

Behavioral Addictions: Gender-related Considerations and Associations with Violence and Aggression

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Child Study, and Neuroscience*

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Director, Impulsivity Research Program

Yale University School of Medicine



Disclosures

- **Consultant to Lakelight Therapeutics/Opiant, AXA, Idorsia, Game Day Data, BariaTek; Novartis Yale Patent Application**
- **Research Grant from Children and Screens**
- **Research Gifts from Mohegan Sun and Connecticut Council on Problem Gambling**
- **Consultant to Gambling and Legal Entities on Issues Related to Impulse Control, Internet Use and Addictive Disorders**



What is Addiction?

- **Addict (verb)** - “to devote or give (oneself) habitually or compulsively”; from Latin *addicere*
 - bound to or enslaved
- **Historical Shifts in Usage of Term**
- **Core Components of Addiction (Shaffer, 1999)**
 - Continued Behavior Despite Adverse Consequences
 - Diminished or Lost Control / Compulsive Engagement
 - Craving or Urge State Component



Changing Perspectives on Addiction

2001

2010

Aided by brain imaging advances, scientists are looking for evidence that compulsive nondrug behaviors lead to long-term changes in reward circuitry

'Behavioral' Addictions: Do They Exist?

ADDICTION

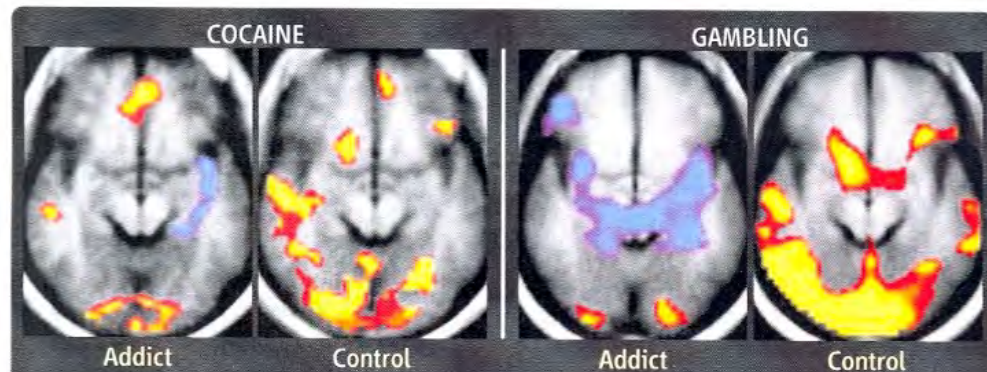
The concept of addiction is changing, as this special news package describes: There's more emphasis on how drugs and even behaviors may wreak long-term damage to the brain.

▶ **COMPULSIVE
BEHAVIORS
LONG-TERM
CHANGES**

Shared brain vulnerabilities open the way for nonsubstance addictions: Carving addiction at a new joint?

Joseph Frascella,¹ Marc N. Potenza,² Lucy L. Brown,³ and Anna Rose Childress^{4,5}

Behavioral Addictions Debut in Proposed *DSM-V*



Hooked. Brains of pathological gamblers watching a gambling video resemble those of cocaine addicts watching a cocaine video, with relatively less activation in regions implicated in judgment and motivation. Differences may reflect the toxic effects of cocaine exposure.

DIAGNOSTIC AND STATISTICAL
MANUAL OF
MENTAL DISORDERS

FIFTH EDITION

DSM-5

AMERICAN PSYCHIATRIC ASSOCIATION

ICD-11

International Classification of Diseases for
Mortality and Morbidity Statistics

Eleventh Revision

Reference Guide

DRAFT

NOT FOR DISSEMINATION



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Reconsideration of Addictions in Anticipation of DSM-5

HEALTH

WHAT COUNTS AS CRAZY?

This is the book doctors use to define mental illness—and it's all about to change

BY JOHN CLOUD

THE NEW ABNORMAL?



BINGE EATING

Binge-eating disorder (BED) appears in the current DSM's appendix, but that means clinicians can't bill insurers for it. DSM 5 would include BED as a formal diagnosis, but critics question vague criteria like "eating until feeling uncomfortably full."



INTERNET ADDICTION

Despite a push by clinicians who say patients spend so much time playing online games and tweeting that they risk getting lower grades or losing jobs and relationships, DSM editors have said not enough research supports adding this diagnosis.



SEX ADDICTION

A highly disputed proposal for DSM 5, "hypersexual disorder" would mean engaging in sexual behaviors even when they interfere with, say, your marriage (infidelity) or job (looking at porn at work). But should we pathologize what some see as simply poor judgment?

A Range of Internet Use Behaviors

the social network

YOU DON'T
GET TO
500 MILLION
FRIENDS
WITHOUT MAKING
A FEW
ENEMIES

NETFLIX

Porn hub

amazon

travelocity®

ebay™



FANDUEL

bwin

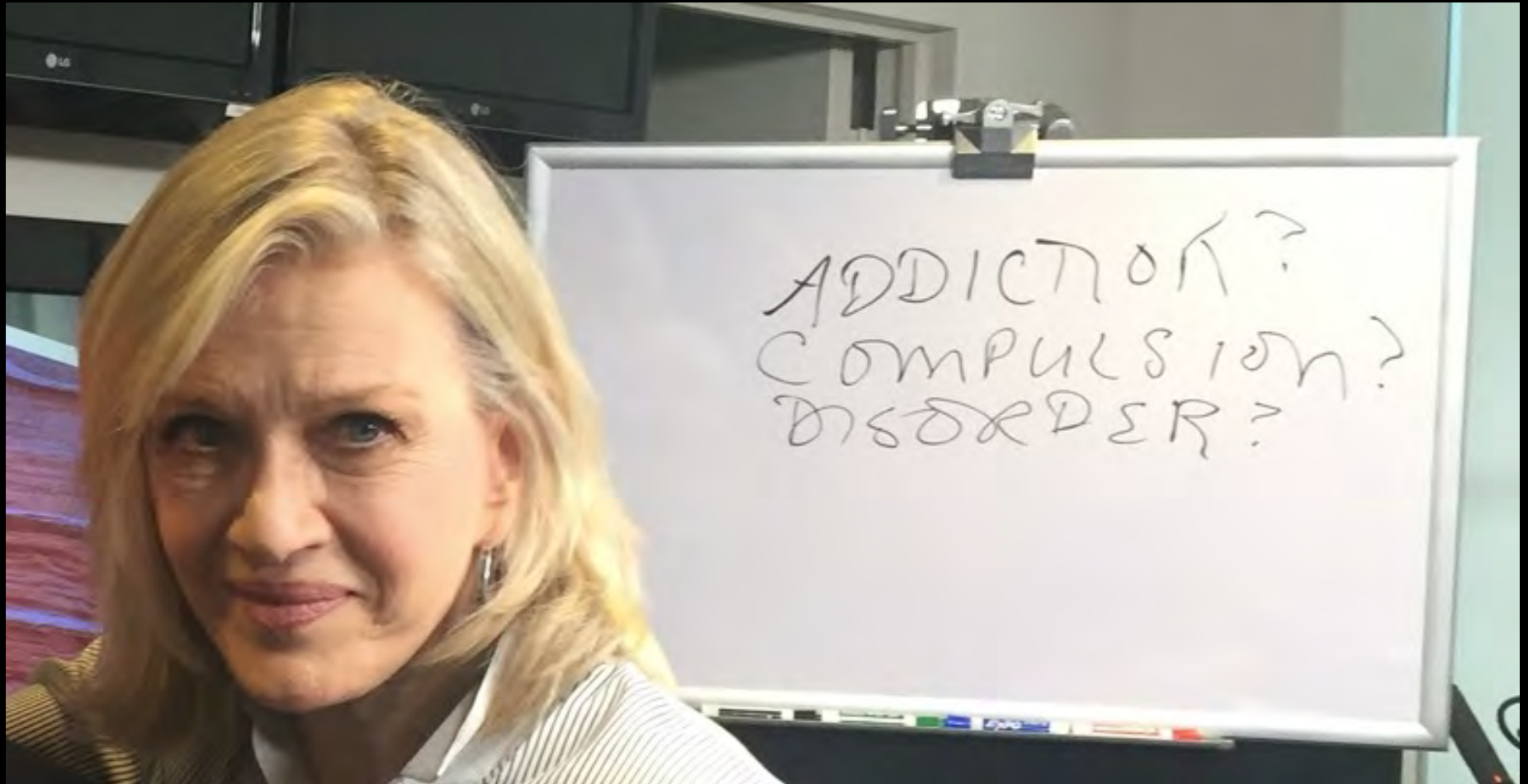


Internet Use and Screen Time: A National Concern?



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Are These Addictions, Compulsions or Disorders?



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Internet Use in DSM-5 (and ICD-11)

Addiction



EDITORIAL

doi:10.1111/add.12162

Internet gaming disorder and the DSM-5

- **IGD Included in Section 3 (Future Research)**
- **Similar Criteria as For Gambling Disorder**
- **Non-gaming Forms of Internet Use (and Arguably Non-Internet-based Forms of Gaming) Currently Not Directly Addressed in DSM-5**
- **Current Focus of WHO**



Problematic Internet Use in Students

- Present in 4% of CT High School Students (3.5% of Boys; 4.5% of Girls)
 - PIU Defined By: 1) Irresistible Urge; 2) Growing Tension; and 3) Trying to Cut Back
- Boys Spent More Time on Internet; Girls More Likely to Think They Have a Problem
 - Similarities with Gambling (Desai et al 2005)
- More Common in Asian (7.9%) and Hispanic (6.1%) Youth
- PIU Associated with Substance Use ($p=.001$), Depression ($p<.0001$) and Aggression ($p<.0001$)



Problematic Gaming in Students

- **Boys (76%) More Likely Than Girls (29%) to Game**
- **Gaming Linked to Lower Odds of Smoking in Boys**
- **Gaming Linked to Depression, Fights and Weapon Carrying in Girls**
- **Among Gamers, 4.9% Had Problematic Gaming (5.8% of Boys, 3% of Girls)**
- **Across Sexes, Correlates of Problematic Gaming Included Regular Tobacco Use, Drug Use, Depression and Getting into Serious Fights**
- **Future Studies Should Assess Gaming Types**



Types of Problematic Internet Use: Gaming, Social Networking, Other

- Population-Based Studies (Rumpf et al, 2015)
- Three Groups: Gaming, Social Networking, or “Other” (e.g., Pornography Viewing, Shopping)
- Social Networking Predominantly Female (83.3%) as Compared to Gaming (20.0%) and “Other” (36.4%)
- “Other” Group Older and Gaming Group Reported More Hours on the Internet
- Psychological Characteristics Largely Similar Across Groups



Pathways in Gambling Disorder

A pathways model of problem and pathological gambling

Alex Blaszczynski, Lia Nower

ADDICTION

SSA SOCIETY FOR THE
STUDY OF
ADDICTION

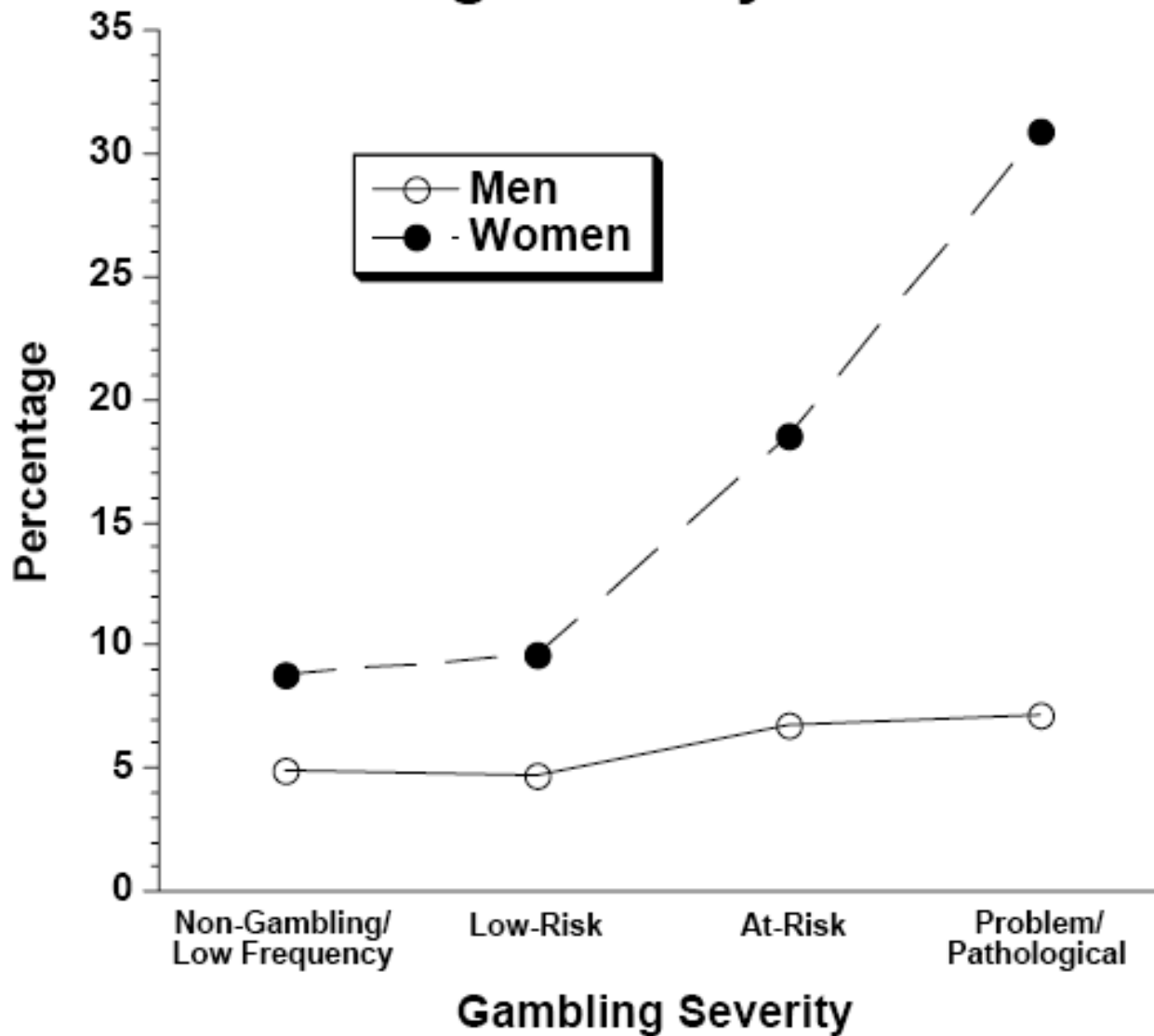
- **Proposes 3 Pathways (Behaviorally Conditioned, Antisocial Impulsive, and Emotionally Vulnerable)**
- **Among GD, Females More Likely than Males to Gamble to Escape Dysphoria (Blanco et al, 2006)**
- **Stronger Links Between Problem-Gambling Severity and Depression in Women Versus Men (Desai and Potenza, 2008)**

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Nower and Blaszczynski, 2002



Rates of Major Depression By Gambling Severity and Gender



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Desai and Potenza, 2008

Gender, Stress, Trauma and Addictions

- **Females and Males Often Experience Different Traumas and Stressors (e.g., Sexual Assault/Rape; Scoglio et al., 2021)**
- **Stress and Trauma Have Been Linked to Addictions and Other Psychopathology in Gender-Sensitive Ways (Armstrong et al. 2018)**
- **Understanding How Stress, Trauma Operate in Females and Males Relate to Psychopathology and Biological Functioning is Important**



Gender, Stress and Psychopathology in the NESARC

Journal of Psychiatric Research 107 (2018) 34–41



Contents lists available at [ScienceDirect](#)

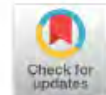
Journal of Psychiatric Research

journal homepage: www.elsevier.com/locate/jpsychires



Gender moderates the relationship between stressful life events and psychopathology: Findings from a national study

Jessica L. Armstrong^{a,b}, Silvia Ronzitti^{a,b,c}, Rani A. Hoff^{a,b,d}, Marc N. Potenza^{b,e,f,g,*}



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Source: Armstrong et al, 2018

Gender, Stress and Psychopathology

- **Women Relative to Men Are More Likely to Experience Moderate or High Stress ($P < 0.0001$), Particularly Social and Financial (Not Work)**
- **Stress Is Associated with Increased Odds of Depression, Anxiety, Substance-Use and Personality Disorders**
- **Stronger Relationships Between Stress and Any DSM-IV Axis I and II Disorders Seen in Women Versus Men, Especially Anxiety (Social Phobia) and Alcohol-Use Disorders and Cluster B (Antisocial) and C (OCPD) Disorders**



Stress, Trauma and Motivations/Cravings in Addictions

- Childhood Trauma Linked to Addictive Behaviors Later in Life, with Childhood Sexual Trauma Linked to Gambling Problems, Particularly in Women (Petry et al., 2005)
- Engaging in Addictive Behaviors Like Gambling Linked to Motivations to Escape from Negative Mood States (Blanco et al., 2006) and Depression (Desai and Potenza, 2008) in Women as Compared to Men
- Findings Raise Questions Regarding Mechanisms By Which Negative Mood States and Stress/Trauma May Operate in Females Versus Males



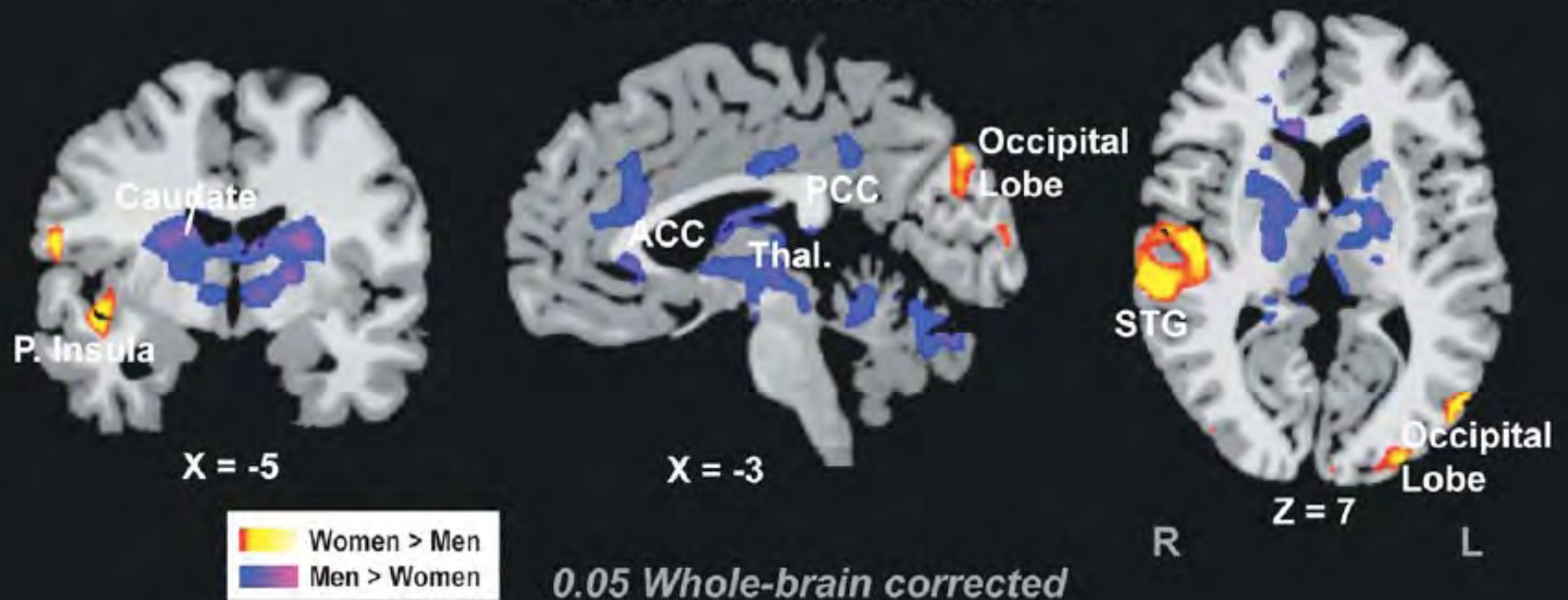
Neural Impacts of Trauma and Stress: Addiction Risk

- Using fMRI, We Investigated the Neural Correlates of Stress Responsive and How It Differs By Gender, Trauma and Addictions
- During Responses to Stress Cues, Women as Compared to Men Showed Greater Cortical Responses (Insula, Temporal and Occipital Cortices) Whereas Men Showed Greater Subcortical Responses (Caudate, Midbrain, Thalamus), as Well as in the Cerebellum and Cingulate
- Neural Correlates of Self-Reported Anxiety Interacted with Gender with Positive Cortical Activations (Parietal, Medial Frontal) Relating in Women But Not Men

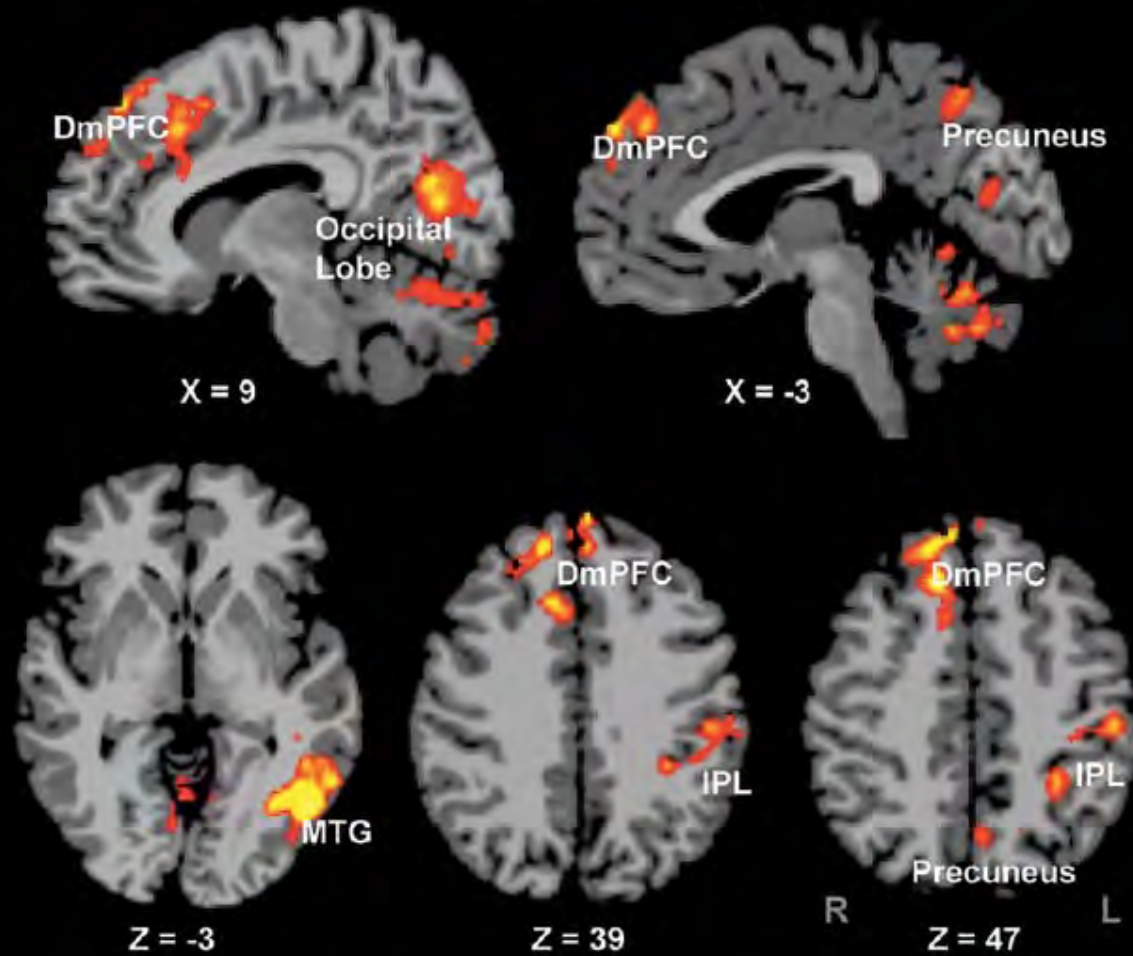


Main Effect of Gender on Stress Response During fMRI

Gender Main Effect

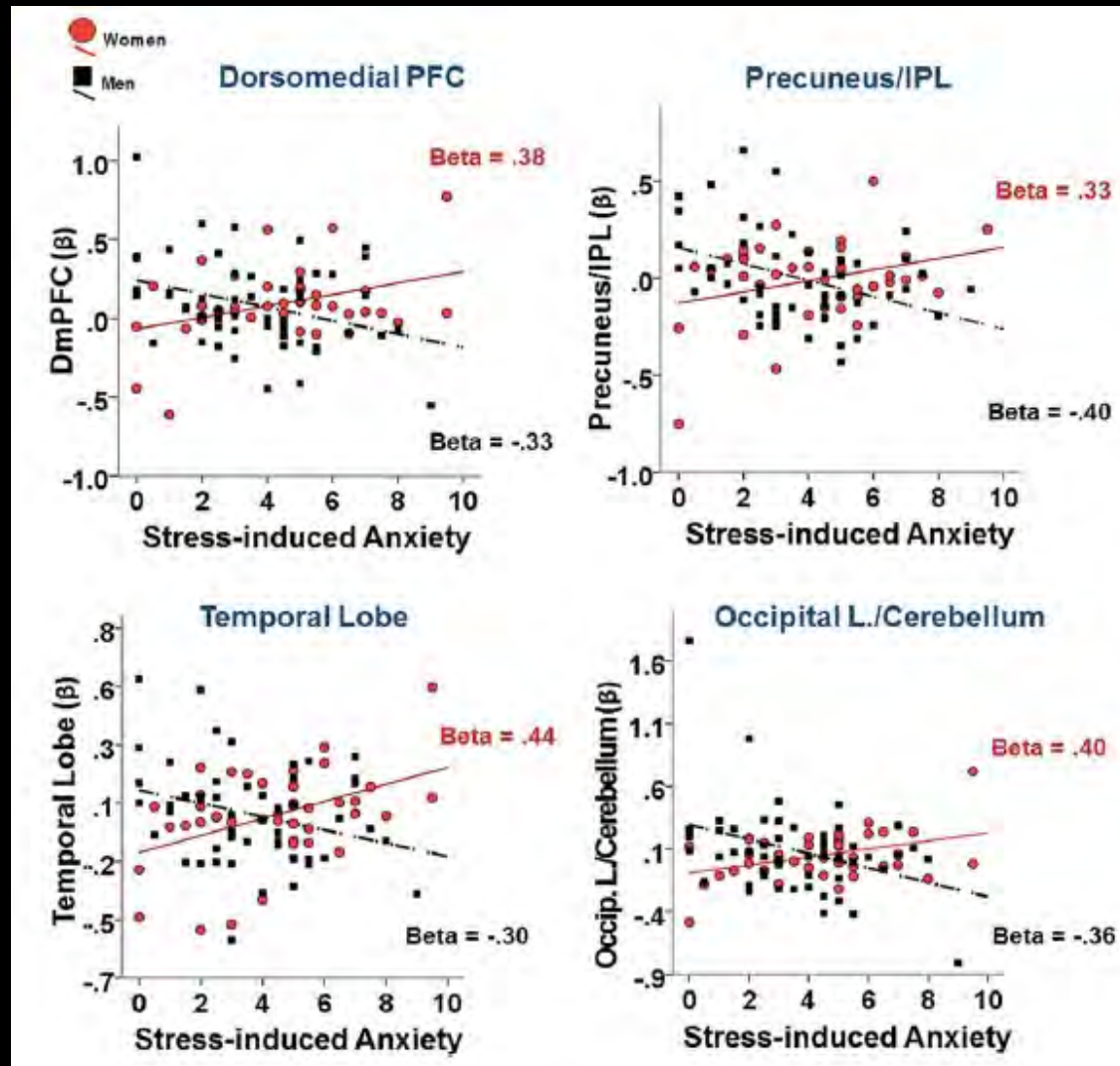


Interaction (Gender x Anxiety)

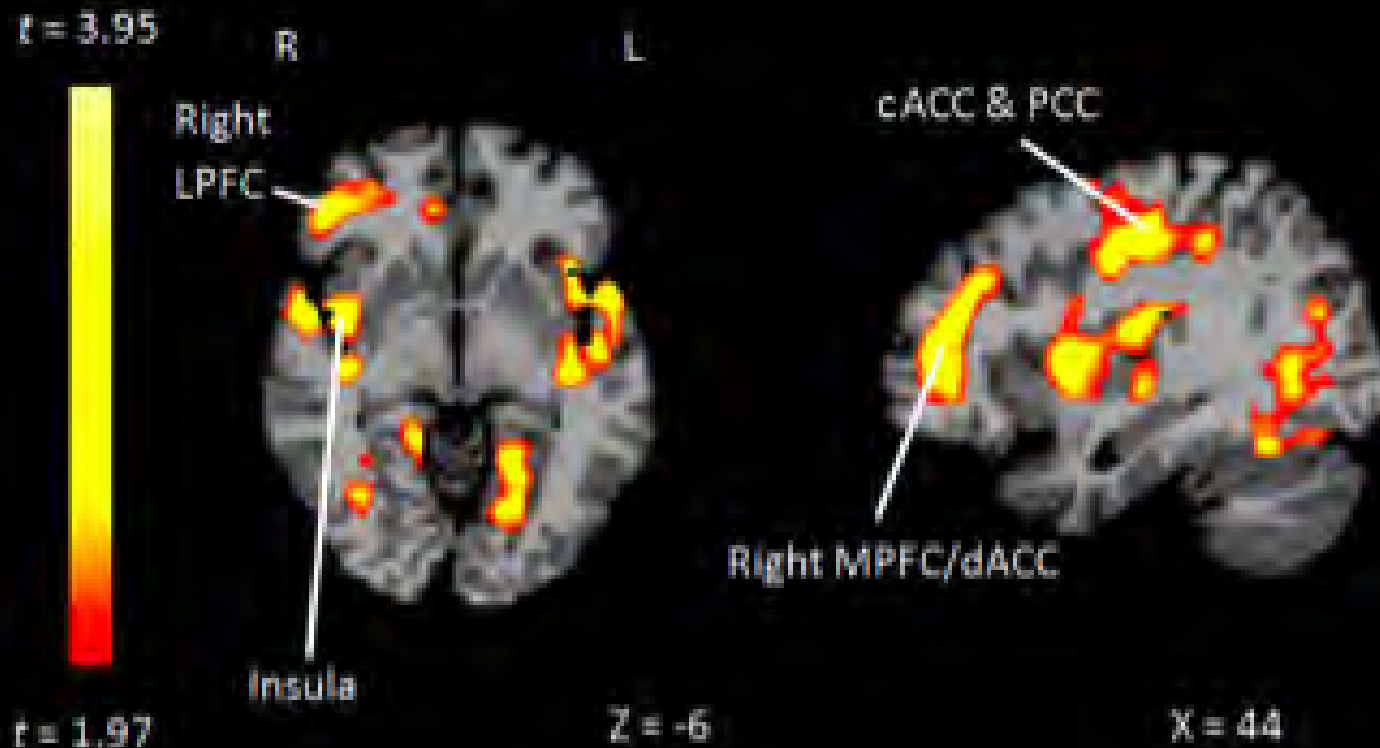


0.05 Whole-brain corrected

Interaction Between Gender and Anxiety Correlates During Stress Response



Influence of Childhood Trauma on Stress Response in Adolescents: High Vs. Low CTQ Score Groups



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Elsey et al, NPP, 2015

Gender, Stress and Cocaine Use Disorder

The American Journal of


Psychiatry

Current Issue | Archive  | About | Residents' Journal | AJP In Advance | Po

New Research

 Full Access

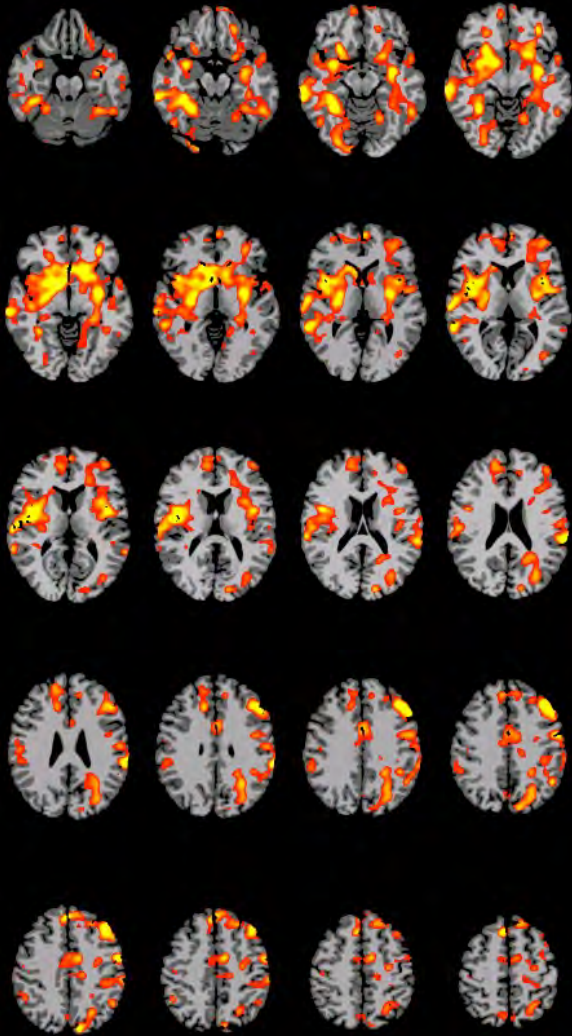
Neural Correlates of Stress-Induced and Cue-Induced Drug Craving: Influences of Sex and Cocaine Dependence

Marc N. Potenza , M.D., Ph.D., Kwang-ik Adam Hong, Cheryl M. Lacadie, B.S., Robert K. Fulbright, M.D., Keri L. Tuit, Psy.D., and Rajita Sinha, Ph.D.

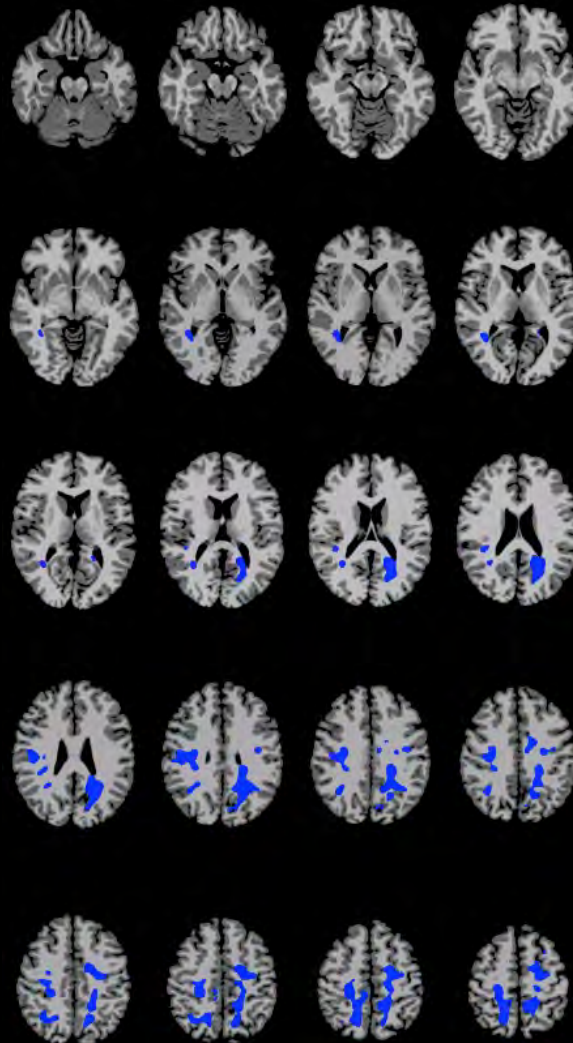
Published Online: 1 Apr 2012 | <https://doi.org/10.1176/appi.ajp.2011.11020289>

CUD Group Differences in Women, $p < 0.05$, FWE

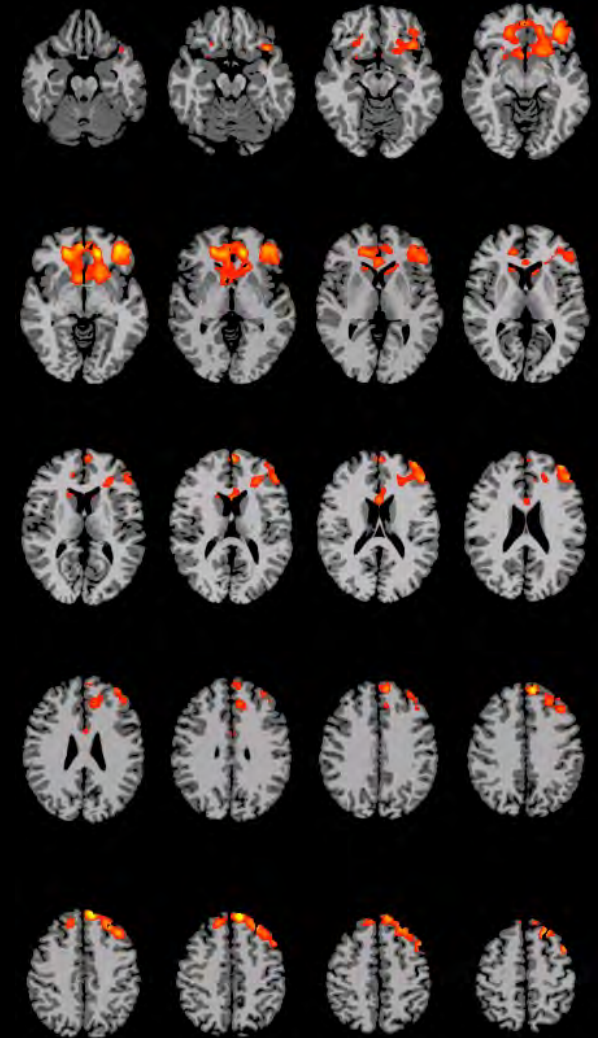
Stress



Drug



Neutral

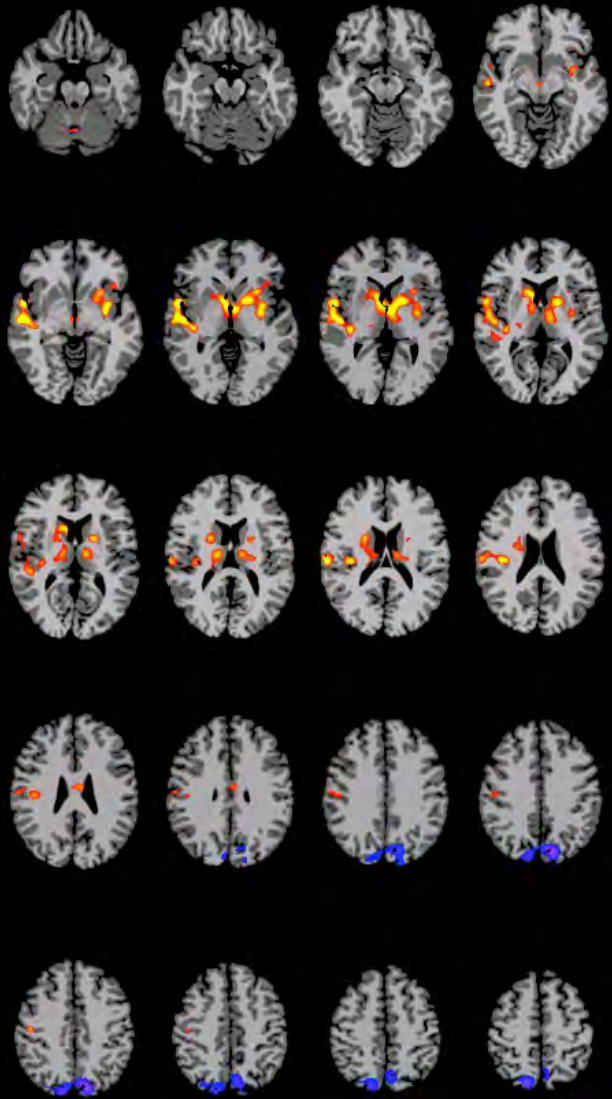


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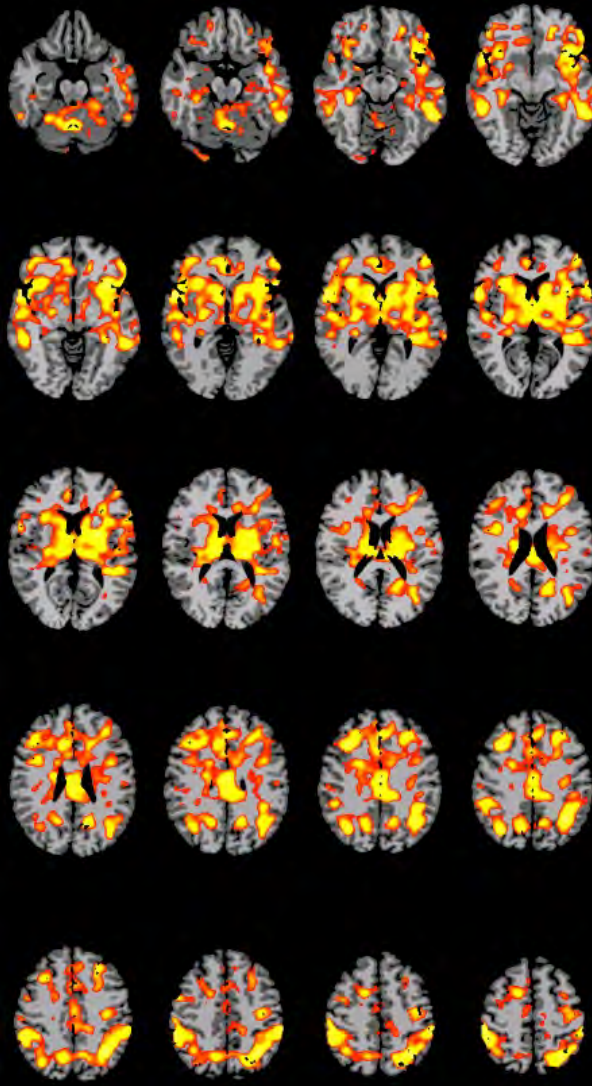
Potenza et al, AJP, 2012

CUD Group Differences in Men, $p < 0.05$, FWE

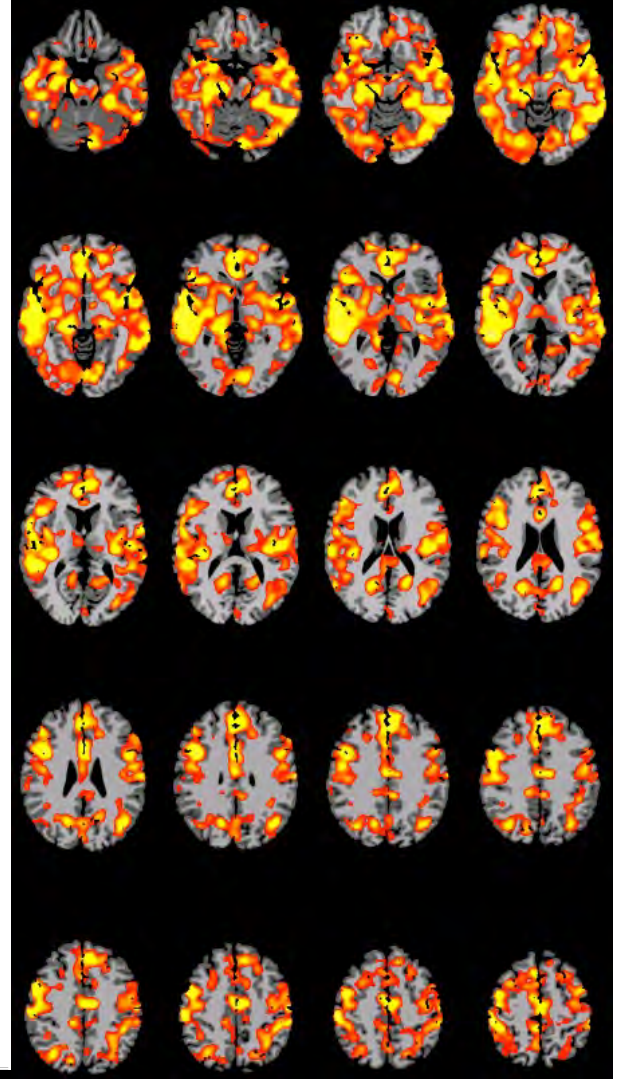
Stress



Drug



Neutral



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Potenza et al, AJP, 2012

Impact of Stress, Trauma and Addiction on Parenting

- Stress and Trauma May Exert Trans-generational Impact Through Influences on Parenting

ANNALS OF THE NEW YORK ACADEMY OF SCIENCES

Issue: *Addiction Reviews*

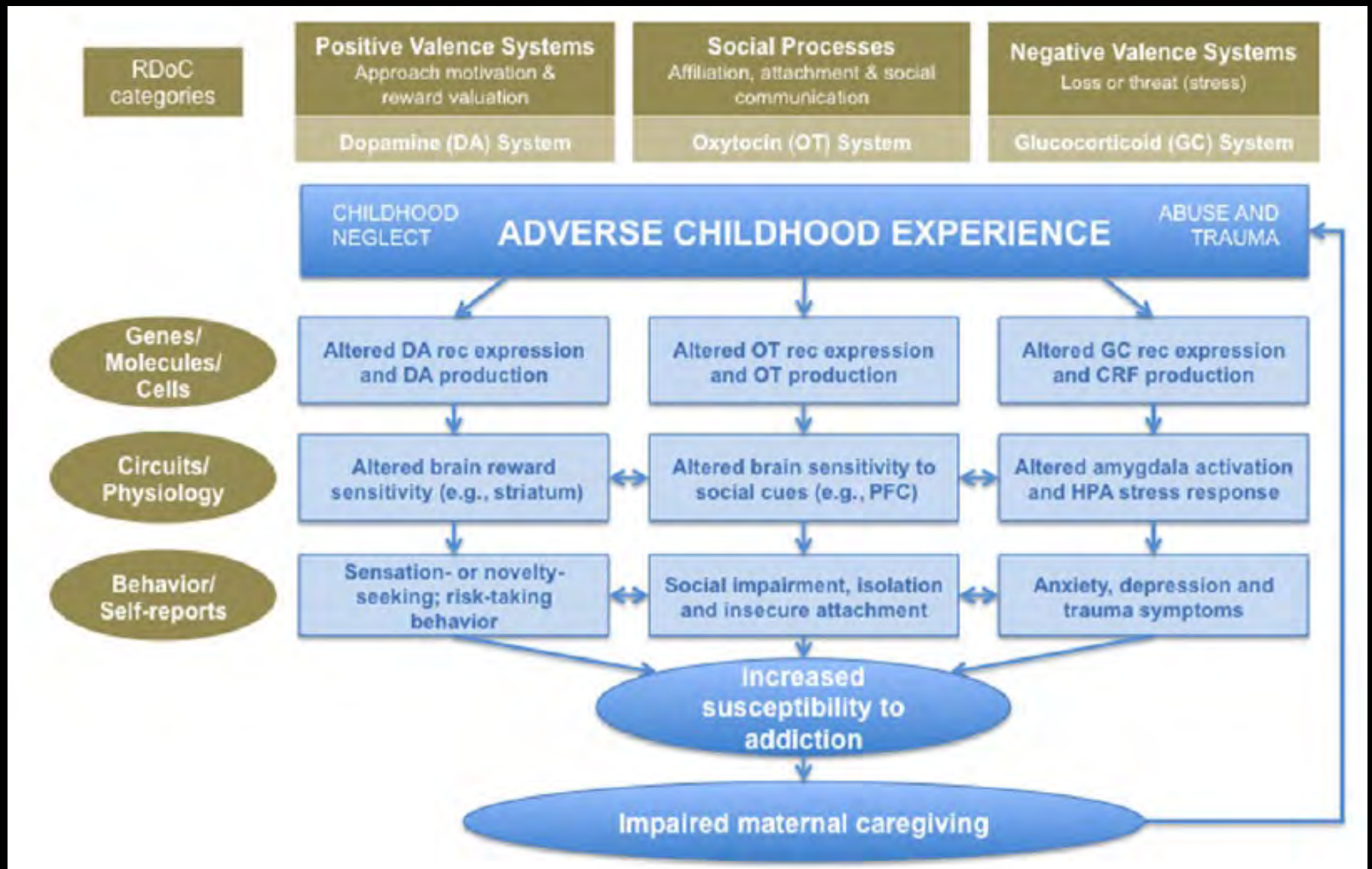
REVIEW

Early adverse experience and substance addiction: dopamine, oxytocin, and glucocorticoid pathways

Sohye Kim,^{1,2,3,4} Stephanie Kwok,² Linda C. Mayes,⁵ Marc N. Potenza,^{5,6,7}
Helena J. V. Rutherford,⁵ and Lane Strathearn^{2,3,4,8}





Proposed Pathways for Impacting Parenting



Mothers with Addictions Show Blunted “Reward” Responses to Own Infants’ Smiles

Mothers with Substance Addictions Show Reduced Reward Responses When Viewing Their Own Infant’s Face

Sohye Kim ^{1,2,3*} Uditā Iyengar,⁴ Linda C. Mayes,⁵ Marc N. Potenza,^{5,6,7}
Helena J. V. Rutherford,⁵ and Lane Strathearn ^{2,8*}



IDENTITY

OWN

UNKNOWN



HAPPY

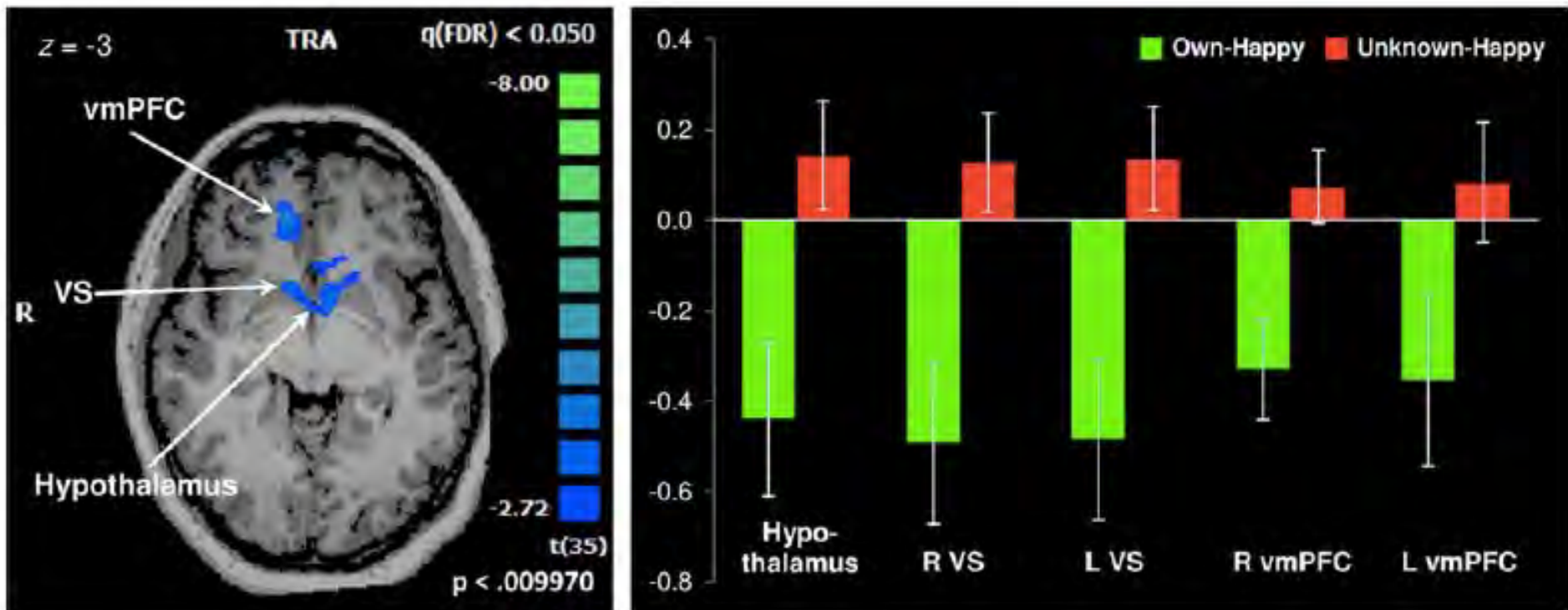
AFFECT



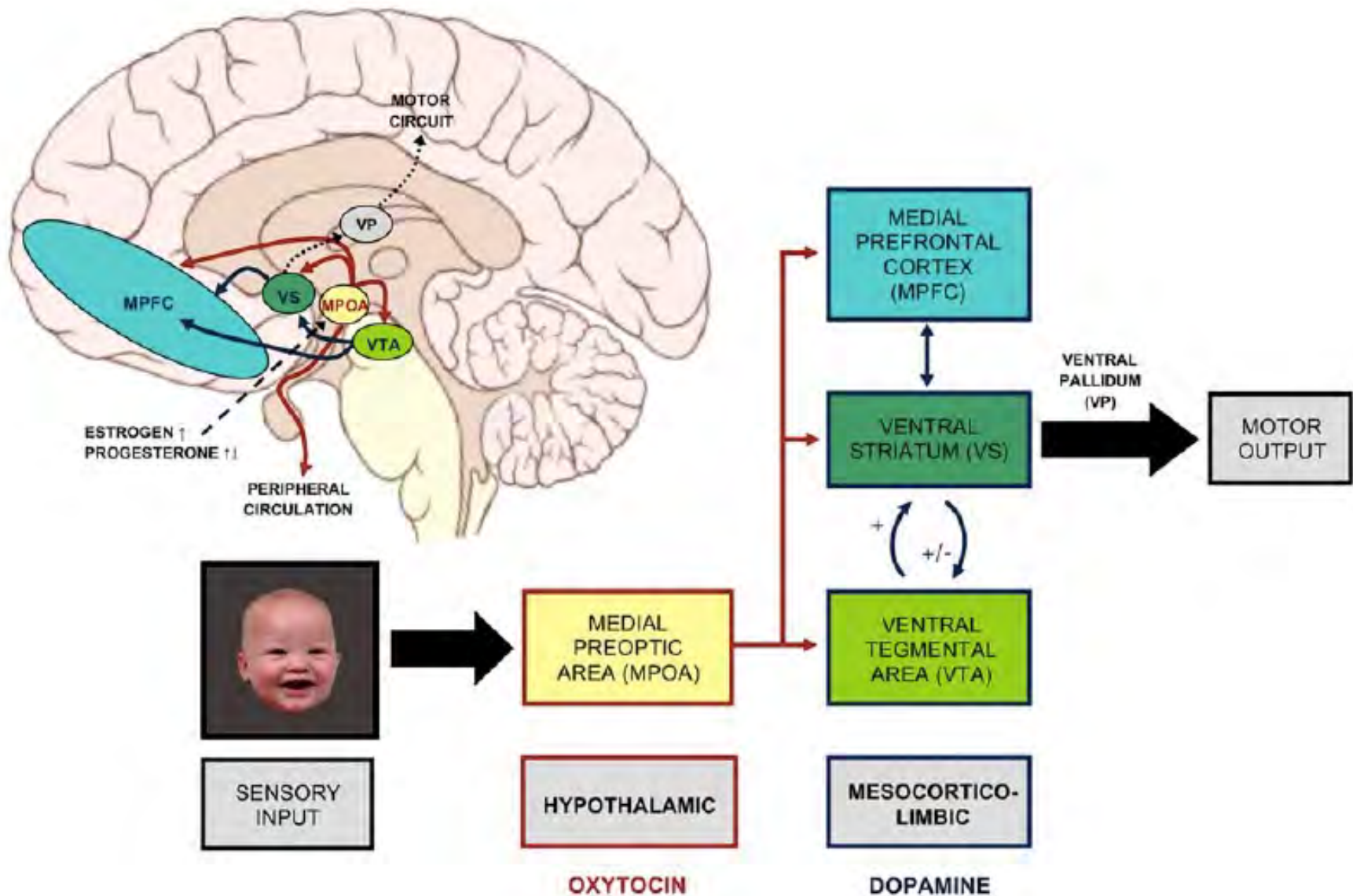
SAD

fMRI of Own/ Other Infant Sad and Happy Faces

Blunted Maternal Neural Responses to Own Infants in Mothers with Addictions

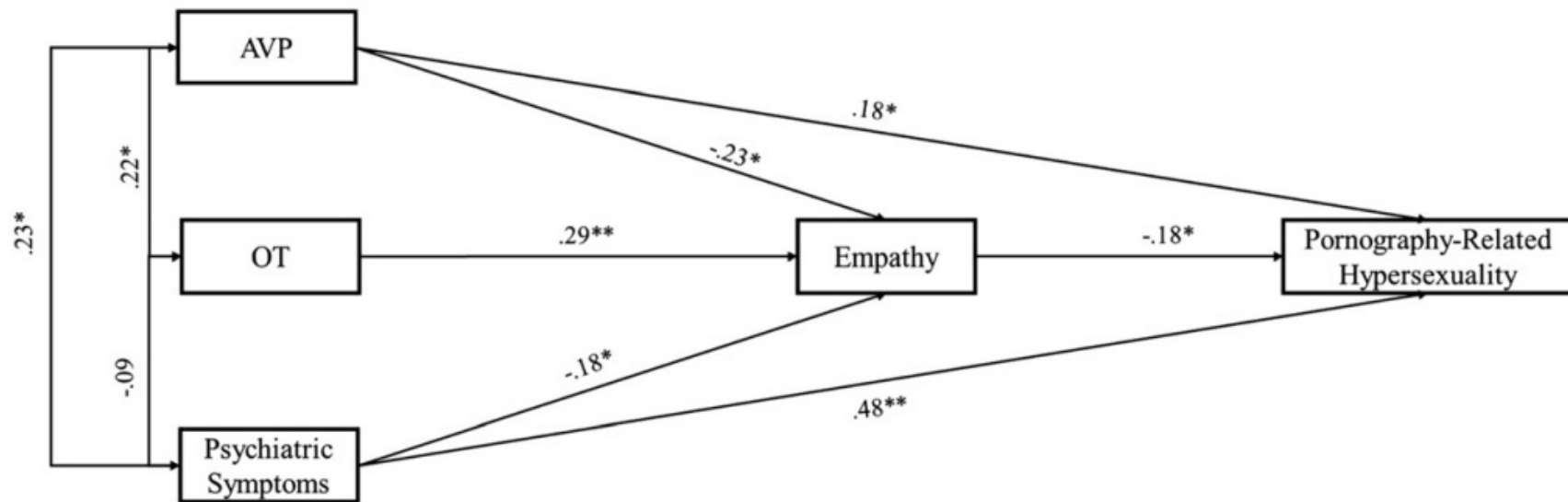


Maternal Responses to Infants



Alterations in oxytocin and vasopressin in men with problematic pornography use: The role of empathy

ARIEL KOR¹, AMIR DJALOVSKI², MARC N. POTENZA^{3,4,5,6,7},
ORNA ZAGOORY-SHARON² and RUTH FELDMAN^{1,2,3*}



Do men become addicted to internet gaming and women to social media? A meta-analysis examining gender-related differences in specific internet addiction

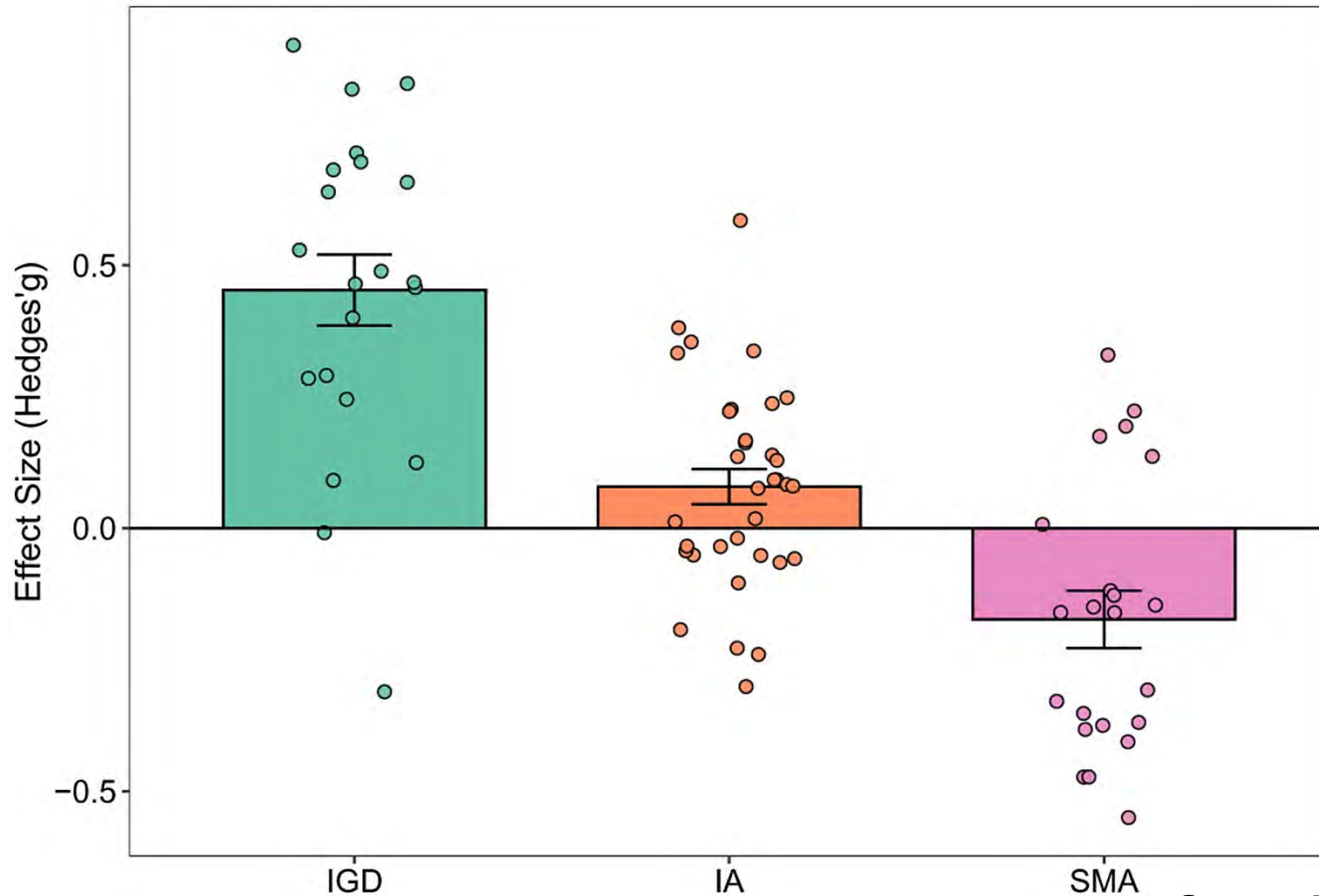
Wenliang Su ^a  , Xiaoli Han ^a, Hanlu Yu ^a, Yiling Wu ^a, Marc N. Potenza ^{b, c, d}



Computers in Human Behavior

Volume 113, December 2020, 106480

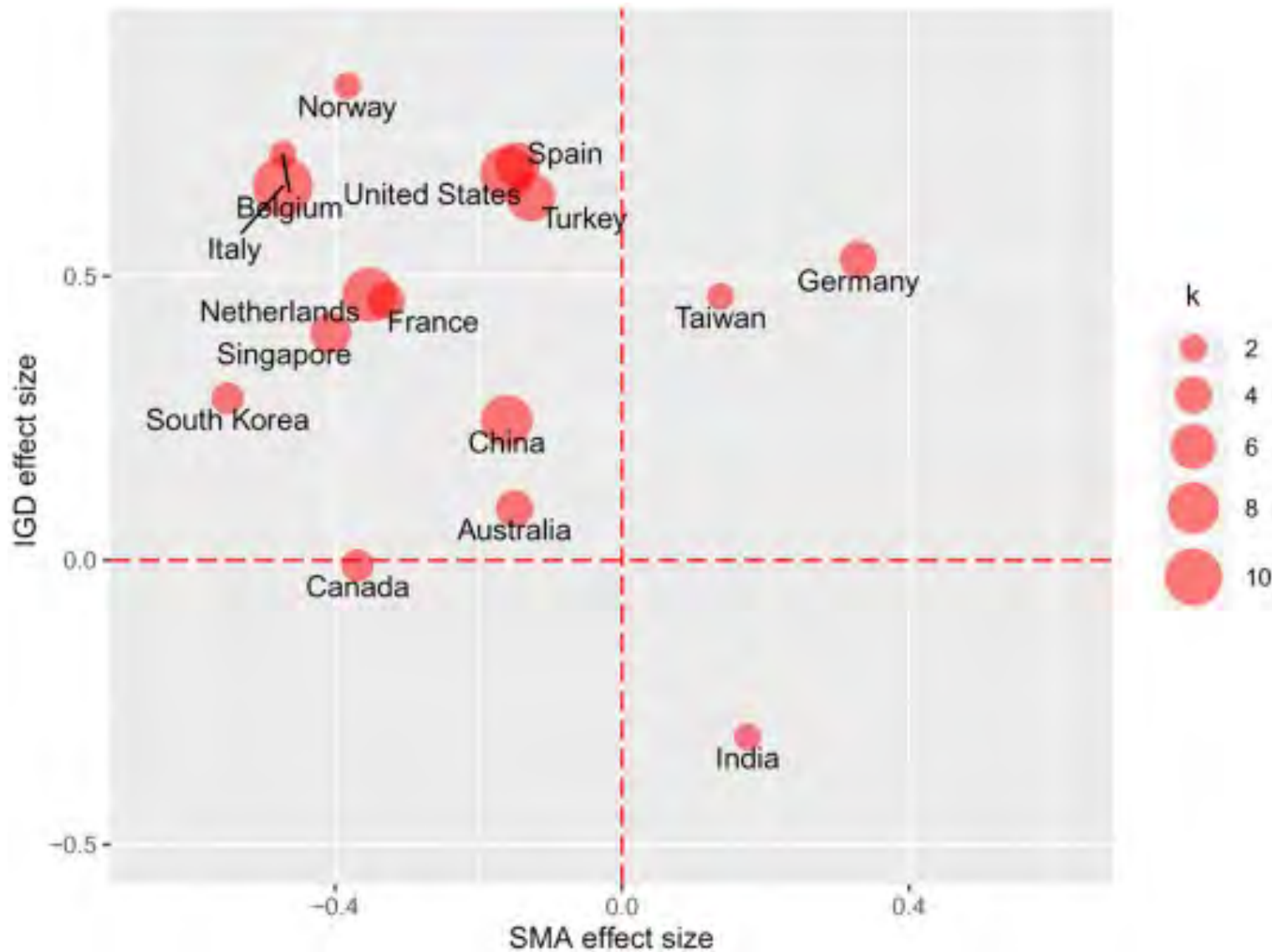
Gender Effect Sizes For Internet Gaming Disorder, Internet Addiction and Social Media Addiction



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Su et al, 2020

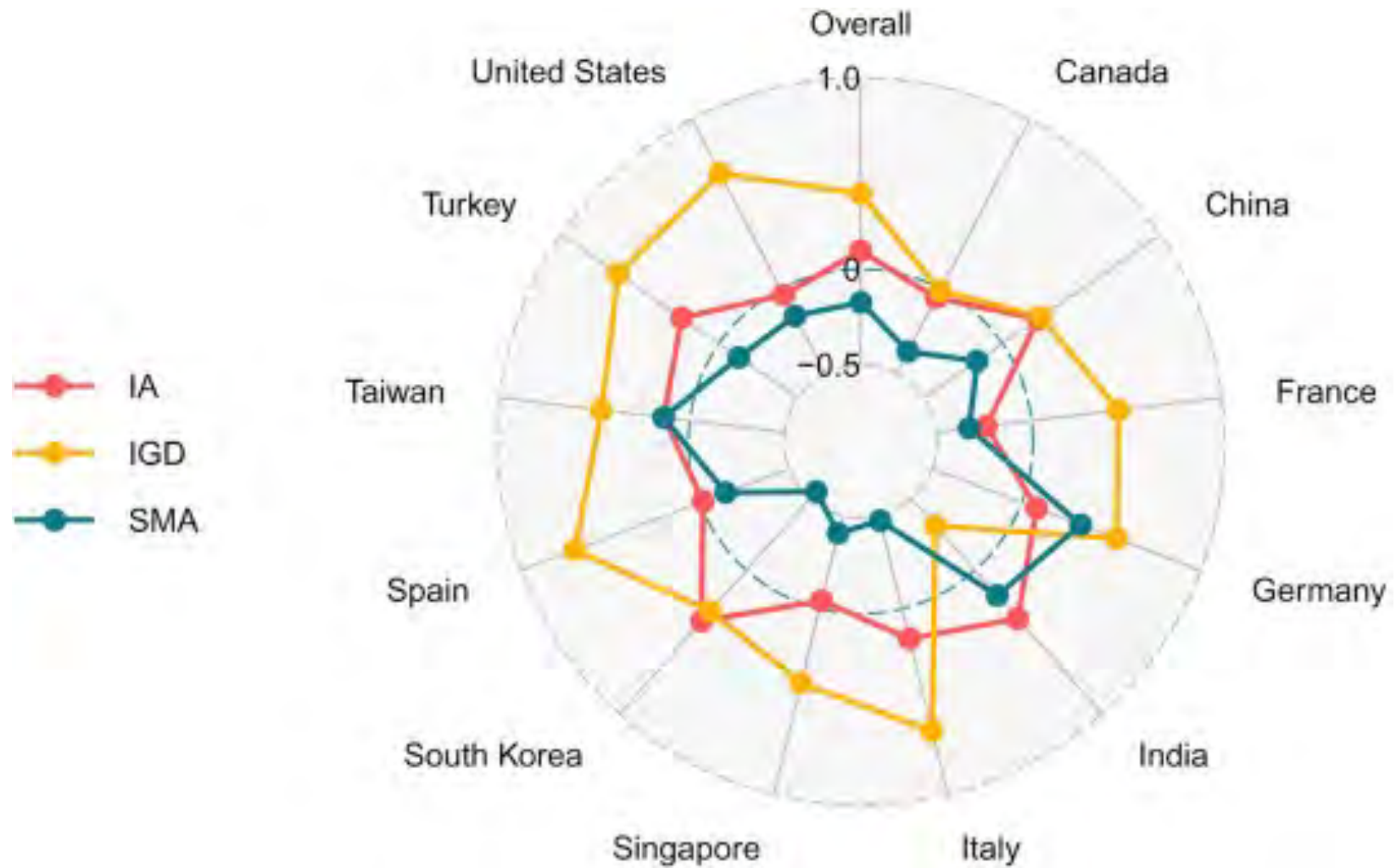
Gender Effect Sizes By Country: IGD and SMA



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Su et al, 2020

Gender Effect Sizes By Country: IGD, IA and SMA



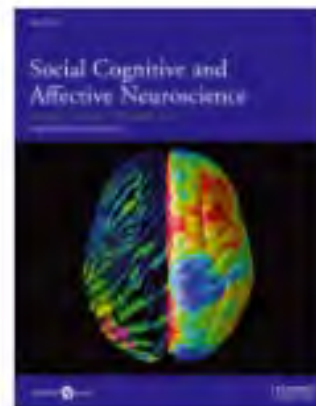
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Su et al, 2020

Gender-related differences in neural responses to gaming cues before and after gaming: implications for gender-specific vulnerabilities to Internet gaming disorder

Guangheng Dong , Lingxiao Wang, Xiaoxia Du, Marc N Potenza

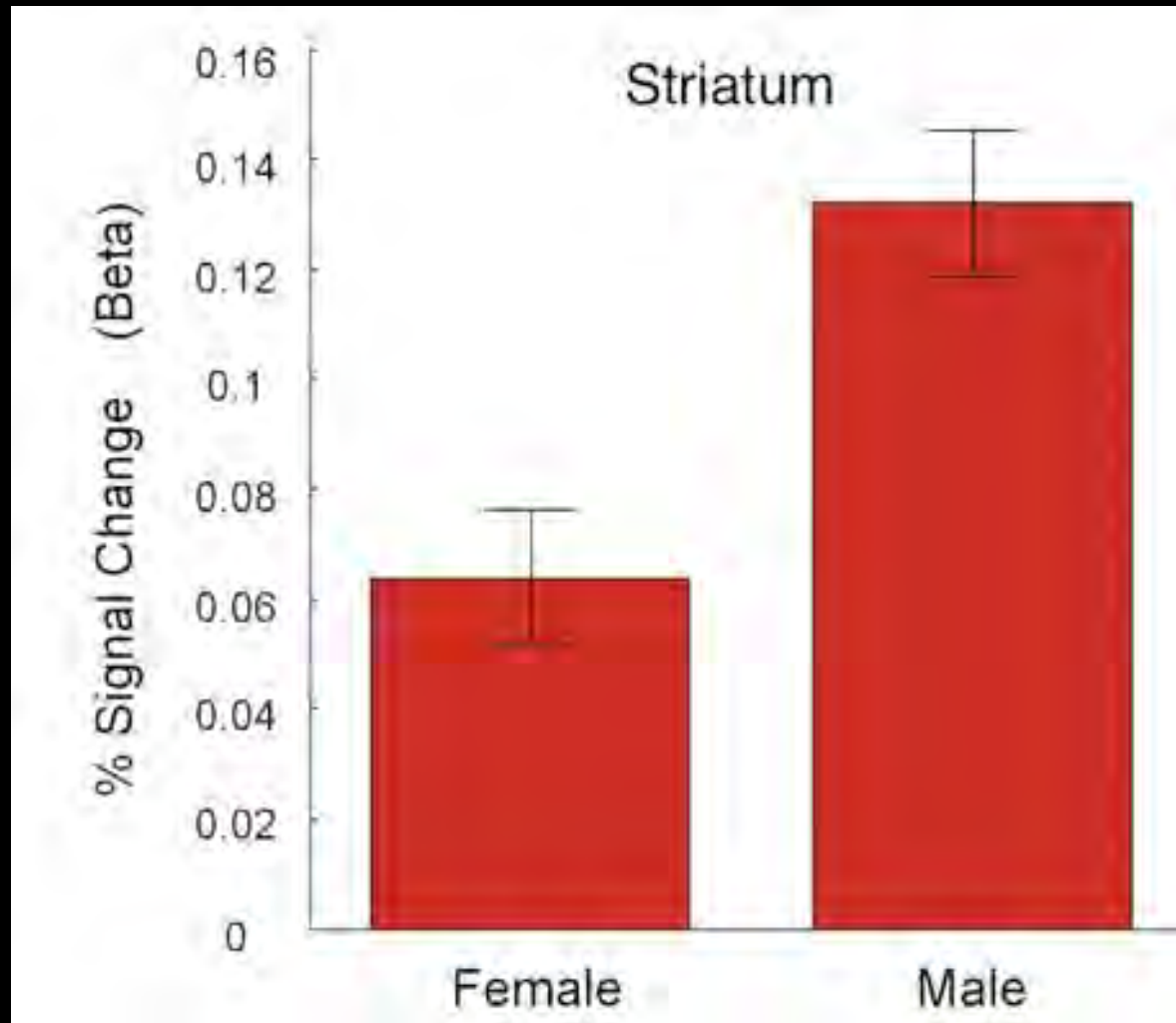
Social Cognitive and Affective Neuroscience, Volume 13, Issue 11, November 2018, Pages 1203–1214, <https://doi.org/10.1093/scan/nsy084>

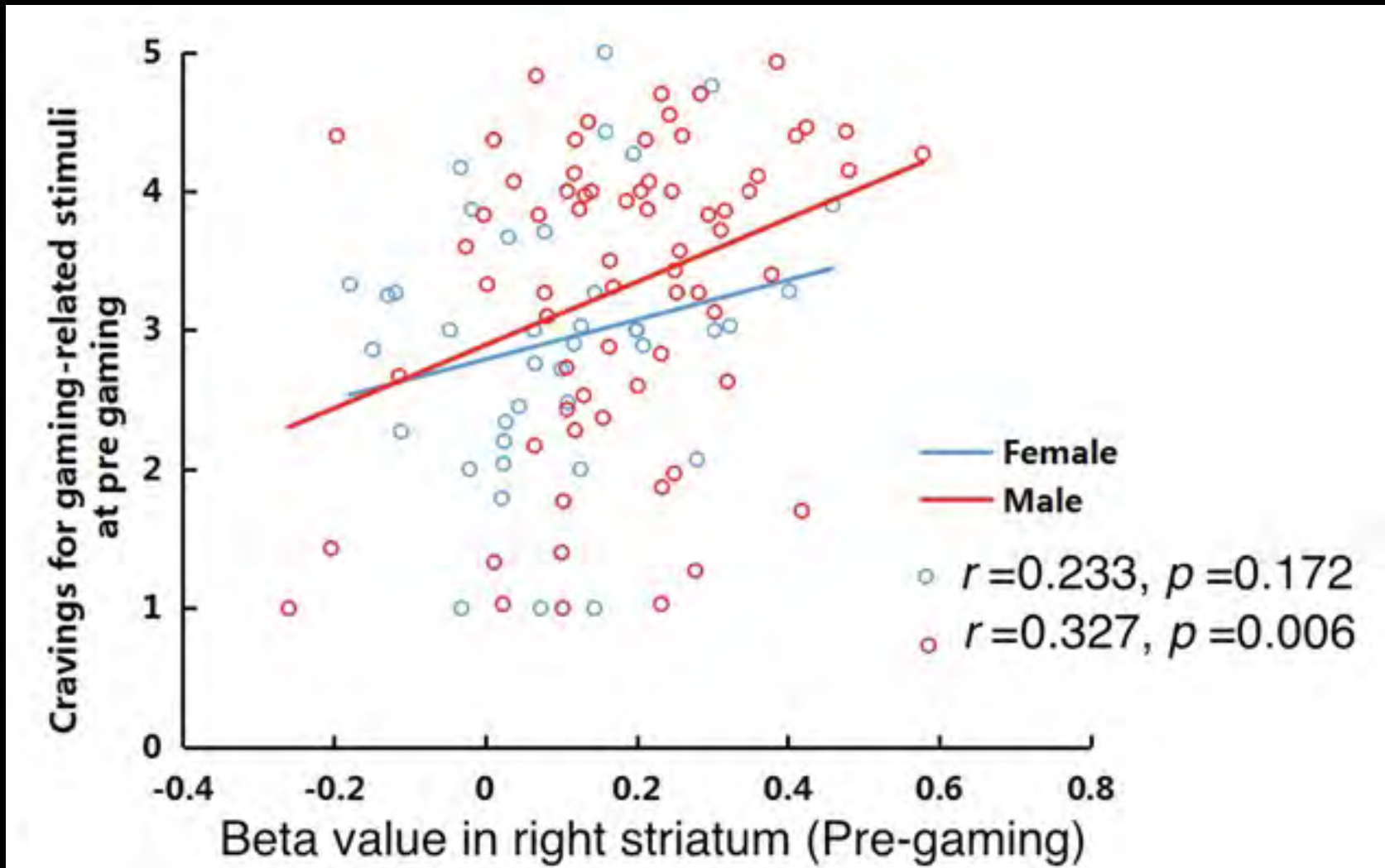


Volume 13, Issue 11
November 2018


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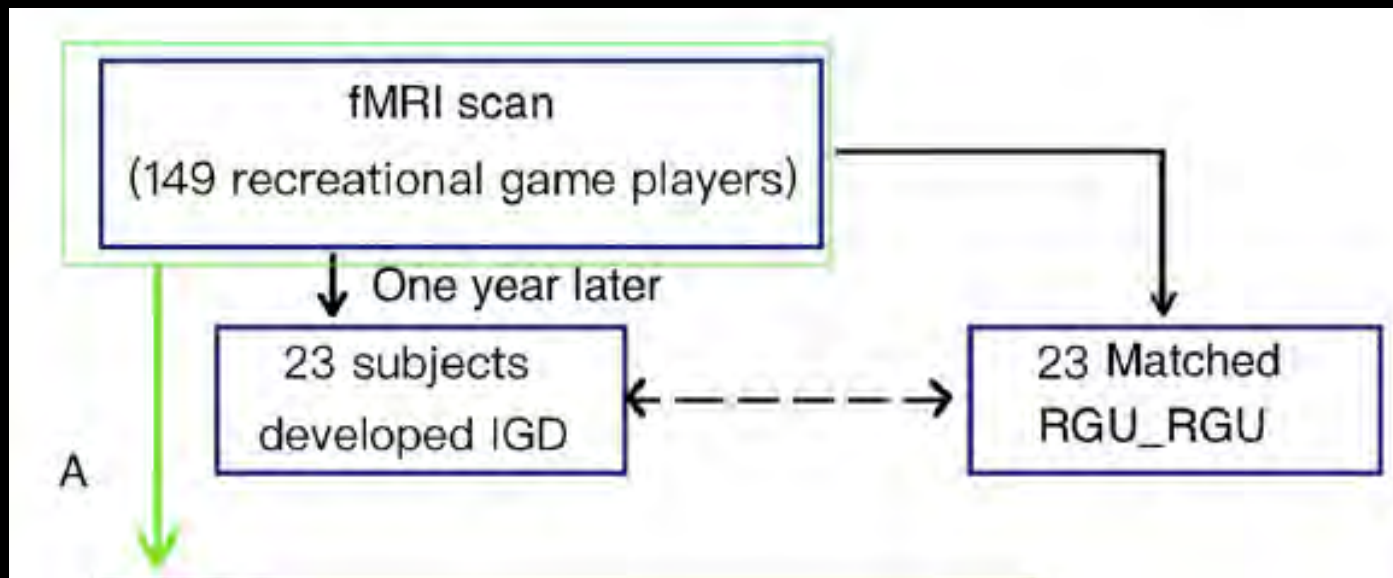
Dong et al, 2018



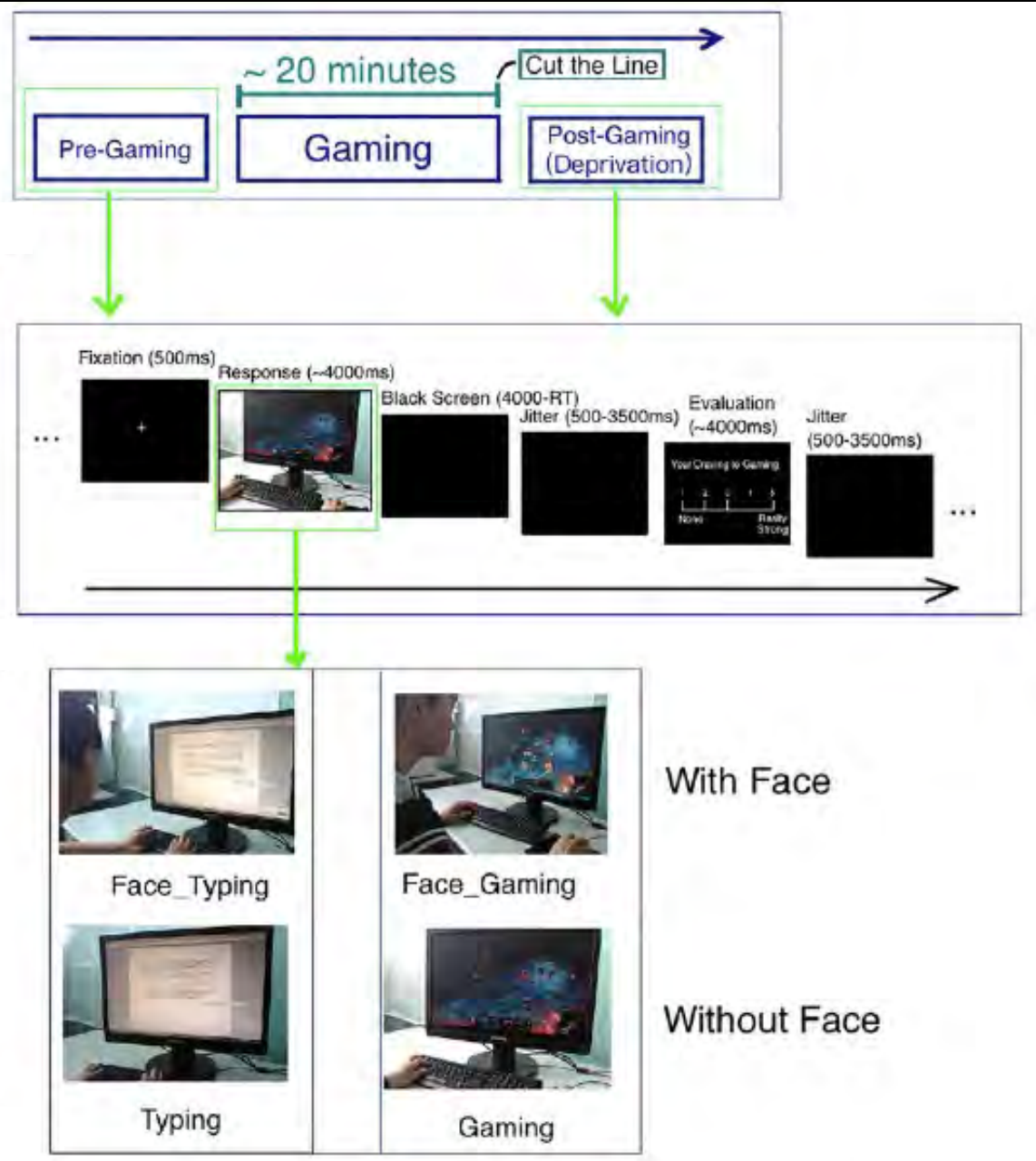


Cue-elicited craving-related lentiform activation during gaming deprivation is associated with the emergence of Internet gaming disorder

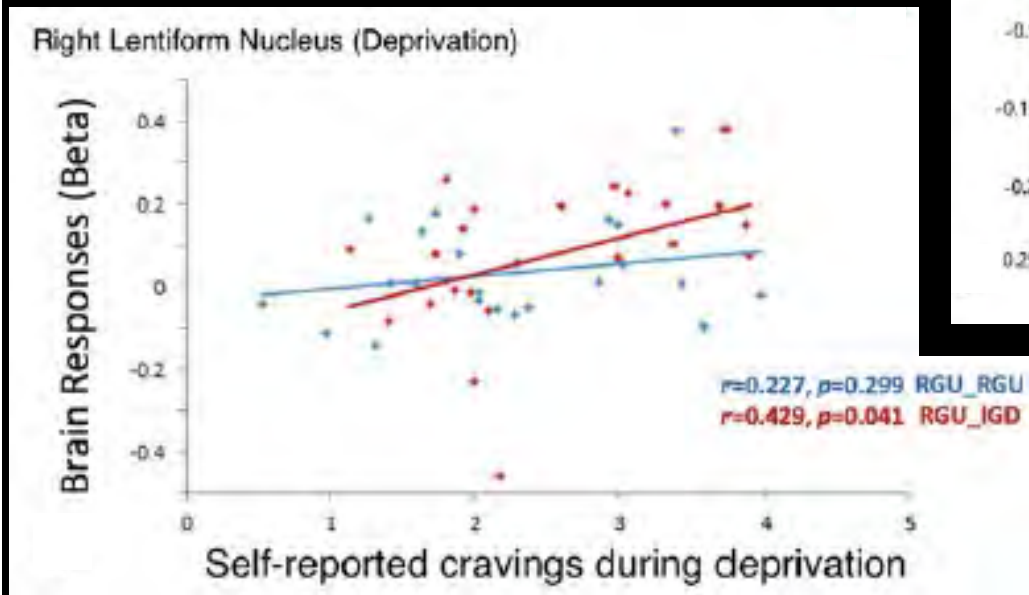
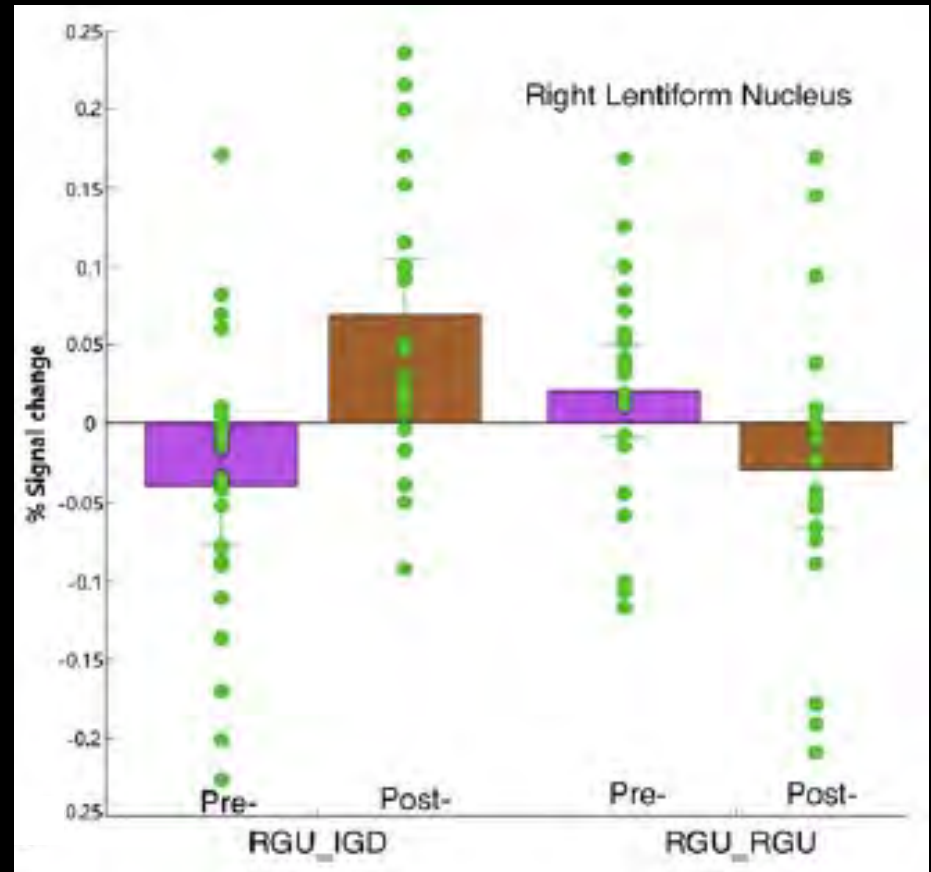
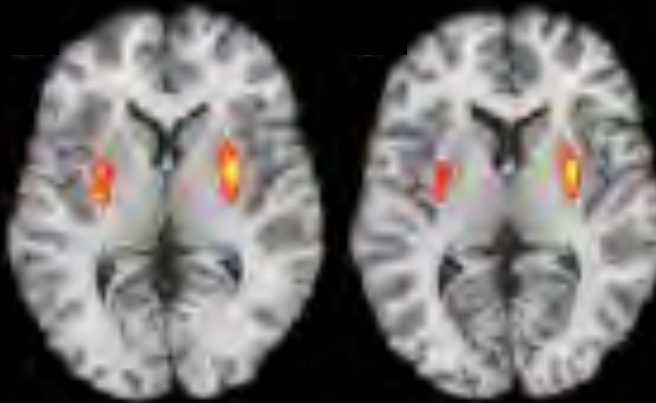
Guangheng Dong¹  | Min Wang¹ | Xiaoyue Liu¹ | Qianxin Liang¹ | Xiaoxia Du² | Marc N. Potenza^{3,4,5}



Cue-Elicited Craving Task Pre- and Post-Gaming and and IGD Emergence



Lentiform Activity and IGD Emergence



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Dong et al, 2019

Telescoping

Does Telescoping Exist in Male and Female Gamblers? Does It Matter?



Yasmin Zakiniaez^{1*},



Kelly P. Cosgrove^{1,2,3,4},



Carolyn M. Mazure^{3,5} and



Marc N. Potenza^{3,4,5,6,7,8}

Front. Psychol., 05 September 2017
Sec. Psychopathology
<https://doi.org/10.3389/fpsyg.2017.01510>



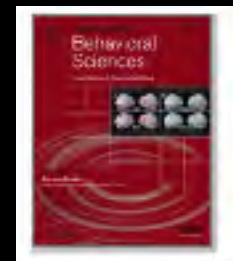
Gender-related differences in addiction: a review of human studies

Yasmin Zakiniaez¹, Marc N Potenza^{2, 3, 4, 5, 6, 7, 8} ✉



Current Opinion in Behavioral Sciences

Volume 23, October 2018, Pages 171-175



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Zakiniaez et al, 2017; Zakiniaez and Potenza, 2018

Gaming, Gambling, Weapons and Mass Violence

News › World › Americas

David Katz: Jacksonville shooting suspect named as gamer, 24, after two killed at 'Madden' tournament

FBI and police raid alleged shooter's Baltimore, Maryland, home

Adam Withnall | @adamwithnall |, Jon Sharman | Monday 27 August 2018 12:35 |  133 comments

CBS/AP / November 4, 2017, 1:01 PM

Las Vegas shooter Stephen Paddock had lost money, been depressed, sheriff says


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Weapons, Gambling and Gaming

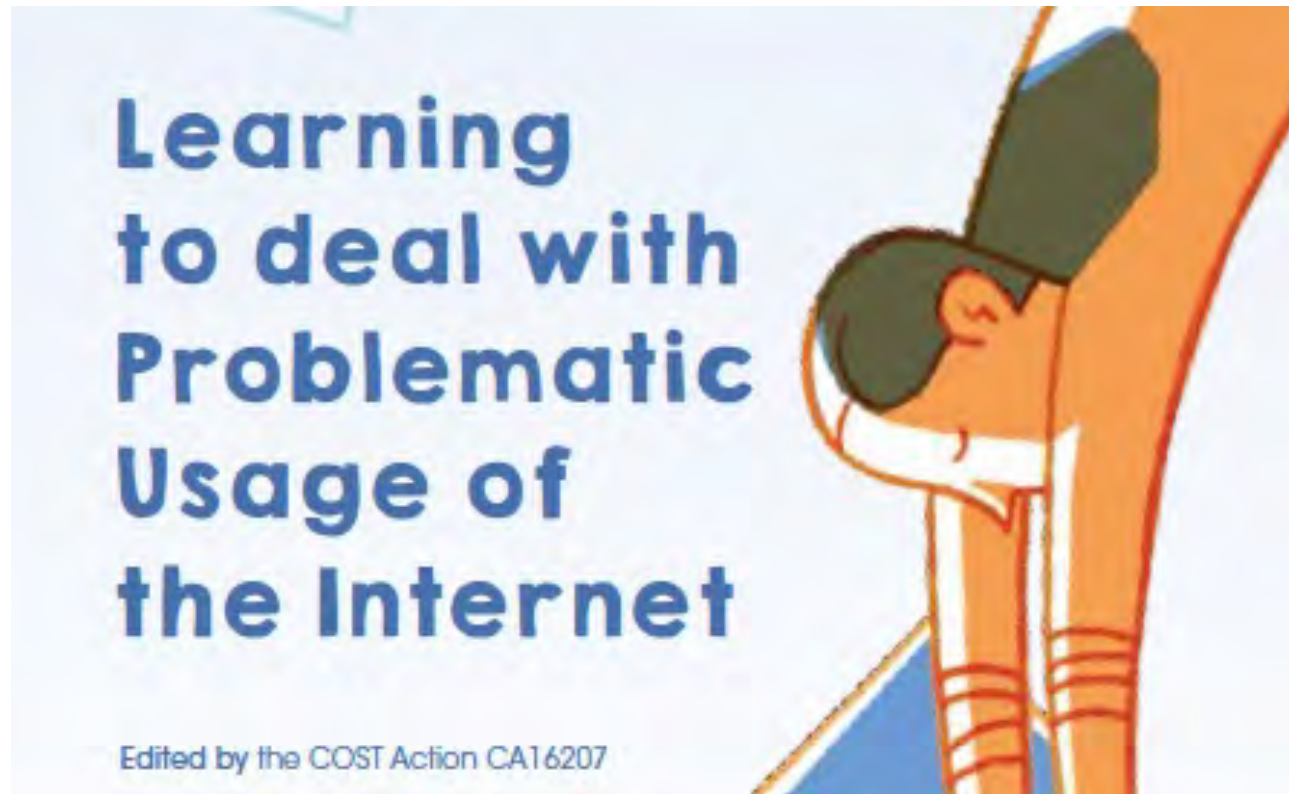
- **Weapon-carrying Associated with More Permissive Gambling Attitudes, Perceived Parental Permissiveness Towards Gambling, More Family Gambling Concerns, ARPG, and Relatively Diminished Associations Between ARPG and Friend/Family/Adult Gambling (Zhai et al, 2019)**
- **Findings Suggest More Socially Isolated Gambling Links ARPG and Weapon-Carrying**
- **Similar Findings with Respect to Gaming Behaviors, Particularly Among Youth with High Sensation-Seeking (Zhai et al., 2020)**
- **Findings Suggest Targeting Isolative and Sensation-Seeking Youth**



Which conditions should be considered as disorders in the *International Classification of Diseases* (ICD-11) designation of “other specified disorders due to addictive behaviors”?

MATTHIAS BRAND^{1,2*} , HANS-JÜRGEN RUMPF³,
ZSOLT DEMETROVICS⁴, ASTRID MÜLLER⁵,
RUDOLF STARK^{6,7}, DANIEL L. KING⁸, ANNA
E. GOUDRIAAN^{9,10,11}, KARL MANN¹², PATRICK TROTZKE^{1,2},
NAOMI A. FINEBERG^{13,14,15}, SAMUEL R. CHAMBERLAIN^{16,17},
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and MARC N. POTENZA^{21,22,23}

COST eBooklet



EDITORIAL COMMITTEE

Naomi Fineberg¹, Bernardo Dell'Osso², Zsolt Demetrovics³, Samuel Chamberlain⁴, Ornella Corazza⁵, Joseph Zohar⁶, Mark Potenza⁷, Eric Hollander⁸, Michael Van Ameringen⁹, Célia Sales¹⁰, Julia Jones¹¹, Natalie Hall¹², Giovanni Martinotti¹³, Julius Burkauskas¹⁴, José Menchón¹⁵, Edna Grünblatt¹⁶, Orsolya Kiraly¹⁷



Milan, 10/30/23

<https://www.internetandme.eu>

Fineberg-et al, 2020

COST eBooklet

- **Covers multiple types of PUI**

Internet-Related Buying-Shopping Disorder

Cyberchondria

Internet Social-Media/Forum Addiction
and others

Cyberpornography
Addiction

Cyberbullying

Internet-Related Gambling Disorder

Internet-Related Gaming Disorder

- **Provides information on the course of PUI and co-occurring disorders**
- **Covers assessment and intervention information**
- **Provides practical tips**

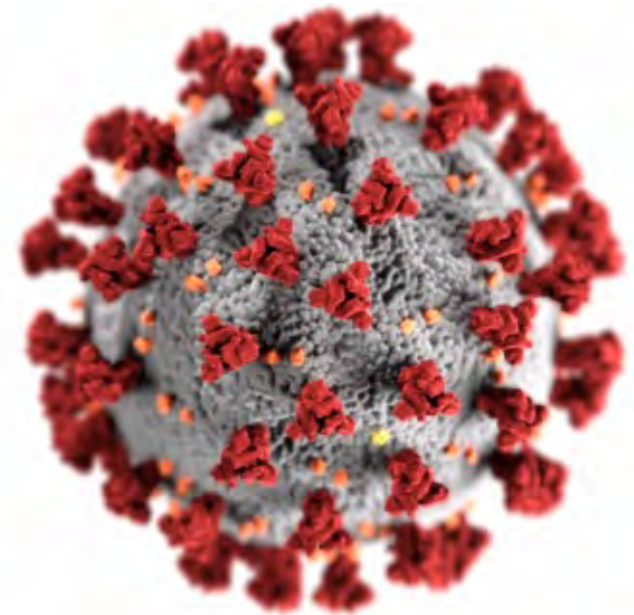


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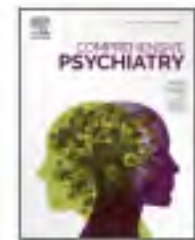
<https://www.internetandme.eu>

Fineberg-et al, 2020

Preventing problematic internet use during the COVID-19 pandemic: Consensus guidance



Orsolya Király ^a✉, Marc N. Potenza ^{b, c, d, e, f}✉, Dan J. Stein ^g✉, Daniel L. King ^h✉, David C. Hodgins ⁱ✉, John B. Saunders ^j✉, Mark D. Griffiths ^k✉, Biljana Gjoneska ^l✉, Joël Billieux ^m✉, Matthias Brand ⁿ✉, Max W. Abbott ^o✉, Samuel R. Chamberlain ^{p, q}, Ornella Corazza ^{r, s}✉, Julius Burkauskas ^t✉, Célia M.D. Sales ^u✉, Christian Montag ^v✉, Christine Lochner ^w✉, Edna Grünblatt ^{x, y, z}✉ ... Zsolt Demetrovics ^{a, z}✉

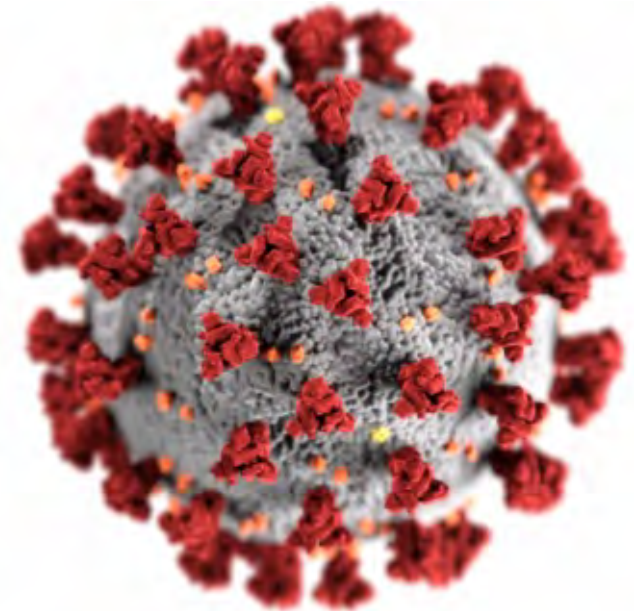


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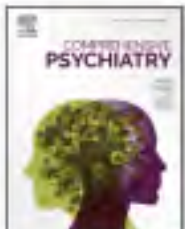
Comprehensive Psychiatry
Volume 100, July 2020, 152180

Kiraly et al, 2020

Problematic use of the internet during the COVID-19 pandemic: Good practices and mental health recommendations



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BEHAVIOURAL ADDICTION IN WOMEN

An International Female Perspective on
Treatment and Research

ROUTLEDGE


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Conclusions & Future Directions

- Addictions in Girls and Women Appear Disproportionately Related to Stress and Trauma
- Biological Studies Suggest that Women and Men Process Stress Differently with Women Processing Stress More at Cortical Levels and This Has Implications for Addictions
- Breaking Trans-generational Transmission of Addictions May Involve Targeting Stress and Social-Processing and Positive and Negative Valence Pathways
- Identifying and Targeting Possible Early Risk Factors Relating to Less Violent and More Prosocial Functioning Appears Important

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Women & Addictions

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