

The Growth and Recognition of Behavioural Addictions

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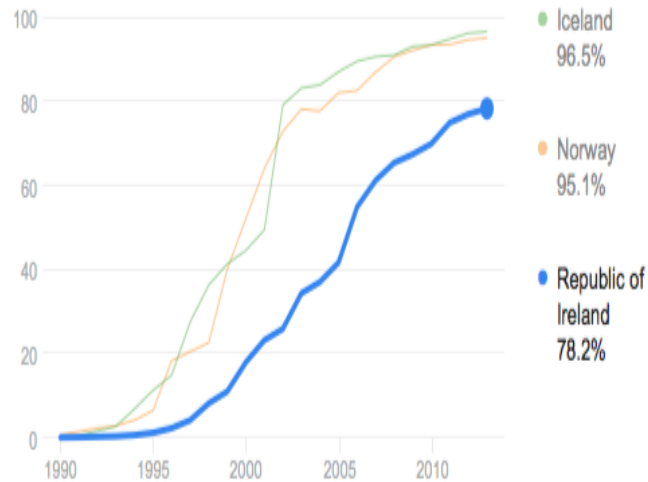
- * Specialist addiction facility Dublin
- * Detox, rehab & aftercare
- * Full range of inpatient and outpatient psychiatric services on site



*Growth of the internet...

78.2% of the population (2013)

Republic of Ireland, Internet users



Business / Sectors / Technology

Smartphone use in Republic hits record high of 59%

Comreg says latest figures for second quarter represent 14.7% jump on previous period



* “42% rise in online revenue”

* “58% of online revenue from tablet and smartphone betting”

PADDYPOWER.



*Growth of online
addictions...

Sports betting

Home

Top Sports
Football
Horse Racing

Next Horse Races
10.20 Flamingo Park
10.50 Flamingo Park
11.20 Flamingo Park

Quick Links
Premier League
Euro 2016
Australia v South Africa
Autumn Internationals
Transfer Fund

A-Z Sports
American Football
Aussie Rules
Baseball
Basketball
Boxing
Chess

itv4 Sunday 19:45


Italy v Croatia

£10 bet returns £55

Add to Bet Slip 9/2

View all markets

Join Now Italy v Croatia LIVE Taylor v Chisnall







sky VEGAS

Deposit £10
Play with £20

More Info

18+ T&CS APPLY

LIVE On TV 4 Football 12 Tennis 2 Darts 1 Golf 1 All 32

| | | | | | |
|---|---|------------------------------------|-------------|--------------|--------------|
|  | Football, Football Live Santos SP v Cruzeiro | Score 0 - 0 | Win 7/4 | Draw 7/4 | Win 7/4 |
|  | Darts, Darts Live Dave Chisnall v Phil Taylor | Score 0 - 5 | Win 20/1 | — | Win 1/200 |
|  | Golf, Golf Live OHL Classic | Favourite Danny Lee 11/8 | | | |
|  | American Football, American Football Live Kansas City v Seattle | Score 14 - 13 | Win 4/5 | Win 10/11 | |

**RONALDO
TO BE SENT OFF**

10/1

bet365

LESTER
RAY

bet
365

FR58.12

98.5%

98.4%



egaming



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Instant play, it's never been easier to choose red or black to double your stack!

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Join the thrill of online poker - big money tournaments, plus new player & monthly bonus

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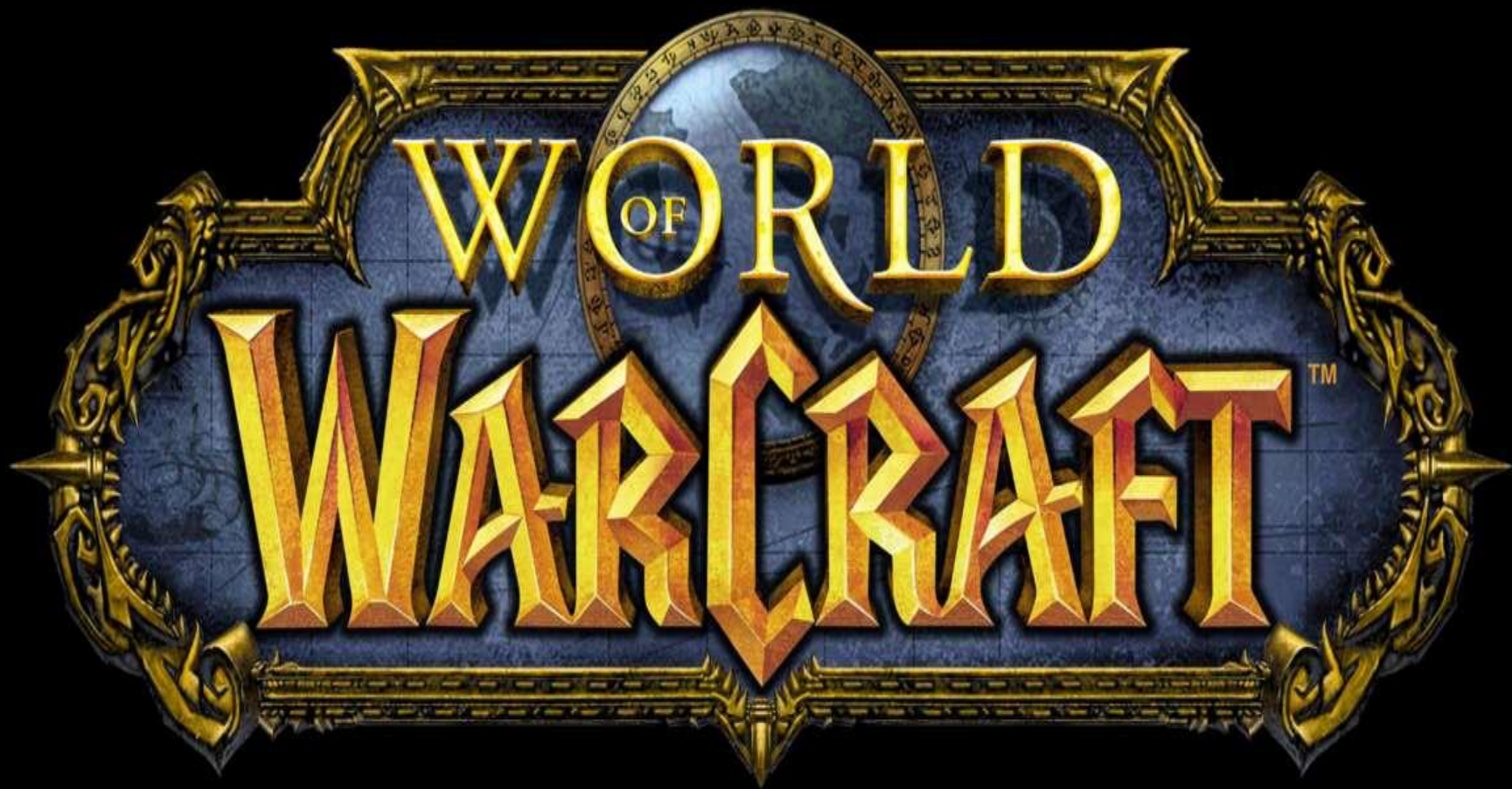
[Live Casino](#)

Watch the dealers turn your cards and see the action unfold live before your eyes!

[Live Casino - Enter Now](#)

Massively Multiplayer Online Role Playing games (MMORPG's)





WORLD

WARCRAFT

TM

Candy Crush SAGA

Jouer !


f Connecter !

King









*Growth of non-internet
based behavioural
addictions...



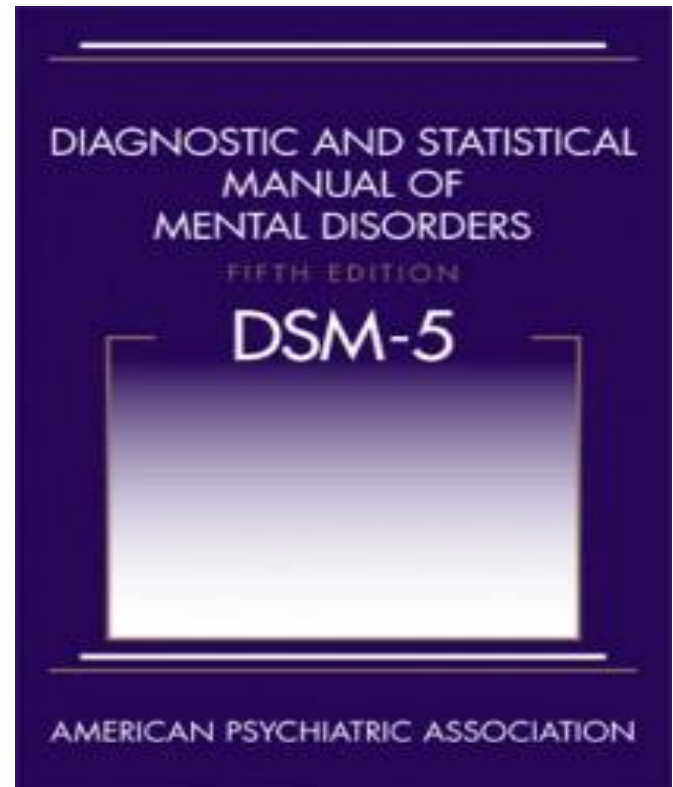
SUGAR NATION ///
**A NATION
IN NEED OF
REHAB**

AMERICA'S BIGGEST PUBLIC
HEALTH CRISIS RESULTS FROM OUR
ADDICTION TO THE SWEET STUFF

A person in a grey shirt and dark pants, seen from the back, standing in front of a dark background.

DSM 5

- * Gambling Disorder
- * Internet Gaming Disorder –
“conditions for further study”
- ✧ Strong overlap between B.A.
& substance disorders



Gambling Disorder - Prevalence

- * 73% adults gambled in past month
- * At risk – 7%
- * Pathological – 0.7% of population

**British Gambling
Prevalence Survey
2010**



Authors: Heather Wardle, Alison Moody, Suzanne Spence, Jim Orford, Rachel Volberg, Dhriti Jotangia, Mark Griffiths, David Hussey and Fiona Dobbie.

Prepared for: The Gambling Commission



Types of Gambling

bookmakers

Bingo

Casino

Gaming machines – coin pusher, VDU's

Lotteries

Pools

Spread Betting, Shares

Raffle

Online, mobile, remote

Overlap - clinical symptoms

- * Persistent psychological distress
- * Behaviour - Destructive and problematic



Triggers for Process addictions are the same as drug/alcohol addictions

- * Travel
- * Unstructured time
- * Boredom
- * Driving through a bad part of town
- * Watching movies
- * Watching sport
- * **Hungry Angry Lonely Tired**

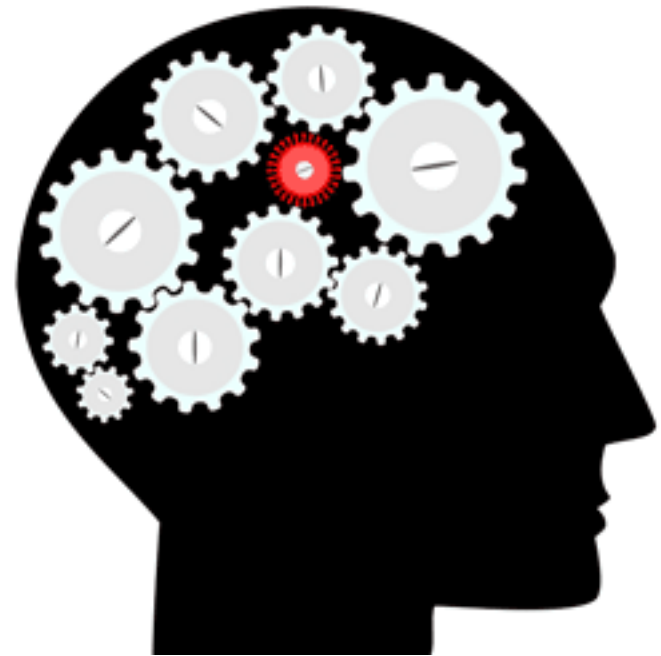


Overlap – dependence features

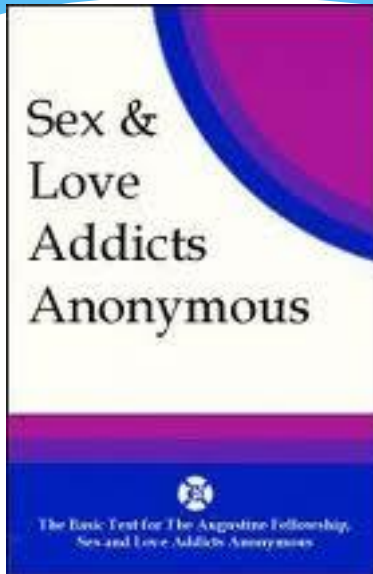
- * Saliency
- * Tolerance
- * Withdrawal
- * Persistence

Overlap - comorbidity

- * Low mood
- * Poor concentration
- * Financial worries
- * Threats of suicide
- * Depression
- * Completed suicide 25%



Overlap - mutual support



Gamblers Anonymous Ireland

For Anyone Who Wants To Stop Gambling

Overlap - clinical treatment

- * Alcohol, opiate dependence
- * Naltrexone decreases dopamine release VTA-NA-FC *
Effective reducing urges - Grant 2008 (n=77)

- * Nalmefene

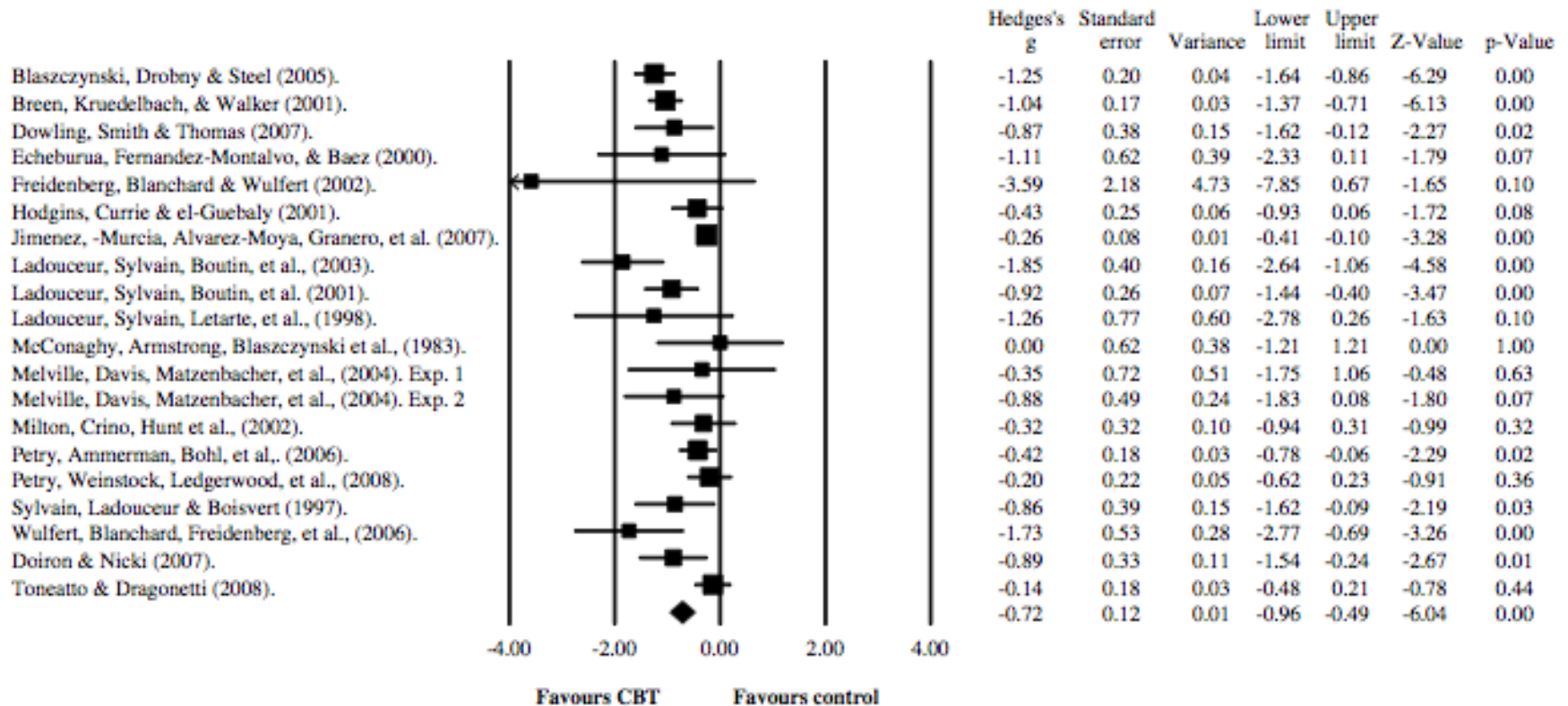
- * (Grant et al Am J Psychiatry, 2006) (BJPsych 2010)



Overlap - clinical treatment

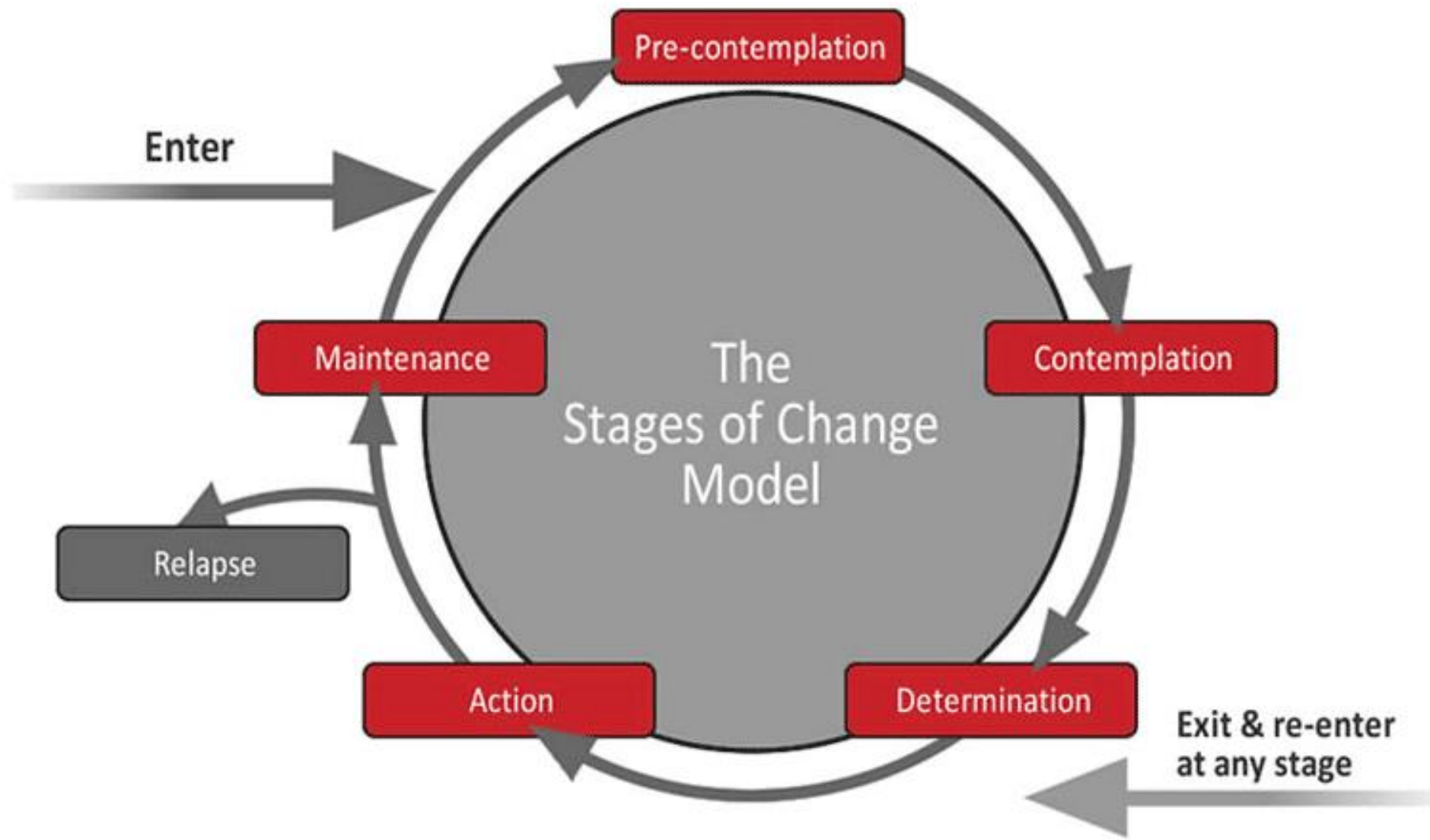
Study name

Hedges's g and 95% CI



Overlap - cognitive distortions

- Magnification of gambling skills (despite persistent losing)
- Gamblers fallacy
- Cognitive/ behavioural superstitions



Unique clinical feature - Parkinsons

- * 0.7% general population
- * 3% parkinsons disease
- * 3-6% or higher on dopamine agonists



Research - neuropsychological tests

- * Choose immediate gratification over delayed rewards (Petry 2001).
- * Place higher wagers on probability decisions demonstrating impulsivity deficits (Lawrence et al addiction 2009)
- * Poor learning in risk assessment (Goudriaan et al addiction 2006)

Research - neuroimaging



Article

An fMRI Stroop Task Study of Ventromedial Prefrontal Cortical Function in Pathological Gamblers

Marc N. Potenza, M.D., Ph.D.
Hoi-Chung Leung, Ph.D.
Hilary P. Blumberg, M.D.
Bradley S. Peterson, M.D.
Robert K. Fulbright, M.D.
Cheryl M. Lacadie, B.S.
Pawel Skudlarski, Ph.D.
John C. Gore, Ph.D.

Objective: Function of the ventromedial prefrontal cortex has been implicated in impulse control. The authors used the Stroop paradigm to test attention and response inhibition during the presentation of congruent and incongruent stimuli in male pathological gamblers and a group of comparison subjects.

Method: Event-related functional magnetic resonance imaging was used to examine ventromedial prefrontal cortex function during Stroop performance.

Results: In response to infrequent incongruent stimuli, pathological gamblers

demonstrated decreased activity in the left ventromedial prefrontal cortex relative to the comparison subjects. Both groups demonstrated similar activity changes in multiple brain regions, including activation of the dorsal anterior cingulate and dorsolateral frontal cortex.

Conclusions: Pathological gamblers share many neural correlates of Stroop task performance with healthy subjects but differ in a brain region previously implicated in disorders characterized by poor impulse control.

(*Am J Psychiatry* 2003; 160:1990-1994)

Despite significant prevalence estimates and associations with adverse consequences (1), pathological gambling has received relatively little study, particularly in its neurobiological underpinnings (2, 3). Function of the ventromedial prefrontal cortex has been widely implicated in impulse regulation (4-6). Previously, we found that pathological gamblers exhibit decreased activity in the ventromedial prefrontal cortex during presentation of gambling cues (10). Our group has used an event-related Stroop paradigm (involving the infrequent presentation of mismatched color-word stimuli and frequent presentation of matched color-word stimuli) in functional magnetic resonance imaging (fMRI) studies to identify the neural correlates of the Stroop effect (11, 12). Since the incongruent stimuli presentations in the Stroop paradigm require response inhibition and pathological gambling involves impaired inhibitory control of gambling behaviors, we predicted that pathological gamblers would differ from comparison subjects in ventromedial prefrontal cortex activity during Stroop task performance.

Method

This research was approved by the Yale Human Investigations Committee, and all subjects provided written informed consent. All subjects were male, 18-45 years of age, native English speakers, and without past or present major neurological injury or illness. Two pathological gamblers were left-handed, and all other subjects were right-handed. Pathological gamblers had an average South Oaks Gambling Screen (13) score of 12.62 (SD=3.03). Pathological gamblers met DSM-IV-TR criteria for pathological gambling and were free of any other active axis I disorder except nicotine dependence. Comparison subjects were free of any active axis I disorder. Diagnostic information was determined by us-

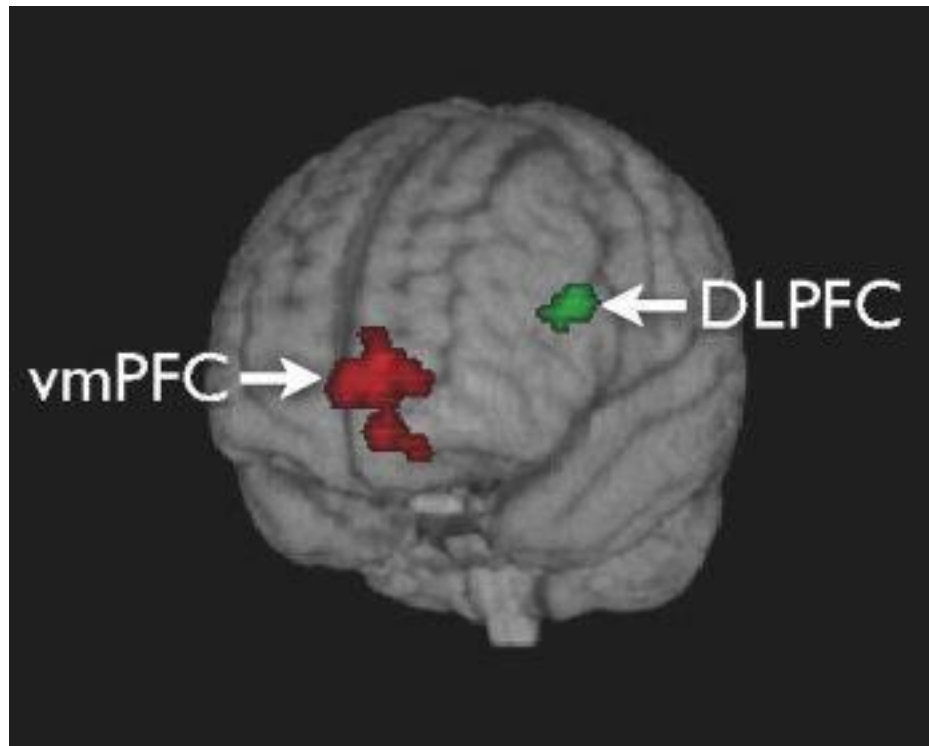
ing the Structured Clinical Interview for DSM-IV (SCID) (14) for the pathological gamblers but not the comparison subjects. The Structured Clinical Interview for Pathological Gambling (unpublished, available from the first author upon request) a SCID-compatible module based on DSM-IV criteria, was used to confirm the diagnosis of pathological gambling.

Data were obtained from 13 pathological gamblers and 11 healthy comparison subjects. Pathological gamblers and comparison subjects were similar in age (mean=35.15 years (SD=7.97) and 33.08 years (SD=7.81), respectively; $Z=1.82$, $d.f.=1$, $p=0.07$). Six pathological gamblers were considered nicotine dependent (Fagerstrom Test for Nicotine Dependence scores ≥ 5); no comparison subjects reported smoking. All subjects were high school graduates. The racial/ethnic composition for the pathological gamblers was Caucasian (N=6), African American (N=4), and Hispanic (N=1); among the comparison subjects, nine were Caucasian, one was Hispanic, and one was of unknown ethnicity. All subjects denied psychotropic drug use with the exception of nicotine or caffeine for the 72 hours before the fMRI protocol.

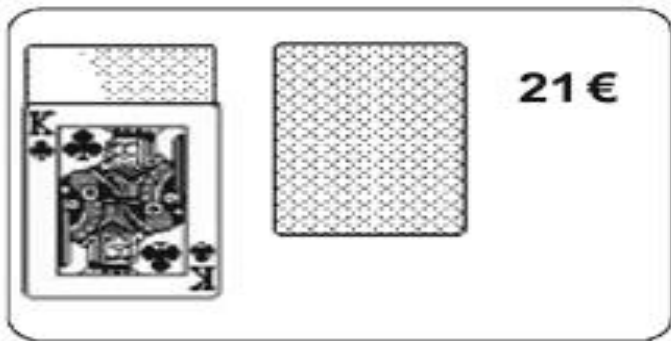
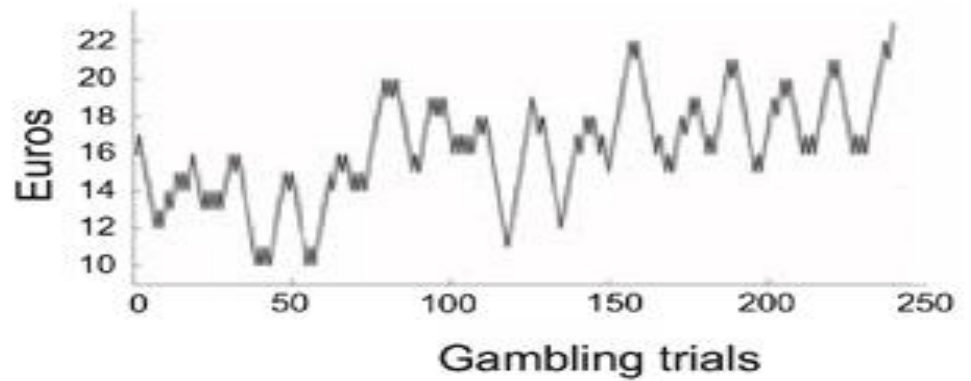
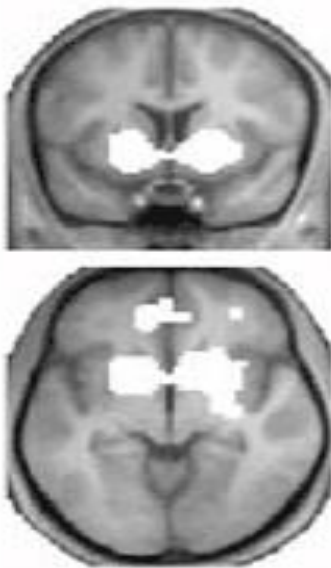
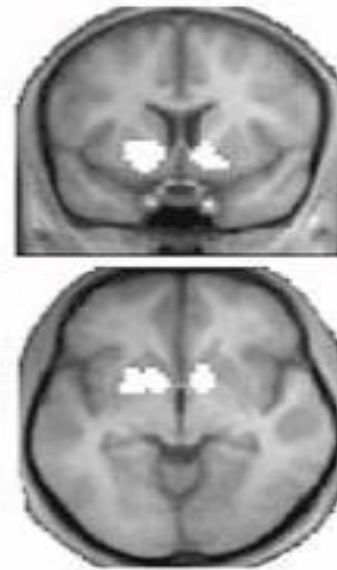
Subjects performed the Stroop task as previously described (11, 12). Briefly, 9-10 runs of 102 stimuli were presented. Each stimulus was presented for 1,800 msec, with an interstimulus interval of 350 msec. Incongruent stimuli were presented pseudorandomly every 13-16 congruent stimuli (i.e., 21, 45-28, 4 seconds apart). Subjects practiced aloud the task for one or two runs before scanning and silent naming was performed during imaging to minimize motion artifact. Performance was assessed following scanning to measure reaction time difference in response times to incongruent versus congruent stimuli and percentage of correct responses to incongruent stimuli (6, 11, 12).

Image Acquisition

Images were obtained with a 1.5-T GE Signa MRI system equipped with an echo-planar imaging system, a standard gradient head coil, and a T₂-sensitive gradient-recalled, single-shot, echo-planar pulse sequence (6, 11, 12). Conventional T₁-weighted sagittal anatomical images (TR=11 msec, TE=60 msec, field of view=24 cm, slice thickness=5 mm, gap=1 mm, 256×128



Ventromedial Prefrontal Cortex, Ref: Catlech, Todd Hare.

a**b****c****d**

Dopamine Pathways

Serotonin Pathways

Frontal cortex

Striatum

Substantia nigra

Nucleus accumbens

VTA

Hippocampus

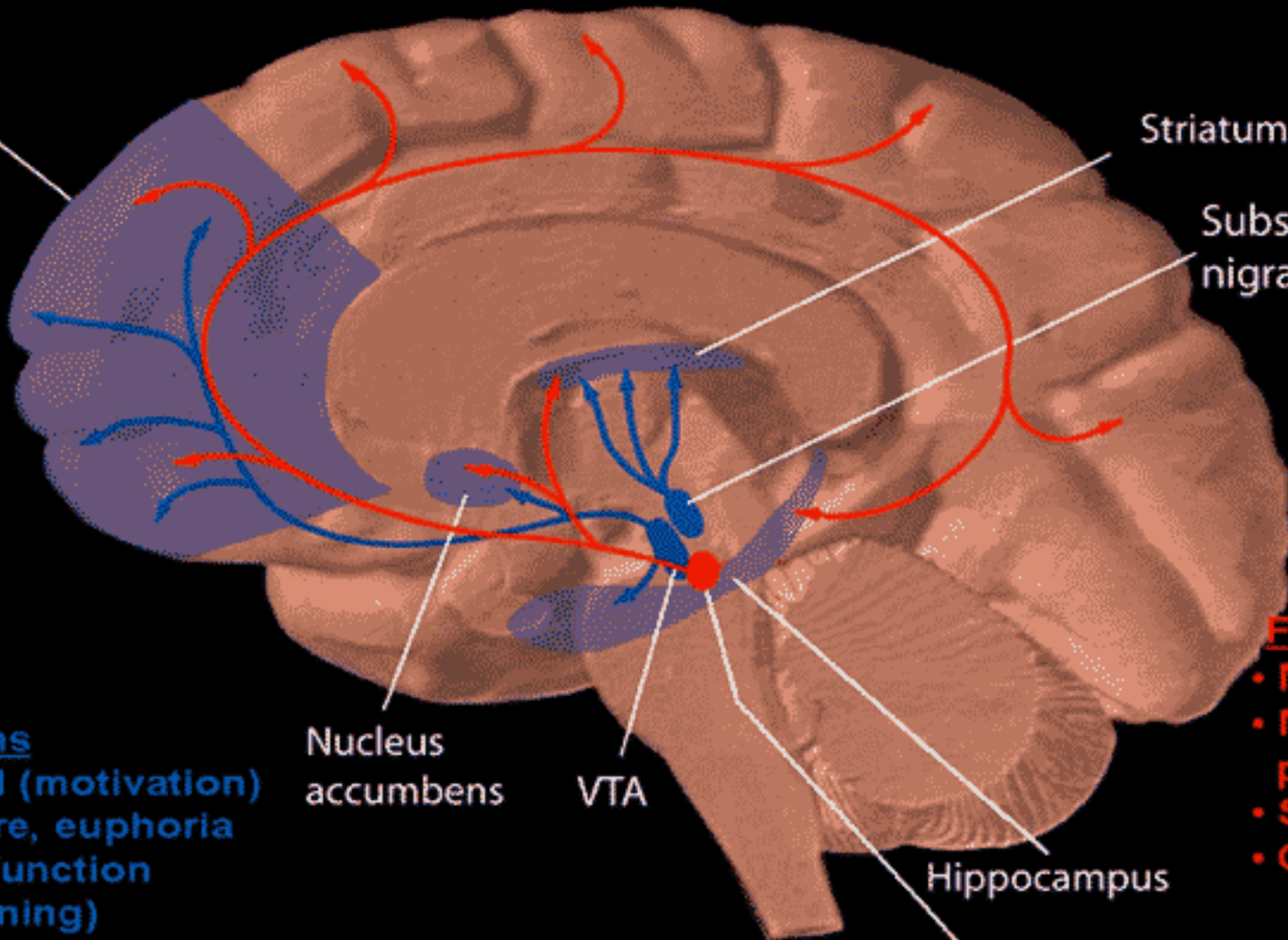
Raphe nucleus

Functions

- Mood
- Memory processing
- Sleep
- Cognition

Functions

- Reward (motivation)
- Pleasure, euphoria
- Motor function (fine tuning)
- Compulsion
- Perseveration

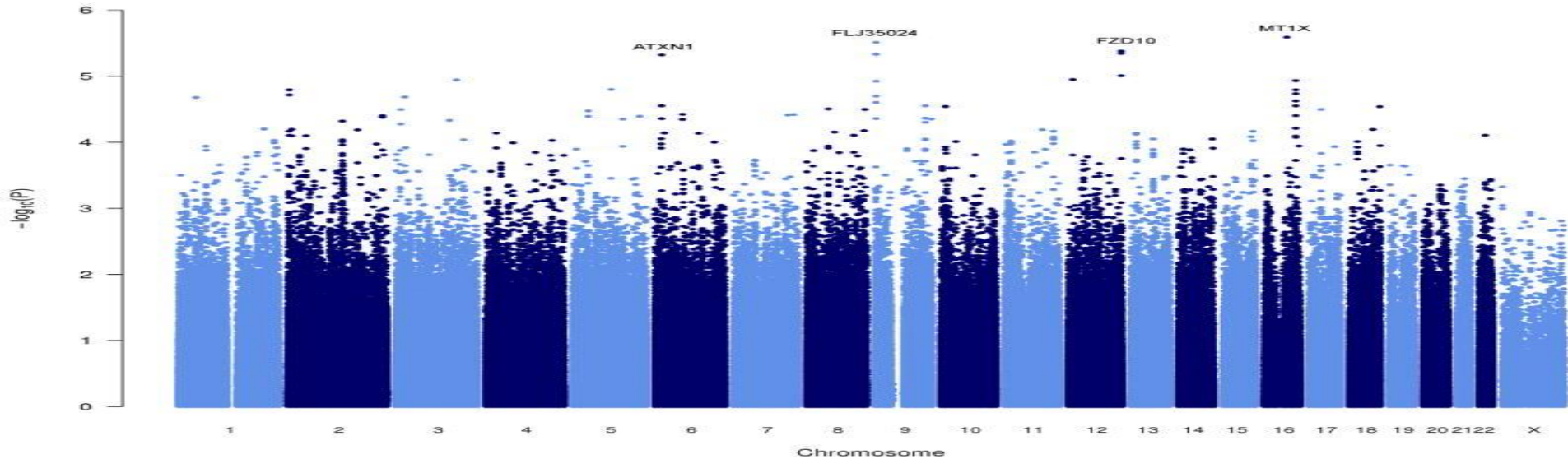


Research - genetics

**Undercontrolled Temperament at Age 3 Predicts Disordered Gambling at Age 32:
A Longitudinal Study of a Complete Birth Cohort
(Slutske, Moffit, Poulton, Caspi)**



Genetic markers



Genome-wide association study of a quantitative disorder gambling trait
Lind et al Addict Biol May 2013

**Let's
Respond Together.**

We need your help Urgently



National Online Gambling Survey for Ireland

If you have ever gambled online, e.g. smartphone betting apps, sports gambling web sites, poker, share trading etc.. please take this survey

[Start survey](#)

Give 3 minutes to take a survey and help those who may be suffering from addiction.

Thank you!

www.drcolinogara.com