The WAGER Vol. 11(2) – Down on Your Luck and Down in the Dumps: A Genetic Link?

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Many people suffering with pathological gambling also struggle with major depression. The co-occurrence of these two disorders has major implications for treatment and recovery: some symptoms (i.e., suicidality) can be an indicator for either disorder, which complicates both diagnosis and treatment when these disorders are present simultaneously. Past studies have found a genetic basis of pathological gambling (see The WAGER 7(28)). Research also has identified a genetic link between pathological gambling and other disorders, such as alcohol dependence (see The WAGER 5(28), 5 (29), and 7(29)). Though it is known that a relationship exists between pathological gambling and major depression, currently little is known about the nature of that relationship. This week The WAGER reviews a study by Potenza, Xian, Shah, Scherrer, and Eisen (2005) that investigated the relationship between the genetics of pathological gambling and the genetics of depression among men.

The researchers examined The Vietnam Era Twin (VET) Registry, a national sample of male twins; 10,253 individuals were eligible to participate. Of those eligible, researchers successfully recruited and interviewed 7,869 participants (1,125 twins without their counterpart, 1,874 monozygotic twin pairs, and 1,498 dizygotic twin pairs) to assess symptoms of pathological gambling and major depression. Interviews were conducted over the phone, using a computerized version of the Diagnostic Interview Schedule (DIS) for DSM-III-R.

Of the participants in the study, 112 (1.4%) met criteria for lifetime pathological gambling (PG), and 755 (9.6%) met criteria for lifetime major depression (MD). There was a high level of co-occurrence between these two disorders – participants with PG were four times more likely to have MD than those without. The results presented in Table 1 show that there was a greater likelihood that both members of a twin pair would meet criteria for pathological gambling if they were monozygotic twins than if they were dizygotic twins (i.e., tetrachoric correlations between twins of .62 compared to .40). The same held true for major

depression (i.e., .42 for monozygotic twins compared to .13 for dizygotic twins). Since monozygotic twins share 100% of their genes and dizygotic twins share only 50%, the fact that more monozygotic twin pairs than dizygotic twin pairs shared each of these disorders is evidence for a genetic influence on each disorder.

To investigate the overlap of the genetic influences on PG and MD, the researchers compared the co-occurrence of PG and MD within individuals in each group (i.e., how likely individuals in the DZ and MZ groups were to have one disorder if they had the other) to the co-occurrence of PG and MD in both members of MZ and DZ twin pairs (i.e., how likely one member of a twin pair in the DZ and MZ groups was to have both disorders if the other member had both disorders).

The co-occurrence of disorders at the individual level was similar for monozygotic (Rtet = .29) and dizygotic twins (Rtet = .33). However, the co-occurrence of PG and MD in both members of a twin pair was greater for monozygotic (Rtet = .22) than dizygotic (Rtet = .04) twins. This suggests that genetic influences contribute to the co-occurrence of pathological gambling and major depression.

Table 1: Correlations Between Pathological Gambling and Major Depression (adapted from Potenza et al., 2005)

Tetrachoric Correlations Between Twins for PG and MD			Tetrachoric Correlations For Co-Occurrence of PG and MD	
Zygosity	PG*	MD*	Within-Individual	Within Twin Pair
Monozygotic Twins	0.62 (0.10)	0.42 (0.06)	0.29 (0.10)	0.22 (0.11)
Dizygotic Twins	0.40 (0.16)	0.13 (0.07)	0.33 (0.10)	0.04 (0.14)

*As defined by DSM-III-R

The results of this study suggest that the link between pathological gambling and major depression is, at least partially, due to genetics. The genetic relationship between these two disorders suggests that there might be similarities between the disorders that could have an impact on treatment (i.e., pharmacological treatments for depression might also be helpful in treating pathological gambling). However, the genetic influences on these disorders are not solely responsible for their development: environmental factors play a key role in explaining the relationship between pathological gambling and major depression, as well, as evidenced by the small to moderate size of the cross-diagnosis correlation between monozygotic twins (i.e. .22). This is true for the development of most disorders. A better understanding of genetic influences and how the

environment affects these genetic predispositions is essential to a more complete understanding of how these disorders develop and how they can be treated optimally.

There are several limitations to this study. First, participants were mostly well-educated, middle aged (mean age of 42 years) white males. This might lessen the generalizability of this study's results to other populations, especially if the impact of unique environmental influences varies by age, gender, or ethnicity. Further research might try to determine whether these results are consistent for women and individuals from other ethnic backgrounds. Nonetheless, this study shows that the genetic overlap between pathological gambling and major depression, in addition to environmental influences, is important to consider when designing prevention and treatment programs for these disorders. Developments in this line of research could have important implications for the treatment of pathological gambling and major depression.

What do you think? Comments on this article can be addressed to Siri Odegaard.

References

Potenza, M. N., Xian, H., Shah, K., Scherrer, J. F., & Eisen, S. A. (2005). Shared Genetic Contributions to Pathological Gambling and Major Depression in Men. Archives of General Psychiatry, 62, 1015-1021.