the population. Hence, the legitimizing factor
252 will be disregarded in favor of the effect, i.e., nurturing possibilities originating from a social
253 need.

254 In short, borderline traits are found in a myriad of unexplained phenomena that appear to
255 be strategies to obtain nurturance and contact with reassuring, father-like, providing figures.
256 Moreover, some of these strategies are exclusively employed by women, which may undermine
257 the 3:1 woman to man ratio. For instance, factitious disorder by proxy is conducted by the
258 biological mother in 98% of cases. Factitious presentation is also a phenomenon that is
259 predominantly seen in women.

260 **Corrections to Baron-Cohen’s Empathize/Systemize Dichotomy**

261 Although people with borderline constitute a promising venue for understanding the
262 extreme female brain, they do not represent exactly what would be expected from Baron-
263 Cohen’s theory. Putting aside their psychopathic traits (Sprague, Javdani, Sadeh, Newman, &
264 Verona, 2012), they do not have a superior empathy, capability of deciphering social cues, or an
265 unusually efficient theory of mind (see Lazarus, Cheavens, Festa, & Rosenthal, 2014, for a
266 review). Although they are hyper-mentalizing (Sharp et al., 2011), people with borderline have
267 been shown to be deficient in emotion recognition (Baez et al., 2015) and theory of mind (Baez

268 et al., 2015; Preißler, Dziobek, Ritter, Heekeren, & Roepke, 2010), although some have found no
269 difference in cognitive empathy compared to controls (Dinsdale et al., 2016; Vaskinn et al.,
270 2015). A revealing study by Franzen and colleagues (2011), provided a more comprehensive
271 view of the psychology of people with borderline, that includes the motivational component of
272 socialization that lacks in cognitive empathy tests. In a fairness game, controls and borderline
273 patients were equally accurate at emotion recognition, but the latter was more dependent on
274 others' emotions to judge their own fairness. These results parallel the findings of Levine,
275 Marziali, and Hood (1997). In short, people with borderline are more socially dependent than
276 socially skilled. Again, the empathizing/systemizing dichotomy needs to be regarded as a need
277 rather than a skill, and defined by their underlying motivation, as borderlines cannot be
278 considered socially skilled, or empathetic in the broader sense of the word.

279 **Genetics and Borderline Personality Disorder**

280 Disorders linked to excessive masculinity are usually highly heritable. Namely, ADHD
281 and autism spectrum disorders have repeatedly been linked to low 2D:4D ratios (e.g., Auyeung
282 et al., 2012; de Bruin, Verheij, Wiegman, & Ferdinand, 2006). Both are highly heritable and co-
283 heritable. Lichtenstein, Carlström, Råstam, Gillberg, and Anckarsäter (2010) found that genetic
284 effects accounted for 80% of the variation in ASD and 79% in ADHD. In regards to co-
285 heritability, among monozygotic twins of children with autism, the probability of having a
286 diagnosis of ADHD was 44%, compared to 15% among dizygotic twins (Lichtenstein et al.,
287 2010). Importantly, 2D:4D ratios in girls are 66% heritable (Paul, Kato, Cherkas, Andrew, &
288 Spector, 2006). If borderline is truly linked to hyper-femininity, this pattern should also be
289 observed. Evidence suggests that it is. Amad, Ramoz, Thomas, Jardri, and Gorwood (2014)

290 estimate the heritability of borderline to be 40%. Like other conditions related to a pronounced
291 sexual expression, borderline personality disorder is highly heritable.

292 Although the present framework suggests that borderline personality disorder is a good
293 candidate of the extreme female brain, it needs to be addressed that one third of the diagnoses are
294 made in men. However, many findings suggest that the true ratio might be more biased towards
295 women than previously assumed. First, there are a vast range of other pathologies that share the
296 neurotic presentation seen in borderline, that are exclusively seen in women. People with
297 Munchausen Syndrome by Proxy are all women, and most have borderline features. Ratios
298 which demonstrate similar base rates of borderline in men and women are often based on
299 community samples (e.g., Grant et al., 2008), with no regard to confounding variables or
300 referrals. Substance abuse, impulsivity, social anxiety, and sexual promiscuity are strongly
301 linked to ADHD, but ADHD is not borderline (APA, 2013; Davids & Gastpar, 2005; Lampe et
302 al., 2007; Nigg, Silk, Stavro, & Miller, 2005; Xenaki, & Pehlivanidis, 2015). Similarly,
303 behaviors that are similar between men and women are often erroneously considered having the
304 same motivation (Cahill, 2006). For instance, sexual promiscuity is the optimal evolutionary
305 success for males of almost all species. In contrast, sexuality is the female resource (Baumeister
306 & Vohs, 2004), and indiscriminate promiscuity is what women are evolutionarily wired to avoid.
307 Promiscuous sexuality in females is linked to emotional distress (Ethier et al., 2006), physical
308 unattractiveness (Walsh, 1993), borderline personality disorder (APA, 2013), susceptibility to
309 sexual victimization (Perilloux, Duntley, & Buss, 2011), and attachment problems. As a thought-
310 provoking example, depression is linked to females with many sexual partners, in contrast to
311 men, in which it is unusually present in those with few partners (Weisfeld & Woodward, 2004).
312 Hence, borderline personality might differ in motivation and expression, notably in the case of

313 promiscuity. Most importantly, if both brain and hormonal femininity promote borderline traits,
314 their occurrence in men requires clarification.

315 **Histrionic Personality Disorder**

316 The DSM-5 defines histrionic personality disorder as “a pervasive pattern of excessive
317 emotionality and attention seeking, beginning by early adulthood and present in a variety of
318 contexts” (APA, 2013, p. 667). Symptoms include: being uncomfortable in situations in which
319 he or she is not the center of attention, inappropriate sexually seductive or provocative behavior,
320 shallow expression of emotions, using physical appearance to draw attention to self, using an
321 excessively impressionistic style of speech, self-dramatizing, theatricality, exaggerating
322 expression of emotion, being suggestible, and considering relationships to be more intimate than
323 they actually are.

324 There is not much to say about histrionics, as they are clearly incredibly successful social
325 agents, as can be seen by their number of Facebook friends (Rosen, Whaling, Rab, Carrier, &
326 Cheever, 2013), or their interpersonal style more broadly. They are always up to the latest fads,
327 and familiar with everyone. As a symptom of autism is the unwillingness to share intentions and
328 group movements (Tomasello, Carpenter, Call, Behne, & Moll, 2005), histrionic personality
329 disorder is the opposite of this social behavior.

330 Histrionic personality disorder was argued to be the female phenotype of antisocial
331 personality disorder by Cale and Lilienfeld (2002). Their empirical results were weak and
332 inconsistent, but their methodology was questionable, as they tested histrionics on Newman’s
333 (1987) response modulation hypothesis of psychopathy. This assumes that men and women have
334 a common pathway to psychopathy, as psychopathy scales are tailored for men specifically. As
335 our conspecifics are the key to evolutionary success or failure, elevated interpersonal power

336 suggest a success at negotiating interpersonal power and influence. Fitness is achieved
337 differently in men and women. As a striking example, men and women use different aggression
338 strategies. Women use more relational aggression, such as excluding someone from a social
339 network (see Wynn, Høiseth, & Pettersen, 2012 for an overview of psychopathy in women).
340 Indeed, histrionic women have been identified as being at risk of making false rape charges
341 (O'Donohue & Bowers, 2006). Kanin (1994) identified three main motivations behind false
342 accusations: obtaining sympathy and attention, getting revenge, and providing an alibi. Likewise,
343 McNamara, McDonald, and Lawrence (2012) found that 50% of their sample was motivated by
344 attention-seeking and sympathy. It could be argued to be a form of fraud, for which male
345 psychopaths are known for. Psychopathy in women might be achieved by interpersonal skill and
346 power, resulting in lowered social fear, as opposed to psychopathic men, who might express
347 psychopathic traits due to a lack of physical fear (Hosker-Field, Gauthier, & Book, 2016).
348 Differential fear mechanisms would be based on differential evolutionary competitive aggressive
349 patterns, namely indirect aggression, relational aggression, and social aggression for women
350 (Archer & Coyne, 2005), and physical aggression for men (e.g., Archer, 2004). Since intra-
351 sexual competitive encounters usually involve a form of competition that establishes the fittest
352 individual based on an evolutionarily adaptive trait, it is not surprising that men and women
353 differ in aggression patterns. While a woman attempts to rob another woman from her social
354 bonds, a man attempts to show himself as the most capable to generate and protect resources
355 with physical capability.

356 Substantial support for the hyper-femininity perspective of histrionic personality disorder
357 came from the measurement of finger length ratios of female psychopaths (Blanchard & Lyons,

358 2010). The results gave a statistically significant positive correlation of 0.45 between 2D:4D
359 ratios and psychopathy in women.

360 Histrionic personality disorder is mostly diagnosed in women, although the exact sex
361 ratio is unknown. Researchers and the DSM-5 are generally unwilling to divulgate the sex ratio,
362 as it is repeatedly quoted that “the sex ratio is not significantly different than the sex ratio of
363 females within the respective clinical setting” (APA, 2013, p. 668). There is a range of
364 diagnostic features that do not really apply to men, such as “consistently use physical appearance
365 to draw attention to themselves”, which is quite revealing as histrionic women are the only
366 subgroup of “disordered” women linked to physical attractiveness (Bornstein, 1999). This higher
367 physical attractiveness is not seen in men, so it remains to be clarified how unattractive men use
368 their physical appearance to draw attention (excluding paraphilias, such as exhibitionism).
369 “[Histrionics] may “fish for compliments” regarding appearance and be easily and excessively
370 upset by a critical comment about how they look or by a photograph that they regard as
371 unflattering” (APA, 2013, p. 668). Most social media users might confirm that this behavior is
372 seldom seen in men, and applies to more than the 2–3% prevalence that the DSM-5 suggests.
373 The DSM-5 expresses that “[histrionics] often act out a role (e.g., “victim” or “princess”)” (APA,
374 2013, p. 668), which, once again, does not seem to apply to non-paraphilic male behavior. The
375 existence of histrionic personality disorder stems from *hysteria*, which was linked to women, the
376 female genitalia, and femininity since Ancient Egypt. In short, it seems like unwillingness to
377 divulge sex ratios in clinical psychology stems from a general unwillingness to accept the reality
378 of sex differences (Cahill, 2006). Clinically naïve participants associate histrionic personality to
379 women five times more than to men (Rienzi & Scrams, 1991).

403 tendencies originating from elevated estrogen levels. Unfortunately, very little research is done
404 on dependent personality disorder.

405 Like borderline, dependent personality is highly heritable. Heritability rates are estimated
406 to be from 55% to 72% (Gjerde et al., 2012). People with dependent personality disorder have a
407 non-dominant, submissive interpersonal style, like those with borderline (Russell, Moskowitz,
408 Zuroff, Sookman, & Paris, 2007). Kaplan (1983) argued that dependent personality disorder is
409 nothing more than a woman conforming to society's idea of a woman, and that behaving in a
410 feminine stereotyped manner alone is sufficient to get a DSM-III diagnosis. Oddly the author
411 remains silent over the fact that this is also true for males, but combined with a neurological
412 justification and a psychoactive solution. Klonsky, Jane, Turkheimer, and Oltmanns (2002)
413 found that in a sample of 665 college students, dependent personality traits were related to higher
414 femininity and lower masculinity in men and women. As indicated by their absent initiative and
415 risk-taking, people with dependent personality disorder have an external locus of control, which
416 is negatively correlated to masculinity (Richards, Stewart-Williams, & Reed, 2015). Their
417 appeasing interpersonal style is sacrificing autonomy to maintain social bonds. For instance,
418 avoiding negotiating, arguing, or discussing. It is an extreme form of the principle of least
419 interest, that explains that people hold more power in relationships in which they have the least
420 interest (Sprecher, Schmeckle, & Felmlee, 2006). In essence, dependent personality disorder is
421 a life strategy motivated by strong social dependence needs.

422 **Bridging Candidates of the Extreme Female Brain as Evolutionary Strategies**

423 Individuals with the covered personality disorders represent a critical and revealing
424 insight into evolutionary-based motivation. Mating strategies differ greatly between men and
425 women (Schmitt, 2015), and are rarely placed in a context-dependent framework. Different

426 mating strategies co-vary with behavioral (or clinical) profiles, which might reveal underlying
427 motivations. It is known that women have a social need. It is also known that women have a need
428 to regulate their sexual value (Baumeister & Vohs, 2004). Both can be seen as intertwined
429 variables to manage for an optimal evolutionary success.

430 Dependent, borderline, and histrionic personality disorders are three disorders primarily
431 defined by an interpersonal component. Dependent and histrionic personality disorders have
432 been argued to be strongly linked to dependent personality disorder, as both are inflexible,
433 exaggerated dependency needs (Bornstein & Malka, 2009), and the borderline personality
434 certainly fits under this description as well. Dependent and histrionic personality disorders are
435 believed to have emerged from hysterical personality in the DSM-II (Disney, 2013).

436 A major distinguishing factor between them is their relative success at fulfilling their
437 social need. While all three involve a certain social dependency, it differs on the scale and type
438 of dependence. This is consistent with the hypothesis that the female brain is highly motivated to
439 be active in the social world. Reproductive success in women does not solely depend on their
440 social success. Having the greatest investment in offspring, women need to carefully choose their
441 sexual partners (Schmitt, 2015). As a matter of fact, sexual promiscuity in females is linked to
442 high-scores on measures of depression (Grello, Welsh, & Harper, 2006; Weisfeld & Woodward,
443 2004), emotional distress (Ethier et al., 2006), and psychological distress (Fielder & Carey, 2010;
444 Glenn & Marquardt, 2001), which is the opposite pattern than that of men's. The sexual
445 tendencies of the three personality disorders covered reveals different mating selection and
446 retention strategies.

447 Borderline personality disorder is a neurotic form of dependent personality disorder.
448 They crave their partner's commitment and sometimes engage in frantic and irrational acts to

449 avoid abandonment, such as accusing others of rape and violence, or having children for mate-
450 retention purposes. They are extremely dependent on a single relationship, until this relationship
451 suddenly loses all interest and another one is more inviting. People with borderline are always
452 dependent on someone, but the target of this dependency is rapidly changing. Thus, they
453 sacrifice sexual value to retain social relationships, as they are usually quite sexually
454 promiscuous (Hurlbert, Apt, & White, 1992; Mangassarian, Sumner, & O'Callaghan, 2015). In
455 essence, they obtain masculine investment at an extremely high cost, which also depletes
456 extremely fast. They are usually overweight (Sansone, Wiederman, & Monteith, 2001).
457 Borderline scores correlate 0.44 with body mass index. Similar to histrionics, they use sexuality
458 to obtain men's attention, but "engage" in the sex that histrionics tease with. Women with
459 borderline have more sexual assertiveness and erotophilic attitudes, meaning that they are more
460 willing to give the sex to obtain what they want (Hurlbert et al., 1992). As such, they *spend* the
461 sexual currency (Baumeister & Vohs, 2004) that they possess to obtain male investment, which
462 histrionics are known to withhold.

463 Histrionics are extremely dependent on the social world, but unlike the other two
464 personality profiles mentioned, they are dependent on a large number of people. In essence,
465 histrionics correspond more or less of what a typical feminine woman would dream to embody,
466 if the feminine psychology was indeed defined by a drive for socialization. Physical
467 attractiveness, committed and obsessive providing partner, and an extremely large social circle.
468 In regards to sexual attitudes, histrionic women have lower sexual assertiveness and have
469 erotophobic attitudes, demonstrating a lower willingness to have sex *per se*, but show more
470 sexual preoccupation, lower sexual desire, more marital dissatisfaction, more sexual boredom,
471 more orgasmic dysfunction, higher sexual self-esteem, and greater likelihood to have an

472 extramarital affair (Apt & Hurlbert, 1994). This suggests that they have more sexual potential,
473 and apply it discriminately. They are more likely to cheat, which suggests that monogamous
474 relationships limit their perceived potential gains. People with histrionic personality disorder are
475 more physically attractive than other personality disorders or no personality disorders (Bornstein,
476 1999). If achievable and maintainable, a histrionic presentation is the most evolutionarily
477 attractive, as it entails ultra-socialization, and also selective—but high in value—sexuality.
478 Histrionics are also known to *tease* men by appearing sexually interested, but are also known to
479 refuse actual contact (APA, 2013). As such, they successfully bargain interactions with men
480 without using their sexual currency. Teasing can be conceptualized as an unwillingness to
481 reciprocate a man’s investment. Their life strategy seems effective from an evolutionary
482 standpoint, as the bored histrionic vs. obsessive husband was once the most encountered case in
483 marital therapists (Martin & Waldo Bird, 1959). Although it seems like an adaptive strategy, it
484 also entails great social risks. Being loud and sexually provocative provides many opportunities
485 for “bitching”. As in psychopathy in men, it could be argued that histrionics play the
486 evolutionary game with the highest stakes.

487 Dependent personality disorder is a small scale dependence pattern, usually on a central
488 romantic figure that defines their lifestyle, tastes, activities, and values. In short, they are defined
489 by a single relationship in which they are deeply invested. As dependent girls usually have few
490 to no friendships, they can use their sexual value to satisfy this social urge in a romantic
491 relationship. Their social life is usually limited to one idealized partner. People with a dependent
492 personality seek relationships rapidly after one has ended, and become “indiscriminately attached
493 to another individual” (APA, 2013, p. 676). This involves collateral damage, however, as they
494 exert little discrimination in their mate choice. In this way, superordinate goals (quality of the

495 genetic material) are sacrificed for basic socializing needs. In sum, both social success and
496 sexual success are low in people with dependent personality disorder, as they have few social
497 bonds, and an indiscriminate mating pattern. However, it offers stability.

498 **Conclusion**

499 It seems accurate that the extreme female brain is defined by social hyper-sensitivity, as
500 the three mentioned disorders, characterized by an excessive social motivation, are all more
501 prevalent in women. All of the presented disorders are linked to excessive fear of abandonment
502 and reassurance (APA, 2013). This parallels the finding that 2D:4D ratios are positively
503 correlated to an external locus of control, i.e., the perception of effectively affecting outcomes
504 (Richards et al., 2015). It suggests that the female brain is expressed by an accentuated social
505 dependency, relative to the male brain.

506 This essay investigated the concept of an extreme female brain, originally based on
507 Baron-Cohen's Extreme Male Brain (1997, 2002, 2009) and Theory of Mind (Baron-Cohen,
508 Leslie, & Frith, 1985) theories of autism. The empathizing/systemizing theory proposes that the
509 extreme female brain would be characterized by superior mentalizing, but deficient systemizing.
510 Hence, the current review has argued that borderline, dependent, and histrionic personality
511 disorders are the best candidates to portray the extreme female brain, as they are all defined by a
512 strong social, empathizing need, and their epidemiology is strongly biased towards women. Their
513 success at being a social agent varies greatly. Whereas histrionics are clearly highly functioning
514 socially, the same cannot be said about borderlines, who have average (Dinsdale et al., 2016) to
515 poor social skills (Baez et al., 2015; Bouchard, Lussier, Sabourin, & Villeneuve, 2009; Franzen
516 et al., 2011; Levine et al., 1997), although they are indeed hyper-mentalizing (Sharp et al., 2011).
517 This reiterates the relevance of the position that the empathizing/systemizing drives are needs

518 that do not necessarily translate into superior skills. In aggregate, the hypothesis that the extreme
519 female brain is characterized by a strong empathizing drive is more than plausible, and gaining
520 materiality.

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