

Stability and Progression of Disordered Gambling: Lessons From Longitudinal Studies

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Objective: Few studies have explicitly examined the stability (that is, the tendency for individuals to stay at one diagnostic level as opposed to moving to another improved or worsened level) or progression of disordered gambling; however, conventional wisdom holds that disordered gambling is intractable and escalating. The objective of this study was to examine these assumptions.

Method: We reviewed 5 recent prospective studies of gambling behaviour among nontreatment samples for evidence related to the stability and progression of disordered gambling.

Results: Our review found no evidence to support the assumption that individuals cannot recover from disordered gambling (that is, the persistence assumption), no evidence to support the assumption that individuals who have more severe gambling problems are less likely to improve than individuals who have less severe gambling problems (that is, the selective-stability assumption), and no evidence to support the assumption that individuals who have some gambling problems are more likely to worsen than individuals who do not have gambling problems (that is, the progression assumption).

Conclusion: Contrary to professional and conventional wisdom suggesting that gambling problems are always progressive and enduring, this review demonstrates instability and multidirectional courses in disordered gambling.

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Clinical Implications

- There is considerable movement in and out of more severe and less severe levels of gambling disorder.
- The current evidence suggests that the general course of disordered gambling is in the direction of improved classifications: for individuals who experience maladaptive behaviour patterns (that is, Level 2 and Level 3 gamblers), the likelihood of improvement is high.
- To avoid positively biasing treatment-outcome research, research that involves estimating treatment outcome should measure or, if a controlled experiment is not possible, acknowledge the extent to which people with disorders improve on their own.

Limitations

- More research is needed to characterize the nature, determinants, and stability of the worsening of disordered gambling.
- Future research should use prospective designs to examine correlates of recovery patterns.
- It is possible that, even though the individuals in the studies tended toward improvement in their gambling behaviour, they might have replaced their disordered gambling with a different type of disordered behaviour (for example, smoking, compulsive shopping, or excessive drinking).

Key Words: *gambling, longitudinal, prospective, prevalence, public health, epidemiology*

Beginning in the latter half of the past century, legalized gambling has expanded rapidly.¹ In the wake of this growth, scientists and health care providers have devoted increased empirical attention to gambling and excessive gambling.^{2,3} The resulting research indicates that gambling and, more specifically, excessive gambling can be associated with numerous financial, physical, and mental health problems.⁴⁻⁶ Given such harms, it is important to characterize the distribution and determinants of disordered gambling as well as the natural rates of gambling problem development and abatement. These fundamental characteristics of disordered gambling will influence strategies for treatment and prevention.

Professional and Conventional Wisdom About Disordered Gambling: Content and Origins

Professional and conventional wisdom about disordered gambling, that is, common beliefs about gambling-related problems held by professionals and (or) the general public that do not necessarily have empirical support, suggests that it is both an enduring and a progressive disorder. For example, the DSM-IV holds that “the essential feature of Pathological Gambling is persistent and recurrent maladaptive gambling behaviour . . . that disrupts personal, family, or vocational pursuits.”^{7, p 671} The National Council on Problem Gambling echoes this position, stating on its website that problem gambling is:

a progressive addiction characterized by increasing preoccupation with gambling, a need to bet more money more frequently, restlessness or irritability when attempting to stop, ‘chasing’ losses, and loss of control manifested by continuation of the gambling behavior in spite of mounting, serious, negative consequences.⁸

Gamblers Anonymous similarly notes on its website that:

we are convinced that gamblers of our type are in the grip of a progressive illness. Over any considerable period of time we get worse, never better . . . compulsive gambling is an illness, progressive in its nature, which can never be cured, but can be arrested.⁹

The notion that disordered gambling is enduring and persistent is also evident in recent academic debate. For example, Slutske¹⁰ attributed the absence of past-year symptoms among subjects who met criteria for a lifetime diagnosis of pathological gambling to natural recovery among pathological gamblers. Soon after, the *American Journal of Psychiatry* published an exchange in which Afifi et al¹¹ disagreed with Slutske’s interpretation of her findings. Afifi et al argued

although some pathological gamblers are able to overcome their gambling problems, it is important to emphasize that the majority of individuals with a lifetime diagnosis of pathological gambling continue to experience some level of gambling-related problems in the past year.^{11, p 1297}

Slutske responded that the absence of evidence for recovery does not indicate a chronic or persistent course of disorder; that is, “those individuals who did not meet the criteria for ‘recovery’ in my study could have had a variety of courses of gambling problems.”^{12, p 1298} Both Afifi et al and Slutske agree, however, that “firm conclusions regarding chronicity and persistence will ultimately require the use of longitudinal prospective data.”^{12, p 1298}

In addition to conventional wisdom and language contained in professional diagnostic manuals (for example, the DSM), the tendency to conceptualize disordered gambling as enduring and progressive also could stem from 2 other sources. First, for the general population of North America, metaanalytic work indicated some evidence of small increases in rates of disordered gambling during the latter half of the 20th century.¹³ Second, epidemiologic research demonstrates the stability of population-based disordered gambling prevalence rates across seemingly disparate populations.¹⁴ More specifically, national surveys conducted around the world report distributions of past-year disordered gambling that are similar to each other (that is, within 2%; the range is 0.2% to 2.1%, with a median of 0.5%, and a mean of 0.9%).¹⁵⁻²³

Professional and Conventional Wisdom About Disordered Gambling: Inconsistencies

Neither the small, steady increase over time nor the appearances of disorder stability at the population level necessarily translate into disorder progress or stability at the individual level. Emerging research about the individual courses of other addictive behaviours indicates that symptom constancy is not necessarily a common feature of addictive behaviours. Further, the courses taken by individuals who experience addiction seldom reflect the public conception that addiction results in an inexorable escalation of problems. Perhaps the most famous example of this is the study by Robins et al,²⁴ which found high rates of spontaneous remission from heroin addiction among Vietnam Veterans on their return to the United States. Similarly, alcohol use disorders are unstable, exhibiting considerable remission rates. Using information from the National Epidemiological Survey of Alcohol and Related Conditions, Dawson et al²⁵ found that only 25% of those who met criteria for alcohol dependence prior to the past year met criteria for current alcohol dependence.

Longitudinal studies provide additional support of the symptom instability that retrospective studies (such as Dawson

et al²⁵) suggest. For example, a general population study examining the 3-year course of alcohol disorders as classified by the DSM-IV-TR⁷ showed that the vast majority of participants with alcohol abuse disorders were diagnostically unstable: 81% of baseline abusers were in remission 1 year later, and 85% were in remission 3 years later.²⁶ Alcohol dependence remission rates were also high: 67% at Year 1 and 74% at Year 3. Participants tended to sustain their remission, with about 82% of those followed remaining in remission at Year 3, 14% relapsed to dependence, and 4% relapsed to abuse.

Unfortunately, incidence and trajectory studies of addictive behaviour generally, and disordered gambling specifically, are rare. As mentioned earlier, one cross-sectional retrospective study¹⁰ found that, among individuals who reported a lifetime history of gambling disorder, between 36% and 39% did not experience gambling problems during the past year. Although such findings foster optimism about the plight of individuals who suffer with gambling problems, the methodological limitations of cross-sectional research are well-known.¹² Prospective longitudinal research is necessary to advance our understanding of the natural history of disordered gambling.

Professional and Conventional Wisdom About Disordered Gambling: An Opportunity for Reconsideration

Recently, there have been a few longitudinal studies on disordered gambling.^{27–39} Five nontreatment prospective studies from the peer-reviewed literature are now available to clarify the stability of disordered gambling symptoms. These studies report sufficient summary information to advance our knowledge about the nature and stability of disordered gambling in nontreatment samples.

In this review, we searched for evidence to support 2 primary stability-related predictions and one primary progression-related prediction. First, if disordered gambling is enduring and persistent, we would expect that, once present, disordered gambling (that is, Level 3 gambling problems that reach a clinical threshold) would be relatively inflexible and almost never absent; that is, we would not observe evidence of systematic reductions (above and beyond those associated with chance) in disordered gambling once it is evident. We refer to this as “the persistence assumption.” Second, if disordered gambling is more intractable as severity increases, we would expect that individuals who have numerous problems would be less likely to experience a reduction in classification status (that is, Level 3 gamblers moving to Level 2, subclinical gambling problems) than those individuals who have fewer problems (that is, Level 2 problem gamblers moving to Level 0–1, not gambling or gambling without problems). We refer to this as “the selective-stability assumption.” Third, if disordered

gambling is progressive, we would expect that individuals who have some problems (that is, Level 2) would be more likely later to report an increased level of disorder (that is, moving to Level 3), compared with those without problems initially (that is, Level 0–1 increasing to Level 2 or 3). We refer to this as “the progression assumption.”

Method: A New Examination of the Extant Literature

To identify the extant literature, we performed a literature review, using the PsycINFO database and the search terms: [(gamb* OR gaming) AND (longitud* OR prospective* OR traject*)]. The electronic search retrieved 92 peer-reviewed articles published by October 17, 2006. We reviewed the articles to determine whether they met our criteria for inclusion and exclusion. Studies met initial inclusion criteria if they pertained to gambling, reported empirical data, reported longitudinal data at the individual level, and measured gambling problems at multiple time points. We excluded studies that met the initial inclusion criteria if the studies used treatment samples, the research reported findings already available in other included articles, or the report did not include individual-level summary information about change in gambling problems across time. Of the 13 articles that met our initial inclusion criteria, we excluded 4 because they were treatment-outcome studies, 2 because they reported on datasets already analyzed as part of other articles in our sample of studies, and 2 because they did not include enough information about changes in gambling problems across time. This left 5 articles that met our criteria. Cross-referencing this search with a PubMed search revealed no additional articles that met the inclusion criteria.

The 5 identified peer-reviewed articles that met our criteria were Abbott et al,²⁷ DeFuentes-Merillas et al,²⁹ Shaffer and Hall,³² Slutske et al,³⁴ and Winters et al.³⁸ The 5 studies included in the current analysis used various assessment time points, populations, and measures of problem gambling (see Table 1).

Researchers measured the levels of gambling problems at successive periods, using either past-year or past-6-month time frames. The only exception was the measure of disordered gambling that DeFuentes-Merillas et al²⁹ used in their study, which relied on both lifetime (at Time 1) and past-year (at Time 2) frames of reference. Also, we only included the changes from the second measurement period through the fourth period in our analysis of Slutske et al³⁴ because their study used a lifetime measure at the first observation period. Three studies included 3 time points, and 2 studies included 2 time points. The intervals between assessments ranged from 1 to 7 years.

Table 1 Characteristics of included studies			
Study	Population	Timeline	Gambling measures
Abbott et al ²⁷	<i>n</i> = 143 Australian adult gamblers (one-half problem, one-half nonproblem gamblers at T1)	2 time points, 7 years apart	South Oaks Gambling Screen lifetime and past 6 months at T1 and T2; Level 0–1 = 2 or fewer symptoms, Level 2 = 3 to 4 symptoms, Level 3 = 5 or more symptoms
DeFuentes-Merillas et al ²⁹	<i>n</i> = 134 Dutch adult scratchcard buyers experiencing > 3 South Oaks Gambling Screen symptoms and buyers qualifying for DSM-IV problem gambling at T1	2 time points, 2 years apart	South Oaks Gambling Screen ⁶² (past year); Level 2 = 3 or fewer symptoms; DSM-IV (lifetime); Level 3 = 5 or more symptoms (no mania)
Shaffer and Hall ³²	<i>n</i> = 639 US casino employees (at T1–T3)	3 time points, separated by 1 year each	South Oaks Gambling Screen (past year); Level 0–1 = no symptoms, Level 2 = 4 or fewer symptoms, Level 3 = 5 or more symptoms
Slutske et al ³⁴	<i>n</i> = 468 US college freshmen at T1	4 time points, separated by 3 to 4 years each	Diagnostic Interview Schedule (DSM-III, then DSM-IV) ⁶¹ ; lifetime at T1, past year at T2 to T4; Level 0–1 = no symptoms, Level 2 = 1 or more symptoms
Winters et al ³⁸	<i>n</i> = 305 US general household; young adults (aged ~16 years at T1)	3 time points, separated by 2 years and 6 years, respectively	South Oaks Gambling Screen-Revised Adolescent ⁶³ at T1 and T2; South Oaks Gambling Screen at T3 (all past year); Level 0–1 = 1 or fewer symptoms, Level 2 = 2 to 3 symptoms, Level 3 = 4 or more symptoms

T1 = Time 1; T2 = Time 2; T3 = Time 3; T4 = Time 4

We created classification levels according to the measure-specific baseline gambling problem levels identified in each paper: Level 0–1, Level 2, and Level 3 (see Table 1). Level 0–1 represents no gambling or gambling without problems, Level 2 represents subclinical gambling problems, and Level 3 represents gambling problems that reach a measure's clinical threshold.⁴⁰ This level system has its roots in a public health approach to metaanalysis.^{13,32,41–43} By providing a single framework to integrate similar evidence that authors might have described differently, this system is gaining popularity both as a method for describing individual study results and as a strategy for integrating findings.^{1,17,19,44} In addition, this approach avoids the pejorative strategy of labelling individuals rather than describing their behaviour.

We could not examine all our research questions in some studies. For example, in the Slutske et al³⁴ study, we could not examine the persistence or selective-stability assumptions with respect to Level 3 gamblers because that study did not locate any Level 3 individuals. Also, in the

DeFuentes-Merrillas et al²⁹ study, we could not examine fully the progression assumption because that study did not include any Level 0–1 individuals at baseline.

We defined the following classification configurations to describe 4 primary gambling courses:

- Improving = decreased number of gambling problems sufficient to reduce the classification level from baseline with no period of increase.
- Worsening = increased number of gambling problems sufficient to increase the classification level from baseline with no period of reduction.
- Stable = consistent classification level of gambling problems across all time points.
- Variable = fluctuation of gambling problems sufficient to vary without a consistent direction the classification level of disorder across time points.

Baseline Level	Gambling behaviour trajectory, %			
	Worsening	Improving	Stable	Variable
Abbott et al²⁷				
Level 0–1 (<i>n</i> = 108)	6.5	—	93.5	—
Level 2 (<i>n</i> = 22)	13.6	77.3	9.1	—
Level 3 (<i>n</i> = 13)	—	76.9	23.1	—
DeFuentes et al²⁹				
Level 0–1 (<i>n</i> = 0)	—	—	—	—
Level 2 (<i>n</i> = 134)	4.5	81.3	14.2	—
Level 3 (<i>n</i> = 18)	—	88.9	11.1	—
Shaffer and Hall³²				
Level 0–1 (<i>n</i> = 495)	3.4	—	93.1	3.4
Level 2 (<i>n</i> = 118)	5.9	54.4	25.4	14.4
Level 3 (<i>n</i> = 26)	—	49.9	19.2	30.8
Slutske et al³⁴				
Level 0–1 (<i>n</i> = 377)	1.6	—	96.6	1.9
Level 2 (<i>n</i> = 11)	0.0	90.9	9.1	0.0
Level 3 (<i>n</i> = 0)	—	—	—	—
Winters et al³⁸				
Level 0–1 (<i>n</i> = 251)	23.5	—	72.5	3.6
Level 2 (<i>n</i> = 47)	4.2	80.8	8.5	6.4
Level 3 (<i>n</i> = 7)	—	71.5	28.6	0.0

Results: The Persistence Assumption

If it is accurate that disordered gambling is chronic, then we would expect no systematic change (that is, beyond chance) in diagnostic level among successive classifications of Level 3 gamblers. Therefore, we would reject the hypothesis of no change if the proportion of Level 3 gamblers who prospectively report a less severe level of disordered gambling is greater than the study's margin of measurement error for change (for example, standard deviation). The Slutske et al³⁴ study was not included in these tests because it did not locate any baseline Level 3 gamblers. The analyses revealed that, in the studies by Winters et al,³⁸ Abbott et al,²⁷ DeFuentes-Merrillas et al,²⁹ and Shaffer and Hall,³² the observed proportion of Level 3 gamblers at baseline who reduced their level of severity exceeded the study's corresponding margin of error (that is, improvement among Level 3 gamblers that could be attributed to chance; study Level 3 margins of error were 38%, 28%, 24%, and 20%, respectively). Therefore, for every study, the proportion of Level 3 gamblers improving was greater than zero (See Table 2).

A more conservative test of this hypothesis (that is, some value greater than 0, or no change) would require surpassing some rate of decrease in severity rather than requiring no decrease at all. The highest rate of classification improvement among Level 3 gamblers, at which all studies still exceeded their corresponding margin of measurement error for change, was 29%. In other words, the rates of classification improvement among Level 3 gamblers in each study were at least significantly greater than 29%. Consequently, these results reveal that the extant research does not support the persistence assumption.

Results are similar for Level 2 gamblers. More specifically, in the studies by Slutske et al,³⁴ Abbott et al,²⁷ Winters et al,³⁸ Shaffer and Hall,³² and DeFuentes-Merrillas et al,²⁹ the observed proportion of Level 2 gamblers at baseline who reduced their level of severity exceeded each study's corresponding margin of error (that is, improvement among Level 2 gamblers that could be attributed to chance; study Level 2 margins of error were 30%, 21%, 15%, 9%, and 9%, respectively). Therefore, for every study, the proportion of Level 2 gamblers improving was greater than zero. In fact, the rates of

classification improvement among Level 2 gamblers in each study were at least statistically significantly greater than 45%.

Results: The Selective-Stability Assumption

To test this assumption, for each study, we compared improving classification rates with other rates (that is, stable, worsening, or variable rates) for individuals with Level 3 and Level 2 gambling. If rates of improving, relative to other alternatives, were greater for Level 2 than for Level 3 gambling individuals, we would find support for the selective-stability assumption. The Slutske et al.³⁴ study was not included in this analysis because it did not locate any baseline Level 3 gamblers. Studies by Winters et al.,³⁸ Abbott et al.,²⁷ DeFuentes-Merrillas et al.,²⁹ and Shaffer and Hall³² indicated that improving classification rates, relative to other alternatives, were not different for Level 3 and Level 2 gambling individuals ($\chi^2 = 0.33$, *df* 2, $P > 0.10$; $\chi^2 = 0.00$, *df* 2, $P > 0.10$; $\chi^2 = 0.62$, *df* 2, $P > 0.10$, and $\chi^2 = 0.15$, *df* 2, $P > 0.10$, respectively). Therefore, this analysis reveals that the extant research does not support the selective-stability assumption.

Results: The Progression Assumption

To test the progression assumption, for each study, we compared rates of worsening classification with other rates (that is, stable, improving, or variable rates) among gamblers classified as Level 0–1 and Level 2. We excluded DeFuentes-Merrillas et al.²⁹ from this analysis because that study did not include baseline data on Level 0–1 gamblers. The studies by Abbott et al.,²⁷ Shaffer and Hall,³² and Slutske et al.³⁴ indicated that classification worsening rates were not different for Level 0–1 and Level 2 gamblers ($\chi^2 = 1.32$, *df* 2, $P > 0.10$; $\chi^2 = 1.58$, *df* 2, $P > 0.10$; and $\chi^2 = 0.18$, *df* 2, $P > 0.10$, respectively). The Winters et al.³⁸ study indicated, contrary to prediction, that Level 0–1 gamblers were significantly more likely to experience worsening classification rates than Level 2 gamblers ($\chi^2 = 9.28$, *df* 2, $P < 0.01$). These results reveal that the extant research does not support the progression assumption—that is, individuals with Level 2 gambling problems are more likely to increase their level of disorder than those without symptoms (that is, Level 0–1), with one study suggesting that the opposite is true.

An alternative test of the progression assumption examined whether the rates of worsening among Level 2 gamblers would exceed rates possibly attributable to chance (that is, the margin of error). In studies by Slutske et al.,³⁴ Abbott et al.,²⁷ Winters et al.,³⁸ Shaffer and Hall,³² and DeFuentes-Merrillas et al.,²⁹ the observed proportions of Level 2 gamblers at baseline who increased their level of severity never exceeded the studies' corresponding margin of error (that is, worsening among Level 2 gamblers that could be attributed to chance; as noted previously, study Level 2 margins of error were 30%,

21%, 15%, 9%, and 9%, respectively). Therefore, we did not find evidence that the proportion of Level 2 gamblers worsening was greater than zero.

Discussion

The observed patterns of changes in levels of gambling behaviour were consistent across studies. Although the small number of longitudinal studies included in this review might lead some observers to conclude that this paper is premature for the field, our study used these published studies to provide important new analyses not included in the original studies. These findings are novel and support an unconventional view that recognizes greater flexibility in the nature of disordered gambling than has commonly been anticipated. We gleaned data from studies that, considered individually, might not challenge prevailing beliefs about the nature of gambling-related problems. We believe that the cumulative view offered here is a strong challenge to those beliefs.

Epidemiologic evidence has repeatedly revised popular and professional perspectives about addictive behaviour patterns. For example, although addictions of all types have historically been considered intractable, the evidence that some individuals can control their use of opioids,^{45–47} return to the moderate use of alcohol,^{48,49} and stop using nicotine, cocaine, opioids or gambling without treatment^{10,50–58} contradicts that position. Given the accumulating evidence indicating that the pathways into and away from various expressions of addiction are more similar than different,⁵⁹ it should not be surprising that the epidemiology of intemperate gambling suggests similar revisions to the widely held beliefs about its trajectory.

Research examining the trajectory of disordered gambling at the individual level is rare but growing. In the absence of systematic research, conventional wisdom suggests that rates of gambling problems will reflect the accumulation of more symptoms over time and, consequently, the progression from subclinical to clinical levels of gambling problems. This study, however, reveals a pattern for the course of gambling-related problems that is different from the commonly held view. Although individuals who do not gamble or who gamble without problems tend to remain problem-free, transition between levels of disordered gambling is common. The current evidence suggests that the general course of disordered gambling is in the direction of improved classifications. For individuals who experience maladaptive behaviour patterns (that is, Level 2 and Level 3 gamblers), the likelihood of improvement is high. These longitudinal research findings are consistent with retrospective analyses that have shown rates of recovery from Level 3 gambling that are higher than anticipated.¹⁰

Caveats and Future Directions

Although rates of improvement are higher than many might have expected, and the rates of worsening, particularly for Level 2 gamblers, are lower than might have been expected, researchers and treatment providers should note that improvement is not a certainty and the rates of worsening are still substantial. More research is needed to characterize the nature, determinants, and stability of such worsening. Understanding the variety of biological, psychological, and social factors that influence gambling problem progression will serve as the foundation for the development of effective and efficacious prevention efforts.

Further, the absence of symptoms does not necessarily indicate the absence of a disorder. Many clinicians will be familiar with the term, “white knuckled recovery,” which alludes to individuals who no longer report symptoms of a particular disorder, but under significant personal effort and emotional cost. In this study, we report rates of classification change, but determining rates of symptom suppression is beyond the scope of this work.

Researchers and treatment providers might consider another possible explanation for decreases in classifications, namely, addiction hopping. Emerging perspectives on addiction⁵⁹ suggest that addiction, like a syndrome, can manifest in multiple ways; therefore, individuals can have simultaneous multiple expressions of addiction (for example, chemical and behavioural) and experience numerous transitions between different expressions of addiction (that is, addiction hopping). Consequently, it is possible that, even though the individuals in the studies tended toward improvement in their gambling behaviour, they might have replaced their disordered gambling with a different type of disordered behaviour (for example, smoking, compulsive shopping, or excessive drinking).

The similarity of stable, worsening, and improving rates for each level of gambling across studies is particularly notable because the studies included in this analysis used such varied follow-up periods and populations (for example, the general population, adolescents, and gamblers). We observed similar fluctuation in gambling-related problems in each of the studies regardless of differences in follow-up design and the populations of interest. The small number of studies precludes confident interpretation about the possible effect that differences in the number and intervals of follow-up assessments, as well as population differences (such as gambling populations as opposed to general population studies), might have on the observed rates. Additional studies will be necessary to confirm the extent of agreement in the tendencies observed in these studies. However, it is evident that the severity and direction of gambling-related problems fluctuate between any given time points. More research is necessary to define the

pattern of fluctuation more specifically (for example, the speed with which fluctuations occur).

The studies included in this analysis used different instruments and employed different follow-up periods. The trajectory patterns for individuals are similar across studies regardless of heterogeneity among rates of classification; however, we must consider whether such variability in classification rates is a reality or an artifact of instrumentation. It is possible that the findings of unstable gambling rates reflect unreliability in measurement over time rather than changes in the level of gambling-related problems. The diversity of instruments included in this review provides some protection from the possibility that instrument unreliability is the source of these changes. Nevertheless, the reliability of instrumentation remains an important topic to investigate.

The present research relied on professional conventions of assessment and diagnosis (that is, symptom counts used to classify gamblers into subclinical and clinical levels of disorder). It is possible that symptom counts do not indicate severity; however, if they do reflect severity, our findings using these counts did not support the hypothesis that disordered gambling is progressive. Nevertheless, a professional convention that does not rely on symptom counts might reach different conclusions. For example, an individual theoretically could confirm the same number of criteria at 2 time points but endorse different symptoms each time or endorse them in a different way, indicating that the disorder has progressed in some way. As the field moves toward DSM-V and more diagnostic maturity, it is important to consider such possibilities.

Future research should use prospective designs to examine correlates of recovery patterns. For treatment planning and matching purposes, it would be advantageous to know, for example, whether a particular individual is more or less likely to show a pattern of classification stability, variability, increase, or decrease. Such knowledge would permit health care providers to better tailor treatment plans to help maintain and stabilize positive changes and prevent the onset of worsening. Although some research has examined correlates of recovery and relapse retrospectively,⁶⁰ the difficulties associated with retrospective methodologies are many and well-known. Further, to avoid positively biasing treatment outcome research, research that involves estimating treatment outcome should measure or, if a controlled experiment is not possible, acknowledge the extent to which people with disorders improve on their own.

Conclusions

Although it might be tempting to assume that stability or progressive worsening characterizes disordered gambling, longitudinal study of classification patterns does not support this

conclusion. Studies with both short-term and long-term follow-up periods indicate that, while healthy gambling (and nongambling) behaviour appears to be relatively stable, individuals with some gambling problems experience considerable movement in and out of more severe and less severe levels of gambling disorder and, often, considerable movement out of more severe levels without a return to those levels. These findings challenge many common beliefs about the course of gambling-related problems and disorders. Correcting such misconceptions is particularly important to youthful fields of inquiry, such as the study of disordered gambling.

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References

- National Research Council. *Pathological gambling: a critical review*. Washington (DC): National Academy Press; 1999.
- Eber GB, Shaffer HJ. Trends in bio-behavioral gambling studies research: Quantifying citations. *J Gambl Stud*. 2000;16:461–467.
- Shaffer HJ, Stanton MV, Nelson SE. Trends in gambling studies research: quantifying, categorizing, and describing citations. *J Gambl Stud*. 2006;22:427–442.
- Crockford DN, el-Guebaly N. Psychiatric comorbidity in pathological gambling: a critical review. *Can J Psychiatry*. 1998;43:43–50.
- Cunningham-Williams RM, Cottler LB, Compton WM, et al. Problem gambling and comorbid psychiatric and substance use disorders among drug users recruited from drug treatment and community settings. *J Gambl Stud*. 2000;16:347–376.
- Shaffer HJ, Korn DA. Gambling and related mental disorders: a public health analysis. *Annu Rev Public Health*. 2002;23:171–212.
- American Psychiatric Association. *DSM IV-TR: Diagnostic and statistical manual of mental disorders*. 4th ed. Text revision. Washington (DC): American Psychiatric Association; 2000.
- What is problem gambling? [Internet]. Washington (DC): National Council on Problem Gambling [cited May 17 2006]. Available from: <http://www.ncpgambling.org/>.
- About Gamblers Anonymous [Internet]. Los Angeles (CA): Gamblers Anonymous [cited 2006 May 17]. Available from: <http://www.gamblersanonymous.org/about.html>.
- Slutske WS. Natural recovery and treatment-seeking in pathological gambling: results of two US national surveys. *Am J Psychiatry*. 2006;163:297–302.
- Afifi TO, Cox BJ, Sareen J. Gambling-related problems are chronic and persist for the majority of individuals with a lifetime diagnosis of pathological gambling [letter]. *Am J Psychiatry*. 2006;163:1297.
- Slutske WS. On the limits of cross-sectional retrospective data for characterizing the course of pathological gambling and its relation with comorbid psychopathology: a reply to Afifi, Cox, and Sareen [letter]. *Am J Psychiatry*. 2006;163:1297–1298.
- Shaffer HJ, Hall MN. Updating and refining prevalence estimates of disordered gambling behaviour in the United States and Canada. *Can J Public Health*. 2001;92:168–172.
- Shaffer HJ, LaBrie R, LaPlante D, et al. The road less travelled: moving from distribution to determinants in the study of gambling epidemiology. *Can J Psychiatry*. 2004;49:504–516.
- Abbott MW. Problem and non-problem gamblers in New Zealand: a report on phase two of the 1999 National Prevalence Survey. Report number six of the New Zealand Gaming Survey. Wellington (NZ): New Zealand Department of Internal Affairs; 2001.
- Bondolfi G, Osiek C, Ferrero F. Prevalence estimates of pathological gambling in Switzerland. *Acta Psychiatr Scand*. 2000;101:473–475.
- Collins P, Barr G. Gambling and problem gambling in South Africa: a national study [Internet]. National Center for the Study of Gambling; 2001 [cited 2003 Dec 1]. Available from: http://www.responsiblegambling.co.za/gamblingreprot_pretext%20design.pdf
- Götestam KG, Johansson A. Characteristics of gambling and problematic gambling in the Norwegian context: a DSM-IV-based telephone interview study. *Addict Behav*. 2003;28:189–97.
- Petry NM, Stinson FS, Grant BF. Comorbidity of DSM-IV pathological gambling and other psychiatric disorders: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *J Clin Psychiatry*. 2005;66:564–574.
- Plant M, Miller P, Plant M. The relationship between alcohol consumption and problem behaviours: gender differences among British adults. *Journal of Substance Use*. 2005;10:22–30.
- Productivity Commission. *Australia's gambling industries: final report*. Canberra (AUS): AusInfo; 1999.
- Sproston K, Erens B, Orford J. *Gambling behaviour in Britain: results from the British gambling prevalence survey*. London (GB): National Centre for Social Research; 2000. p 91.
- Volberg RA, Abbott MW, Roennberg S, et al. Prevalence and risks of pathological gambling in Sweden. *Acta Psychiatr Scand*. 2001;104:250–256.
- Robins LN, Davis DH, Goodwin DW. Drug use by US Army enlisted men in Vietnam: a follow-up on their return home. *Am J Epidemiol*. 1974;99:235–249.
- Dawson DA, Grant BF, Stinson FS, et al. Recovery from DSM-IV alcohol dependence: United States, 2001–2002. *Addiction*. 2005;100:281–289.
- de Bruijn C, Van den Brink W, de Graaf R, et al. The three year course of alcohol use disorders in the general population: DSM-IV, ICD-10 and the Craving Withdrawal Model. *Addiction*. 2006;101:385–392.
- Abbott MW, Williams MM, Volberg RA. A prospective study of problem and regular nonproblem gamblers living in the community. *Subst Use Misuse*. 2004;39:855–884.
- Barnes GM, Welte JW, Hoffman JH, et al. Shared predictors of youthful gambling, substance use, and delinquency. *Psychol Addict Behav*. 2005;19:165–174.
- DeFuentes-Merillas L, Koeter MW, Schippers GM, et al. Temporal stability of pathological scratchcard gambling among adult scratchcard buyers two years later. *Addiction*. 2004;99:117–127.
- Hodgins DC, el-Guebaly N. Retrospective and prospective reports of precipitants to relapse in pathological gambling. *J Consult Clin Psychol*. 2004;72:72–80.
- Jacques C, Ladouceur R, Ferland F. Impact of availability on gambling: a longitudinal study. *Can J Psychiatry*. 2000;45:810–815.
- Shaffer HJ, Hall MN. The natural history of gambling and drinking problems among casino employees. *J Soc Psychol*. 2002;142:405–424.
- Slutske WS, Caspi A, Moffitt TE, et al. Personality and problem gambling: a prospective study of a birth cohort of young adults. *Arch Gen Psychiatry*. 2005;62:769–775.
- Slutske WS, Jackson KM, Sher KJ. The natural history of problem gambling from age 18 to 29. *J Abnorm Psychol*. 2003;112:263–274.
- Vachon J, Vitaro F, Wanner B, et al. Adolescent gambling: relationships with parent gambling and parenting practices. *Psychol Addict Behav*. 2004;18:398–401.
- Vander Bilt J, Dodge H, Pandav R, et al. Gambling participation and social support among older adults: a longitudinal community study. *J Gambl Stud*. 2004.
- Wiebe J, Single E, Falkowski-Ham A. Exploring the evolution of problem gambling: one year follow-up study [Internet]. Toronto (ON): The Responsible Gaming Council; 2003 [cited 2007 Sep 5]. Available from: <http://www.responsiblegambling.org/en/research/rcgresearch-details.cfm?intID=6170>
- Winters KC, Stinchfield RD, Botzet A, et al. A prospective study of youth gambling behaviors. *Psychol Addict Behav*. 2002;16:3–9.
- Winters KC, Stinchfield RD, Botzet A, et al. Pathways of youth gambling problem severity. *Psychol Addict Behav*. 2005;19:104–107.
- Shaffer HJ, Hall MN. Estimating the prevalence of adolescent gambling disorders: a quantitative synthesis and guide toward standard gambling nomenclature. *J Gambl Stud*. 1996;12:193–214.
- Shaffer HJ, Eber GB, Hall MN, et al. Smoking behavior among casino employees: Self-report validation using plasma cotinine. *Addict Behav*. 2000;25:693–704.
- Shaffer HJ, Freed CR, Healea D. Gambling disorders among homeless persons with substance abuse disorders seeking treatment at a community center. *Psychiatr Serv*. 2002;53:1112–1117.
- Shaffer HJ, Hall MN, Vander Bilt J. Estimating the prevalence of disordered gambling behavior in the United States and Canada: a research synthesis. *Am J Public Health*. 1999;89:1369–1376.
- Westphal JR, Rush JA, Stevens L. Problem and pathological gambling behaviors within specific populations in the state of Indiana. Shreveport (LA): Gambling Studies Unit, Department of Psychiatry, Louisiana State University Medical Center; 1998.
- Zinberg NE, Harding WM. Control over intoxicant use: pharmacological, psychological, and social considerations. New York (NY): Free Press; 1982.
- Zinberg NE, Harding WM, Winkler M. A study of social regulatory mechanisms in controlled illicit drug users. *J Drug Issues*. 1977;7:117–133.

47. Zinberg NE, Jacobson RC. The natural history of chipping. *Am J Psychiatry*. 1976;133:37–40.
48. Cunningham JA, Sobell LC, Sobell MB, et al. Resolution from alcohol problems with and without treatment: reasons for change. *J Subst Abuse*. 1995;7:365–372.
49. Sobell LC, Cunningham JA, Sobell MB. Recovery from alcohol problems with and without treatment: prevalence in two population surveys. *Am J Public Health*. 1996;86:966–972.
50. Hodgins DC, Wynne H, Makarchuk K. Pathways to recovery from gambling problems: follow-up from a general population survey. *J Gambl Stud*. 1999;15:93–104.
51. Schachter S. Recidivism and self-cure of smoking and obesity. *Am Psychol*. 1982;37:436–444.
52. Shaffer HJ, Jones SB. *Quitting cocaine: the struggle against impulse*. Lexington (MA): Lexington Books; 1989.
53. Waldorf D. Natural recovery from opiate addiction: some social-psychological processes of untreated recovery. *J Drug Issues*. 1983;237–280.
54. Waldorf D, Biernacki P. Natural recovery from opiate addiction: a review of the incidence literature. *J Drug Issues*. 1979;9:282–289.
55. Waldorf D, Biernacki P. The natural recovery from opiate addiction: some preliminary findings. *J Drug Issues*. 1981;9:61–76.
56. Waldorf D, Biernacki P. Natural recovery from heroin addiction: a review of the incidence and literature. In: Zinberg NE, Harding WM, editors. *Control over intoxicant use: pharmacological, psychological, and social considerations*. New York (NY): Human Sciences Press; 1982. p 173–181.
57. Waldorf D, Reinman C, Murphy S. Cocaine changes: the experience of using and quitting. Philadelphia (PA): Temple University Press; 1991.
58. Winick C. Maturing out of narcotic addiction. *Bull Narc*. 1962;14:1–7.
59. Shaffer HJ, LaPlante DA, LaBrie RA, et al. Toward a syndrome model of addiction: multiple expressions, common etiology. *Harv Rev Psychiatry*. 2004;12:367–374.
60. Hodgins DC, Makarchuk K, El-Guebaly N, et al. Why problem gamblers quit gambling: a comparison of methods and samples. *Addiction Research and Theory*. 2002;10:203–218.
61. Robins LN, Helzer JE, Croughan JL, et al. National Institute of Mental Health Diagnostic Interview Schedule: its history, characteristics, and validity. *Arch Gen Psychiatry*. 1981;38:381–389.
62. Lesieur HR, Blume SB. The South Oaks Gambling Screen (SOGS): a new instrument for the identification of pathological gamblers. *Am J Psychiatry*. 1987;144:1184–1188.
63. Winters KC, Stinchfield RD, Fulkerson J. Toward the development of an adolescent gambling problem severity scale. *J Gambl Stud*. 1993;9(1):63–84.

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Résumé : Stabilité et progression des problèmes de jeu : les leçons d'une étude longitudinale

Objectif : Peu d'études ont examiné explicitement la stabilité (c'est-à-dire, la tendance des personnes à demeurer à un stade diagnostique, par opposition à passer à un autre niveau meilleur ou pire) ou la progression des problèmes de jeu; toutefois, les idées reçues soutiennent que le jeu pathologique est insoluble et croissant. Cette étude visait à examiner ces hypothèses.

Méthode : Nous avons cherché, dans 5 études prospectives récentes de comportement de jeu chez des échantillons sans traitement, des données probantes liées à la stabilité et à la progression des problèmes de jeu.

Résultats : Notre recherche n'a pas trouvé de données probantes à l'appui de l'hypothèse que les personnes ne peuvent pas se rétablir du jeu pathologique (c'est-à-dire, l'hypothèse de persistance), ni de données probantes soutenant l'hypothèse que les personnes qui ont des problèmes de jeu plus graves sont moins susceptibles de s'améliorer que celles dont les problèmes sont moins graves (c'est-à-dire, l'hypothèse de stabilité sélective), ni non plus de données probantes appuyant l'hypothèse que les personnes qui ont certains problèmes de jeu sont plus susceptibles de s'aggraver que celles qui n'ont pas de problèmes de jeu (c'est-à-dire, l'hypothèse de progression).

Conclusion : Contrairement aux notions professionnelles et aux idées reçues suggérant que les problèmes de jeu sont toujours progressifs et persistants, cette étude démontre l'instabilité et l'évolution multidirectionnelle des problèmes de jeu.