CHA Cambridge Health Alliance — Division on **Addiction**

HARVARD MEDICAL SCHOOL TEACHING HOSPITAL

Replication is fundamental, but is it common? A call for scientific self-reflection and contemporary research practices in gambling-related research

Researchers have not examined the gambling literature for signs of publication bias.

Advancing open science principles and practices and conducting replication studies will strengthen gambling studies literature.

The Problem

The Replication Crisis, which refers to observations of poor replication rates in the published behavioral research literature, relates to publication bias.

*As little as **40% of published findings replicate**. And, even if findings replicate, they have effect sizes that are 50% smaller.*

Replication: Repeating a study using the exact methods should lead to the same results, suggesting knowledge accuracy.

Publication Bias: Tendency to publish findings that meet some criteria, such as those that are statistically significant or novel, and ignore other results.

Effect Size: Statistical measure of the magnitude or strength of a scientific observation.

Behavioral Research: Systematic studies of individual and social behavior, such as gambling behavior.

The Causes

Researcher Degrees of Freedom: Amount of flexibility a researcher has in scientific study.

→ *Testing many different comparisons to find a statistically significant outcome.*

→ *Picking statistics that are more likely to yield a statistically significant outcome.*

→ *Dropping non-significant measures from a report.*

Hypothesizing After Results are Known (HARKing): Promoting an illusion that findings were predicted before they were known.

Low Power: Studies with small sample sizes that are insufficient to properly test specific scientific questions.

Biased Review: Rejecting methodologically sound papers that report non-significant findings as unimportant or replication studies as unoriginal.

The Solutions

Pre-Registration: Publicly documenting research plans, hypotheses, and analytic approaches prior to beginning a study.

Power Analysis: An assessment to ensure a planned sample size will be sufficient to properly test a specific scientific question and detect related effects.

Open Science Practices: Making study resources freely available for scientific use and review.

Open data, includes making study data publicly available for review and new studies.

Open materials, includes making measures, analytic code, and lab notes publicly available for use in new studies.

Open access, includes making publications easily available for free.

The Benefits

Assessing the replicability of the gambling literature will help us to understand the reliability of the published literature. Promoting open science helps accelerate science and create confidence in published research.

Is publication bias common?	Are open science practices common?	How replicable is the literature?
Shared behavioral research methods suggest the possibility of shared problems in the gambling research.	Systematic reviews will reveal the extent to which gambling studies researchers use open science.	Developing a research replication coalition will help estimate replication rates for gambling studies.