

### Introduction

Some neuropsychiatric disorders are thought to originate during fetal development, even if patients are not typically diagnosed until adolescence or young adulthood. Of these, most are much more common in males. Other disorders begin to manifest at puberty or later in life, and these occur more frequently in females. The biological reasons for these sex biases in disease prevalence are currently under investigation.

Credit: <http://www.the-scientist.com/?articles.view/articleNo/44096/title/Sex-Differences-in-the-Brain/>

### Major depressive disorder (female)

One of the most common neuropsychiatric disorders, MDD is considered strongly gender biased, with women twice as likely as men to be diagnosed. This bias is seen worldwide, suggesting a biological as opposed to cultural origin. Dysregulation of the stress axis and its convergence with the dynamic nature of reproductive hormones in women are implicated as root causes of greater risk in women, although more recent evidence suggests this dysregulation may have its origins in very early childhood. However, the importance of other variables contributing to the gender bias, such as the willingness of women to seek help while men tend to self-medicate with drugs and alcohol, cannot be discounted..

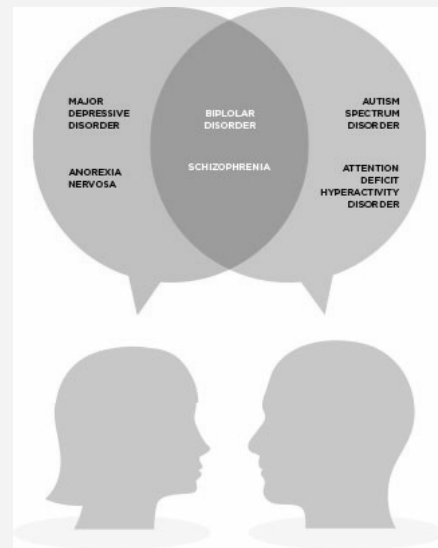
### Female: Anorexia nervosa

Strictly postpubertal in onset, anorexia nervosa is predominantly a young woman's disease, with a gender bias greater than 10:1 that is almost assuredly driven by perceived societal pressures. Interestingly, bulimia nervosa, a disorder of binge eating but in which normal body weight is maintained, is much less gender biased, with women only three times as likely as men to suffer the disorder.

### Female: Schizophrenia

When considered for the population overall, there is no clear gender bias in the frequency of schizophrenia. However, diagnosis is much more common in boys and young men than in girls, whereas diagnosis in middle age or older is substantially more frequent in women. Differential responses to stress, with distinct brain regions being over- or underactivated in men versus women, further contribute to divergence in the disease.

### Gender Bias



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### Female: Bipolar disorder

Rates of bipolar disorder do not vary between men and women, yet a genetic polymorphism strongly associated with the disorder is relevant to risk in women but not men. This highlights how much we have to learn about the nature of sex differences in neuropsychiatric disorders and the multiple ways in which some differences can manifest.

### Male: Autism spectrum disorder

While ASD was originally considered only twice as prevalent in boys, recent estimates put the ratio closer to 5:1. A currently popular but unproven theory postulates that elevated testosterone in utero leads to ASD-like behaviors by placing boys on the extreme end of the male spectrum. A counter-theory is that girls are underdiagnosed for ASD due to physician bias and a different presentation, with fewer social and cognitive defects. Others argue that girls are more resilient and require a greater load of genetic insult before the disorder manifests, and empirical evidence supports this view for those limited instances in which a genetic origin of ASD is clear..

### Male: Attention deficit hyperactivity disorder:

Reports of the degree to which ADHD occurs more frequently in boys than girls vary widely and are likely influenced as much by cultural factors as biological ones. Additionally, males tend to show greater impairments, making them at least four times more likely to be diagnosed.