

# **The WAGER Vol. 10(9) - Suicide and Pathological Gambling - The State of the Evidence and the Need to Improve Scientific Methods (Part 2)**

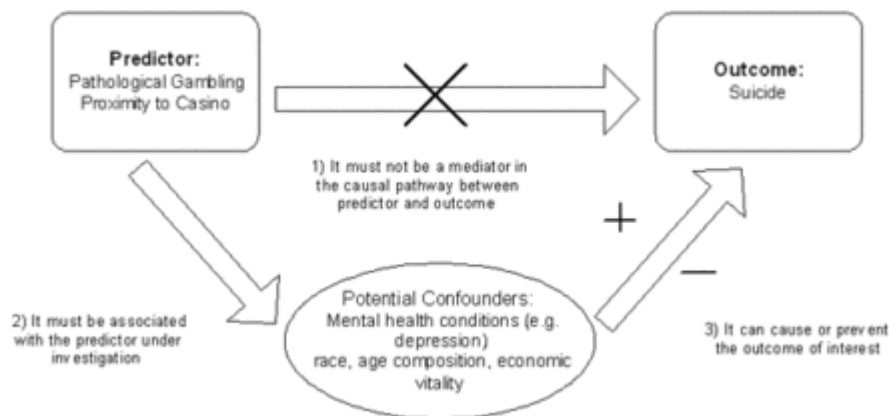
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An important question to ask when interpreting scientific research is: Does the association between variables represent a cause-effect relationship? This article is the second in a two-part series presenting the methodological issues confronting researchers who seek to identify a causal relationship between pathological gambling (PG) and suicide. As in the first part of this series, we hope to convey to readers the importance of reading research studies with a clear understanding and healthy skepticism of study methodology in order to better evaluate scientific evidence. The previous issue of the WAGER discussed how methodological problems such as bias (i.e., systematic error) or chance (i.e., random error) can lead to spurious findings or prevent detection of true associations; this week we conclude the series with a discussion of methodological issues such as confounding that can complicate, mislead or obscure the accurate interpretation of non-spurious associations in observational studies.

Confounding occurs when the apparent relationship between a predictor and outcome is influenced by other factors, some of which might be unmeasured or unrealized. For example, if a coach finds a relationship between the performance of her football team (wins) and the weather (rainy days), she might conclude that her team plays better in rainy conditions. However, if every game day that it does not rain, her team goes out for ice cream before the game, their performance might actually relate to the effect that eating ice-cream has on their performance rather than the weather. In general, a confounder is a mixing of effects that confuses an association. Figure 1 illustrates that a confounding variable must meet the following criteria: 1) it must not be a mediator in the causal pathway between predictor and outcome, 2) it must be associated with the predictor under investigation, 3) it can cause or prevent the outcome of interest (Last, 2001). It is

important to think critically about potential confounding when examining a reported cause-effect relationship. Unless researchers make deliberate adjustments, it is not possible to distinguish between the effect of confounding variables and the variables being studied (Hulley et al., 2001).

### Figure 1. Potential Confounders for the Association between Pathological Gambling and Suicide



Results from some gambling related research studies (Blaszczynski & Maccallum, 2003; Newman & Thompson, 2003) suggest that mental health conditions such as depression are potential confounders in the association between PG and suicidal ideation (see WAGERS 8(24) and 8(25)). For example, Newman and Thompson found a stronger association between major depression and attempted suicide than between PG and attempted suicide. This observation suggests that depression is either a mediator (i.e., it explains the relationship between PG and suicide - people who are pathological gamblers experience depression as a result of their gambling problems and that depression leads to suicide attempts) or a confounder (i.e., depression affects both suicide and PG — depressed people are both more likely to experience gambling problems and more likely to commit suicide) of the relationship between PG and suicide.

Recent studies (McCleary, Chew, Merrill, & Napolitano, 2002; Nichols, Stitt, & Giacopassi, 2004) considered proximity to casinos as a proxy for PG in the suicide/PG relationship, but found mixed evidence (see WAGER 7(35)). Even if research were to find a relationship between casino proximity and suicide, the methodological issues discussed above complicate the interpretation of those findings. There are potential confounders in the relationship between proximity to casino and suicide. For example, factors such as race, age composition, and economic vitality common to the population in regions near casinos might account

for the relationship (McCleary et al., 2002). Without specifically measuring gambling behavior or reason for suicide, scientists can not determine whether gamblers are committing the suicides that occur near casinos or whether these suicides are gambling-related.

Scientists can use study designs and analytic strategies to control for confounding. Investigators can match study subjects on the confounding variables before assignment to experimental groups or restrict the study to subjects who are homogenous on potential confounding measures (e.g., to study gambling's relationship to suicide, select subjects with a similar depression rating score to control for depression). During the analysis phase of a study, researchers can control for confounders by identifying the effects of potential confounders on outcomes and then focusing on the remaining effect potentially free of confounding influences (e.g., to examine the relationship between football performance and weather, measure and control for ice-cream intake). For any strategy to be effective, researchers need to collect data about these potential confounders (Hulley et al., 2001).

Suicide is a complex, multifactorial phenomena; consequently, it is both difficult and important to tease out the varied influences of different causes. Scientists must find creative new ways to design studies that minimize bias and confounding. For example, a multi-site, longitudinal study with comprehensive mental health assessment would enable scientists to gather detailed information on the temporal course of behaviors (e.g. whether pathological gambling preceded mental health conditions or vice versa) and the distribution of phenomena in different geographic regions. The WAGER will continue to report new and innovative research on the co-occurrence of PG and suicide.

What do you think? Comments on this article can be addressed to Allyson Peller.

## **References**

Blaszczynski, A., & Maccallum, F. (2003). Pathological gambling and suicidality: An analysis of severity and lethality. *Suicide and Life-Threatening Behavior*, 33(1), 88.

Hulley, S. B., Cummings, S. R., Warren, S. B., Grody, D., Hearst, N., & Newman, T. B. (2001). *Designing Clinical Research*. Philadelphia: Lippincott Williams and Wilkins.

Last, J. M. (Ed.). (2001). *A Dictionary of Epidemiology, Fourth Edition*. Oxford: Oxford University Press.

McCleary, R., Chew, K. S. Y., Merrill, V., & Napolitano, C. (2002). Does legalized gambling elevate the risk of suicide? An analysis of U.S. counties and metropolitan areas. *Suicide and Life-Threatening Behavior, 32*(2), 209-221.

Newman, S. C., & Thompson, A. H. (2003). A population-based study of the association between pathological gambling and attempted suicide. *Suicide & Life-Threatening Behavior, 33*(1), 80-87.

Nichols, M. W., Stitt, B. G., & Giacopassi, D. (2004). Changes in Suicide and Divorce in New Casino Jurisdictions. *Journal of Gambling Studies, 20*(4).