Precursori psicopatologici del Disturbo da Gioco d'azzardo patologico in età evolutiva

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AO Brotzu

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- Vifor
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ScienceDirect

Comprehensive Psychiatry 60 (2015) 40–46

COMPREHENSIVE PSYCHIATRY

www.elsevier.com/locate/comppsych

255 patients
Age 44
Iowa

Age at onset of DSM-IV pathological gambling in a non-treatment sample: Early- versus later-onset

Donald W. Black*, Martha Shaw, William Coryell, Raymond Crowe, Brett McCormick, Jeff Allen

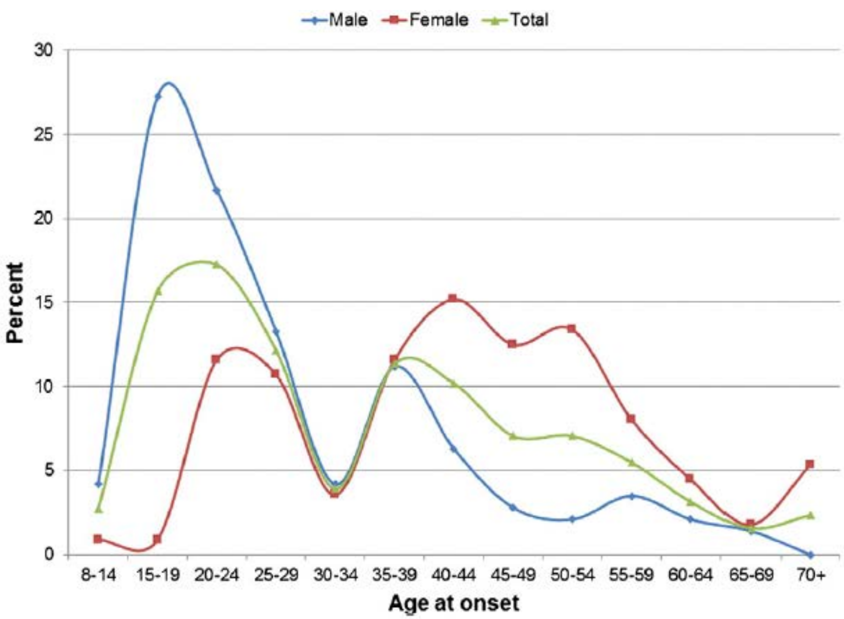


Fig. 1. Age at onset in male and female subjects with PG.

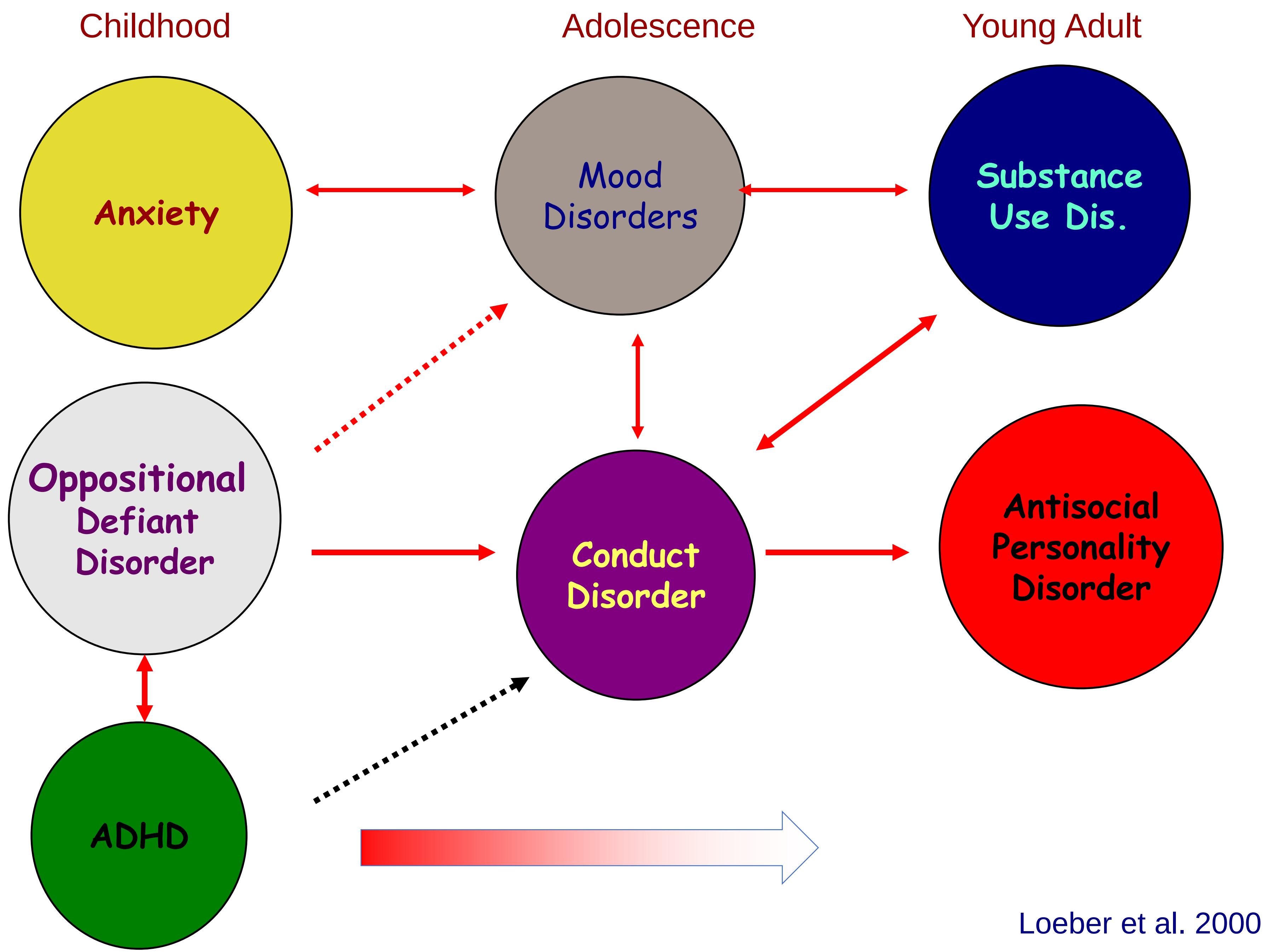
Predictors of early-onset PG.

Variables	Est.	SE	P-value	Odds Ratio (95% C.I.)
Age	−0.103	0.015	<0.001	0.90 (0.88, 0.93)
Male gender	1.496	0.420	<0.001	4.46 (1.96, 10.16)
Any substance use disorder	0.946	0.458	0.039	2.58 (1.05, 6.32)
ADHD	1.636	0.596	0.006	5.13 (1.60, 16.52)
Study group[a]				
Family study probands	−1.100	0.468	0.019	0.33 (0.13, 0.83)
Family study relatives	−0.465	0.628	0.458	0.63 (0.18, 2.15)

Results based on multiple logistic regression analyses with stepwise variable selection.

ADHD = attention deficit/hyperactivity disorder.

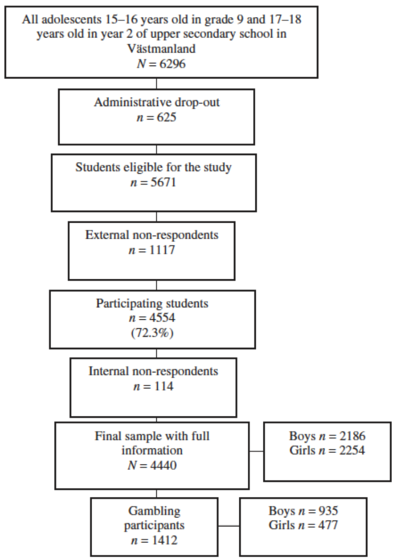
[a] Subjects from the longitudinal study used as reference group.


Childhood
Adolescence
Young Adult
Anxiety
Mood Disorders
Substance Use Dis.
Oppositional Defiant Disorder
Conduct Disorder
Antisocial Personality Disorder
ADHD
Loeber et al. 2000

Gambling frequency and symptoms of attention-deficit hyperactivity disorder in relation to problem gambling among Swedish adolescents: a population-based study

UJMS 2017

Charlotta Hellström[a,b], Philippe Wagner[a], Kent W. Nilsson[a], Jerzy Leppert[a] and Cecilia Åslund[a]



Model I. Analysis of the chance of not becoming susceptible to developing gambling problems.[a]

	OR	p	95% CI	
Age	0.48	0.001	0.30	0.75
ADHD symptoms index	0.95	0.041	0.90	1.00
Gambling frequency index	0.46	0.009	0.26	0.82
ADHD symptoms × Gambling frequency index	0.92	0.023	0.85	0.99

Model II. Analysis of adolescents already susceptible to problem gambling.[b]

	IRR	p	95% CI	
ADHD symptoms index	1.03	0.031	1.003	1.07
Gambling frequency index	1.34	<0.001	1.20	1.51
Sex (ref: boys)	0.25	<0.001	0.16	0.38
Sex × Gambling frequency index	1.67	<0.001	1.34	2.13

[a]Model I: adjusted for covariates sex and parents' country of birth.
[b]Model II: adjusted for covariate age.

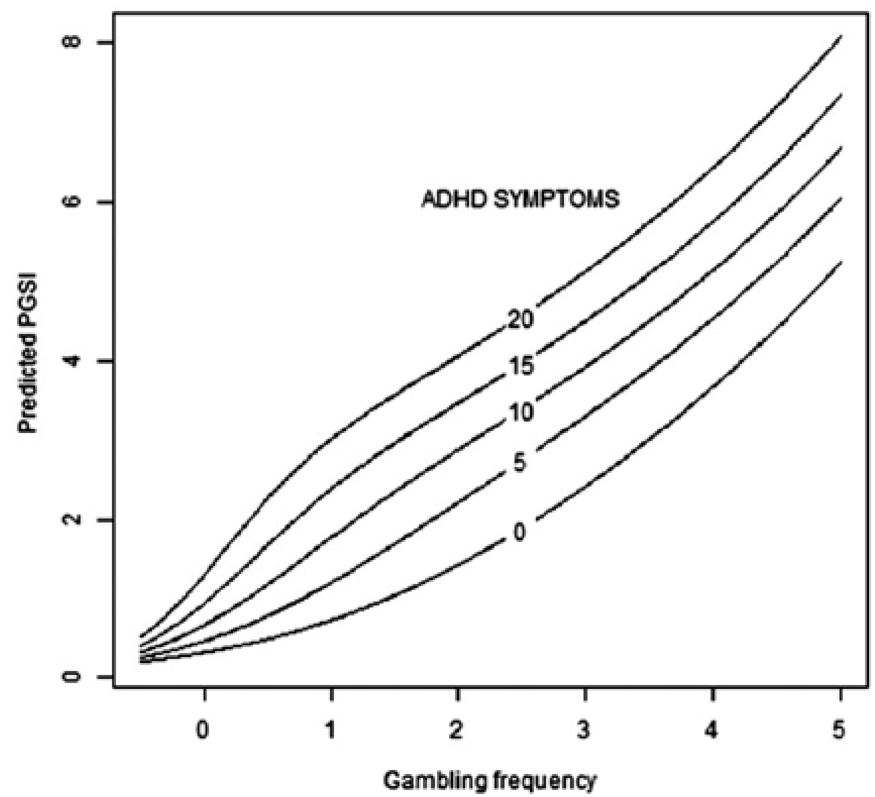


Figure 2. Illustration of the association between gambling frequency and the Problem Gambling Severity Index (PGSI). The expected degree of gambling problems in the study sample, irrespective of susceptibility to gambling problems, plotted against gambling frequency for different degrees of ADHD symptoms according to the ADHD symptom index.

Attention-deficit hyperactivity disorder and addictions (substance and behavioral): Prevalence and characteristics in a multicenter study in France

LUCIA ROMO[1,2]*, JOEL LADNER[3,4,5], GAYATRI KOTBAGI[1,6], YANNICK MORVAN[1,7], DALIA SALEH[1,8], MARIE PIERRE TAVOLACCI[4,9] and LAURENCE KERN[1,10]

Journal of Behavioral Addictions 7(3), pp. 743–751 (2018)

1517 students (85 ADHD): 20.6 Y

Table 3. Addictive behaviors associated with ADHD ($N = 1{,}517$)

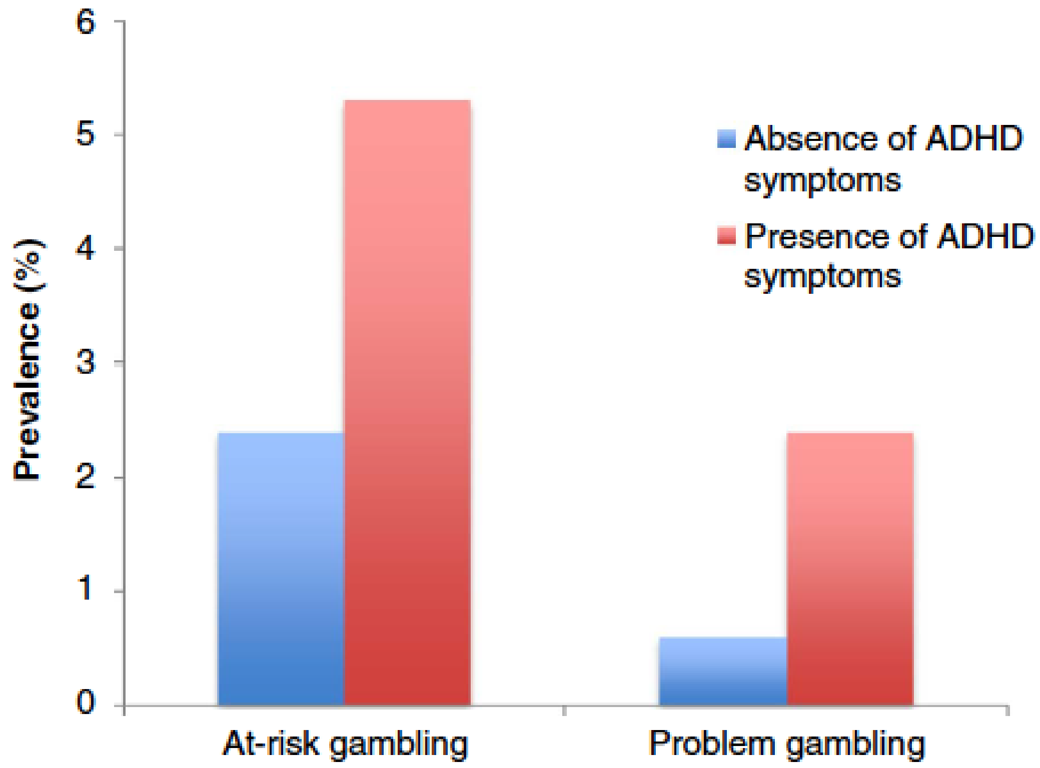
	ADHD– ($N = 1{,}432$)	ADHD+ ($N = 85$)	Total ($N = 1{,}517$)	p	AOR (95% CI)	p
Physical activity (GLTEQ)				.30		
Insufficient	24.0	28.4	24.2			
Moderate	14.1	8.1	13.8			
Active	61.9	63.5	62.0			
Eating disorders (SCOFF)	17.4	32.9	18.3	$<10^{-3}$	1.33 (0.76–2.33)	.31
Internet Addiction Test (IAT)	8.4	34.5	9.9	$<10^{-3}$	3.87 (2.14–7.01)	$<10^{-4}$
Online compulsive buying (Echeburua's test)	11.8	40.0	13.4	$<10^{-3}$	3.38 (2.02–5.65)	$<10^{-4}$
Problem gambling (ICJE)	9.3	20.0	9.9	.001	1.76 (0.94–3.31)	.08
Food addiction (YFAS)	4.0	14.1	4.5	$<10^{-3}$	2.27 (1.05–4.88)	.04

Note. Adjusted on universities, gender, cursus, and financial difficulties. GLTEQ: Godin's Leisure Time Questionnaire; ADHD: attention-deficit hyperactivity disorder; AOR: adjusted odds ratio; CI: confidence interval; ICJE: Indice Canadian du Jeu excessif (Canadian Index of Excessive Gambling); YFAS: Yale Food Addiction Scale.

Relationship between attention-deficit hyperactivity disorder symptoms and problem gambling: A mediation analysis of influential factors among 7,403 individuals from the UK

LOUIS JACOB[1]*, JOSEP MARIA HARO[2,3] and AI KOYANAGI[2,3]

Journal of Behavioral Addictions 7(3), pp. 781–791 (2018)



Adult ADHD Is Associated With Gambling Severity and Psychiatric Comorbidity Among Treatment-Seeking Problem Gamblers

Journal of Attention Disorders
1–13

Laura Brandt[1,2] and Gabriele Fischer[2]

Table 1. Sociodemographic Characteristics of the Sample by Gender and ADHD Group.

	Total $N = 80$	Male $n = 64$	Female $n = 16$	p_{gender}	No history of ADHD[a] $n = 46$	Childhood ADHD[b] $n = 25$	Adult ADHD[c] $n = 9$	$p_{ADHDgroup}$
Age, *M* (*SD*)	43.1 (12.4)	42.2 (12.4)	46.8 (12.1)	.193	44.0 (12.9)	43.0 (10.9)	38.7 (14.2)	.503
Marital status, *n* (%)				.772				.031*
Single/divorced	53 (66.3)	43 (67.2)	10 (62.6)		25 (54.3)	21 (84.0)	7 (77.8)	
In a relationship/married	27 (33.8)	21 (32.8)	6 (37.5)		21 (45.7)	4 (16.0)	2 (22.2)	
Employment status, *n* (%)				.409				.404
Employed	33 (41.3)	28 (43.8)	5 (31.3)		19 (41.3)	12 (48.0)	2 (22.2)	
Unemployed	47 (58.8)	36 (56.3)	11 (68.8)		27 (58.7)	13 (52.0)	7 (77.8)	
Highest educational attainment, *n* (%)				.372				.866
Compulsory education	15 (18.8)	12 (18.8)	3 (18.8)		7 (15.2)	5 (20.0)	3 (33.3)	
Secondary education	12 (15.0)	9 (14.1)	3 (18.8)		7 (15.2)	4 (16.0)	1 (11.1)	
Vocational training	46 (57.5)	39 (60.9)	7 (43.8)		27 (58.7)	14 (56.0)	5 (55.6)	
University degree	7 (8.8)	4 (6.3)	3 (18.8)		5 (10.9)	2 (8.0)	0 (0)	
ADHD group classification, *n* (%)								
No history of ADHD[a]	46 (57.5)	37 (57.8)	9 (56.3)	.910	—	—	—	—
ADHD only in childhood[b]	25 (31.3)	20 (31.3)	5 (31.3)	.412	—	—	—	—
ADHD persistent in adulthood[c]	9 (11.3)	7 (10.9)	2 (12.5)	.324	—	—	—	—

Adult ADHD Is Associated With Gambling Severity and Psychiatric Comorbidity Among Treatment-Seeking Problem Gamblers

Journal of Attention Disorders
1–13

Laura Brandt[1,2] and Gabriele Fischer[2]

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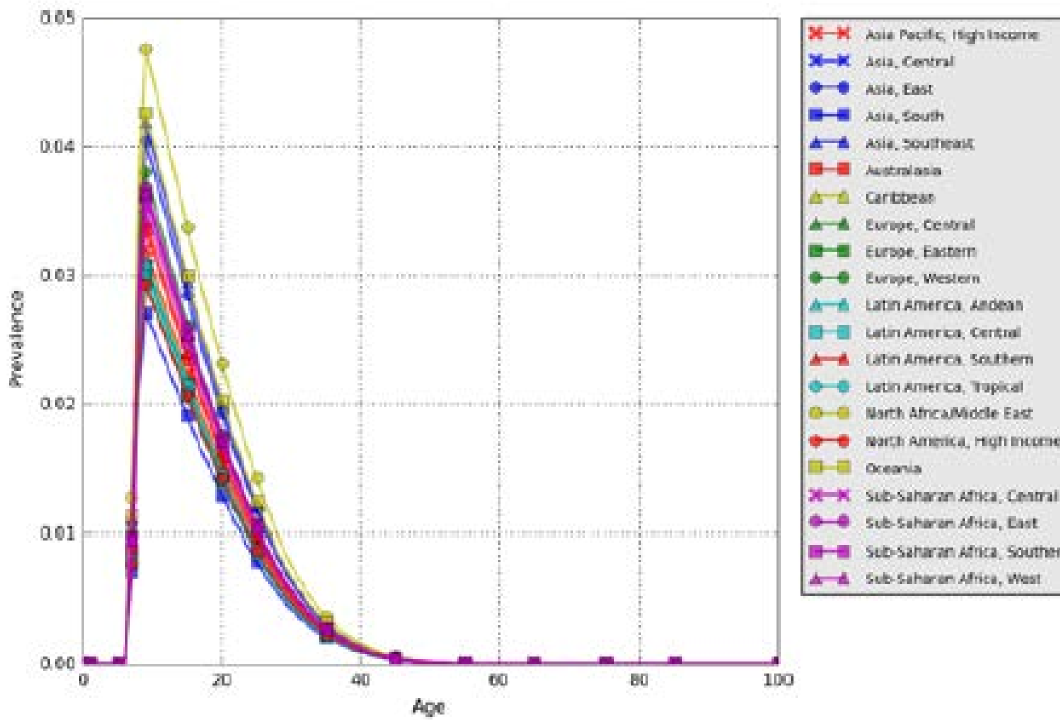
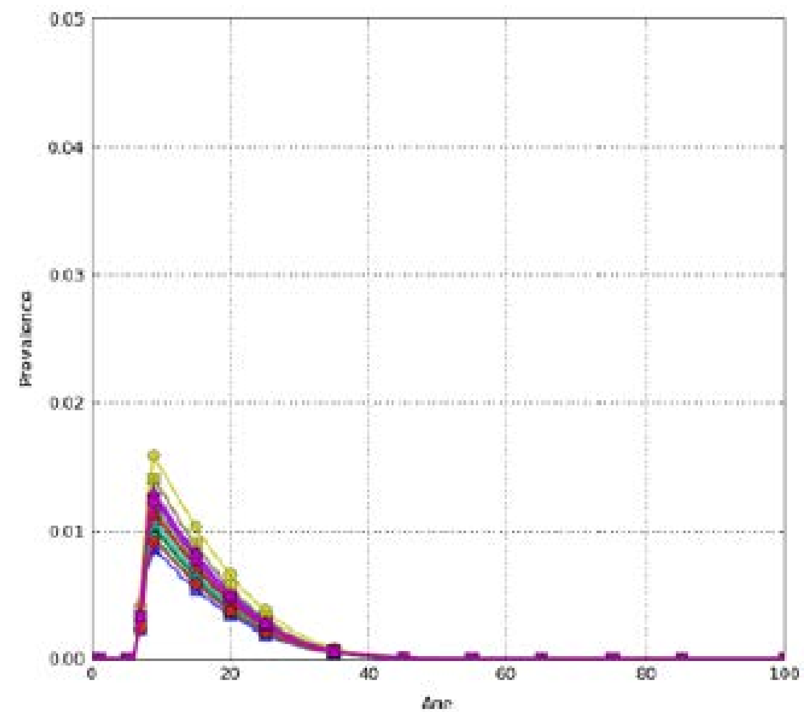
THE JOURNAL OF CHILD PSYCHOLOGY AND PSYCHIATRY
ACAMH THE ASSOCIATION FOR CHILD AND ADOLESCENT MENTAL HEALTH
Journal of Child Psychology and Psychiatry 54:12 (2013), pp 1263–1274 doi:10.1111/jcpp.12144

Research Review: Epidemiological modelling of attention-deficit/hyperactivity disorder and conduct disorder for the Global Burden of Disease Study 2010

Holly E. Erskine,[1,2] Alize J. Ferrari,[1,2] Paul Nelson,[3] Guilherme V. Polanczyk,[4,5] Abraham D. Flaxman,[6] Theo Vos,[6] Harvey A. Whiteford,[1,2] and James G. Scott[2,7,8]





Association of attention-deficit/hyperactivity disorder with gambling disorder

J Neural Transm (2016) 123:1013–1019

Wolfgang Retz[1] · Jutta Ringling[2,4] · Petra Retz-Junginger[3] · Monika Vogelgesang[2] · Michael Rösler[3]

Table 1 Psychiatric co-morbidity according to ICD-10 in 163 patients with GD

Diagnoses	No ADHD ($N = 116$)	Lifetime ADHD ($N = 47$)	Current ADHD ($N = 41$)	Entire GD group ($N = 163$)
Substance use disorders[a]	29 (25 %)	21 (44.7 %)*	19 (46.3 %)*	50 (30.7 %)
Alcohol	27 (23.3 %)	20 (42.6 %)*	18 (43.9 %)*	47 (28.8 %)
Drugs	6 (5.2 %)	5 (10.6 %)	4 (9.8 %)	11 (6.7 %)
Nicotine	95 (81.9 %)	41 (87.2 %)	36 (87.8 %)	136 (83.4 %)
Mood disorders	38 (32.8 %)	15 (31.9 %)	12 (29.3 %)	53 (32.5 %)
One suicide attempt	11 (9.5 %)	9 (19.1 %)*	8 (19.5 %)*	20 (12.3 %)
Two or more suicide attempts	14 (12.1 %)	10 (21.3 %)*	10 (24.4 %)*	24 (14.7 %)
Neurotic, stress-related and somatoform disorders	17 (15.7 %)	13 (27.7 %)****	13 (31.7 %)*	30 (18.4 %)
Anxiety disorders	10 (8.8 %)	3 (7.5 %)	3 (8.8 %)	13 (8.5 %)
Reaction to severe stress, and adjustment disorders	7 (6.0 %)	7 (14.9 %)****	7 (17.1 %)*	14 (8.6 %)
Personality disorders	25 (21.6 %)	31 (66.0 %)***	27 (65.9 %)***	56 (34.4 %)
Cluster A	0 (0.0 %)	1 (2.1 %)	1 (2.4 %)	1 (0.6 %)
Cluster B	3 (2.6 %)	8 (17.0 %)**	7 (17.1 %)**	11 (6.7 %)
Cluster C	9 (7.8 %)	8 (17.0 %)	7 (17.1 %)	17 (10.4 %)
Combined/other	13 (11.2 %)	14 (29.8 %)*	12 (29.3 %)*	27 (16.6 %)

* $p < 0.05$, ** $p < 0.005$, *** $p < 0.0001$, **** $p = 0.05$–0.1 (compared to subjects without ADHD)

[a] Without nicotine

The Relationship Between Problem Gambling and Attention Deficit Hyperactivity Disorder

O. R. Waluk[1] · G. J. Youssef[1,2] · N. A. Dowling[1,3,4,5]

J Gambl Stud (2016) 32:591–604

Gambling and Attention Deficit Hyperactivity Disorders (ADHD) in a Population of French Students

L. Romo · J. J. Rémond · A. Coeffec · G. Kotbagi · S. Plantey · F. Boz · L. Kern

J Gambl Stud (2015) 31:1261–1272

The role of affect-driven impulsivity in gambling cognitions: A convenience-sample study with a Spanish version of the Gambling-Related Cognitions Scale

FRANCESCO DEL PRETE[1,3], TREVOR STEWARD[4,5], JUAN F. NAVAS[1,2*], FERNANDO FERNÁNDEZ-ARANDA[4,5,6], SUSANA JIMÉNEZ-MURCIA[4,5,6], TIAN P. S. OEI[7,8] and JOSÉ C. PERALES[1,2]

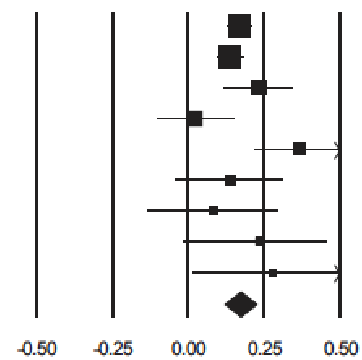
Journal of Behavioral Addictions 6(1), pp. 51–63 (2017)

Exploring the Relationships Between Problem Gambling and ADHD: A Meta-Analysis

Theule et al. *JAD* 2016

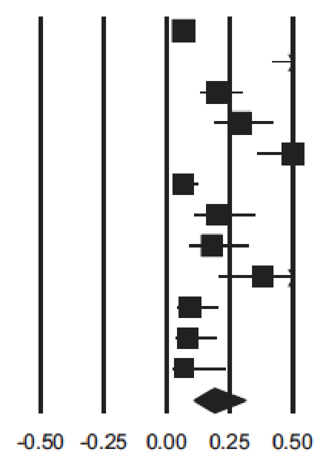
Correlation ADHD & Gambling Problems

Study name	Publication Type	% Female	Mean Age	Correlation	Lower limit	Upper limit	p-Value	Total	Relative weight
Taylor et al. (2014)	Journal Article	61	17	0.17	0.12	0.22	0.000	1738	25.17
Slutske et al. (2014)	Journal Article	59	38	0.14	0.09	0.19	0.000	1773	25.14
Preston et al. (2012)	Journal Article	0	35	0.24	0.12	0.35	0.000	254	11.87
Canu & Schatz (2011)	Journal Article	29	20	0.03	-0.11	0.16	0.710	224	10.96
Turner et al. (2008)	Journal Article	47	42	0.37	0.22	0.50	0.000	141	7.89
Lopez Viets (2013)	Thesis/Dissertation	53	20	0.14	-0.05	0.31	0.140	115	6.72
Carroll (2006)	Thesis/Dissertation	73	23	0.09	-0.14	0.30	0.453	80	4.96
Dai et al. (2013)	Journal Article	52	33	0.24	-0.02	0.46	0.069	60	3.83
Black et a. (2013)	Journal Article	61	47	0.28	0.01	0.51	0.040	54	3.47
				0.17	0.12	0.22	0.000		



ADHD Prevalence in individual with Gambling Problems

Study name	Publication Type	% Female	Mean Age	Event rate	Total	Relative weight
Nower et al. (2013)	Journal Article	38	42	0.07	31 / 470	9.11
Hardoon (2002)	Thesis/Dissertation	57	15	0.50	57 / 113	9.10
Grall-Bronnec et al. (2012)	Journal Article	14	43	0.20	18 / 84	8.83
Rodriguez-Jimenez et al. (2006)	Journal Article	0	33	0.29	16 / 55	8.76
Steinberg et al. (1992)	Journal Article	31	28	0.50	22 / 44	8.74
Walther et al. (2012)	Journal Article	49	19	0.07	8 / 123	8.48
Specker et al. (1995)	Journal Article	38	41	0.20	8 / 40	8.34
Black et al. (2007)	Journal Article	28	43	0.18	7 / 39	8.24
Lawrence et al. (2009)	Journal Article	0	40	0.38	8 / 21	8.09
Black et al. (2013)	Journal Article	61	47	0.09	5 / 54	7.99
Goudriaan et al. (2006)	Journal Article	24	36	0.08	4 / 49	7.72
Grant et al. (2010)	Journal Article	62	50	0.07	2 / 29	6.60
				0.18		

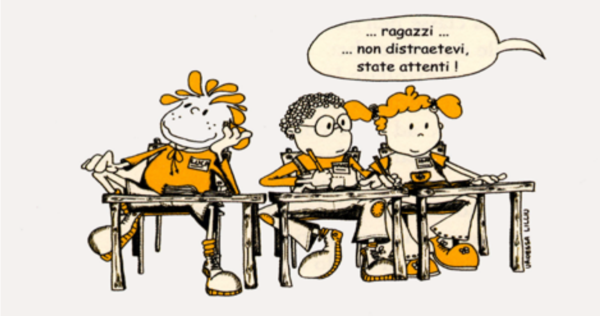


ADHD: DSM 5

Sintomi di iperattività e impulsività:

1. Spesso è irrequieto (non riesce a star fermo su una sedia)
2. Si alza in situazioni non opportune (lascia la postazione al lavoro)
3. Corre e salta eccessivamente (senso di irrequietezza interna)
4. Non riesce a svolgere le attività ricreative in modo tranquillo
5. È spesso "Sotto pressione" o sembra azionato da un motorino (a disagio nel rimanere fermo, per esempio nei ristoranti, durante le riunioni)
6. Spesso parla troppo
7. "Spara" la risposta prima che la domanda sia completata
8. Mostra difficoltà nell'aspettare il suo turno (mentre aspetta in fila)
9. Spesso interrompe o è invadente con gli altri (si inseriscono o subentrano in ciò che fanno gli altri)

ADHD: DSM 5



Sintomi di disattenzione:

1. Scarsa attenzione per i dettagli/errori di distrazione (*lavoro non accurato*)
2. Mostra difficoltà nel mantenere l'attenzione (es *conversazione o lunga lettura*)
3. Sembra non ascoltare quando gli si parla
4. Spesso non segue le istruzioni e non porta a termine le attività
5. Mostra difficoltà di organizzazione (es. *non rispetta scadenza*)
6. Evita le attività che richiedono attenzione sostenuta
7. Perde gli oggetti (es. *portafogli, chiavi, documenti, telefono*)
8. Facilmente distraibile (in adolescenti e adulti anche *pensieri non correlati tra loro*)
9. Spesso sbadato nelle attività quotidiane (*pagamento di bollette*)

Transizione dell'ADHD dall'infanzia all'età adulta

- L'iperattività motoria diminuisce: si può manifestare come **irrequietezza psichica** (impulsività).

- L'inattenzione spesso persiste: si può manifestare come **difficoltà nel portare a termine i compiti** (es.: *rispettare appuntamenti, scadenze o focalizzarsi su una singola attività*).

- Può interferire significativamente con vari aspetti della vita quotidiana.

Volkow & Swanson 2013

ADHD in età adulta:

- La definizione DSM 5 di ADHD si focalizza sul deficit di attenzione, ma le manifestazioni cliniche includono una minore percezione delle gratificazioni con conseguente deficit di motivazione.

- Adulti con ADHD mostrano una ridotta le risposta alle ricompense premi e appaiono meno motivati a impegnarsi ed a portare a termine le attività.

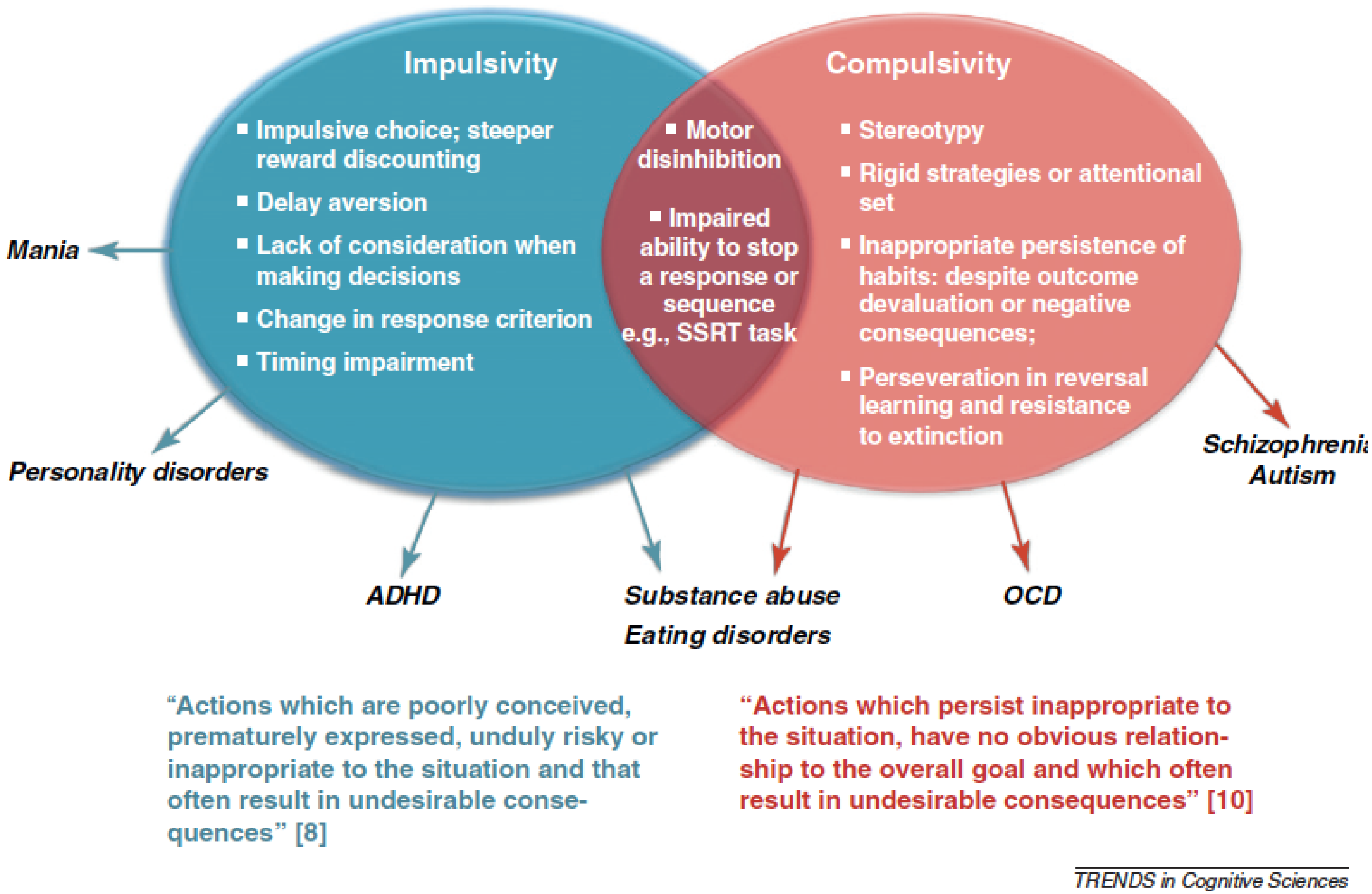
Wolkow & Swanson *NEJM 2013*

Special Issue: Cognition in Neuropsychiatric Disorders

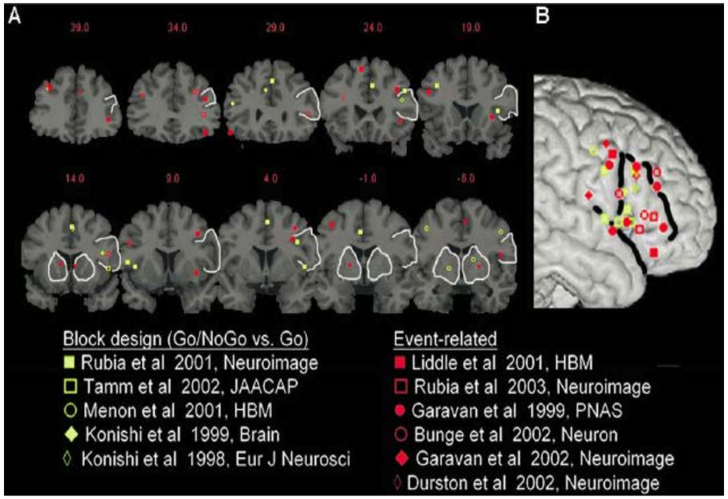
Neurocognitive endophenotypes of impulsivity and compulsivity: towards dimensional psychiatry

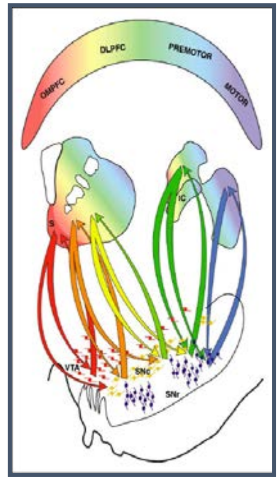
TiCS 2012

Trevor W. Robbins[1,2], Claire M. Gillan[1,2], Dana G. Smith[1,2], Sanne de Wit[4] and Karen D. Ersche[1,3]

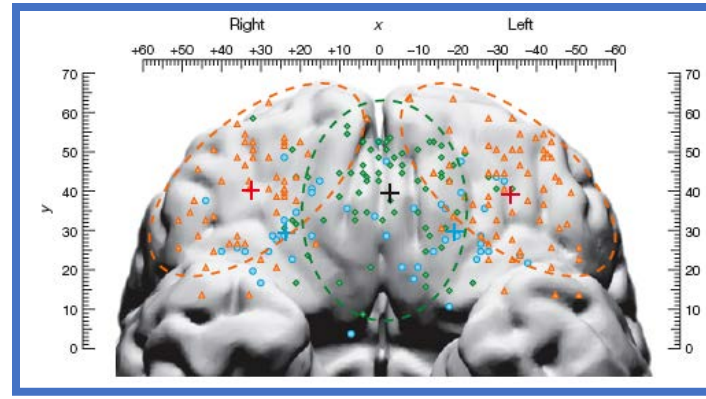


Dorsolatereral prefrontal Ctx
Executive





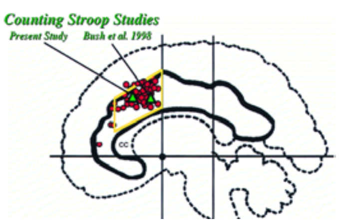
Orbito (Ventral) prefrontal Ctx
Reward/punishment

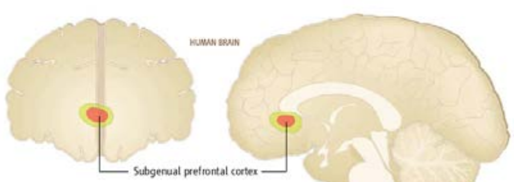


Reward
Punishment

Reinforcement Motivational-independent
Monitoring Punishment
Monitoring Reward

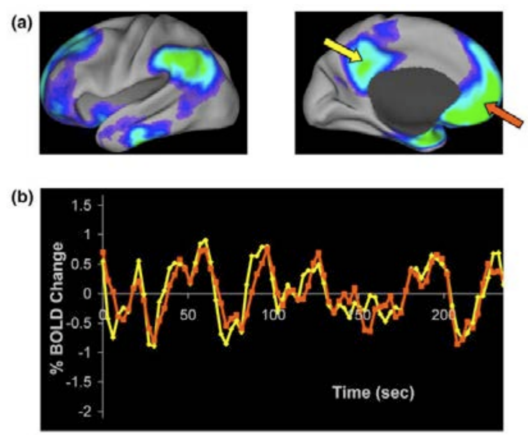
Anterior Cingulate
Choice

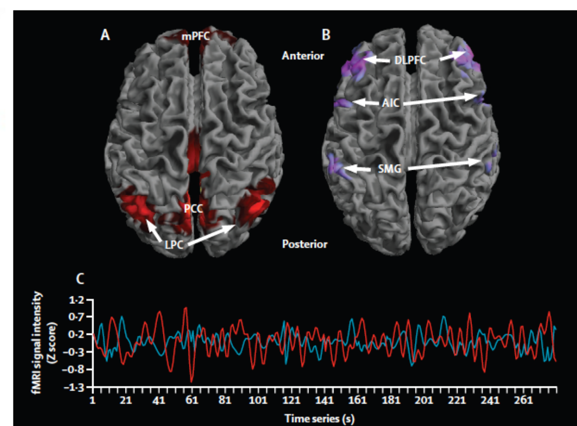




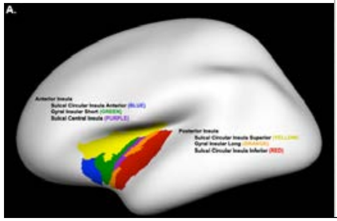
In search of the core of depression. Imaging brain activity in human patients suffering from depression or in animal models of the disease will help to link brain activity in regions such as the hippocampus and prefrontal cortex to behavioral disorders (10, 11).

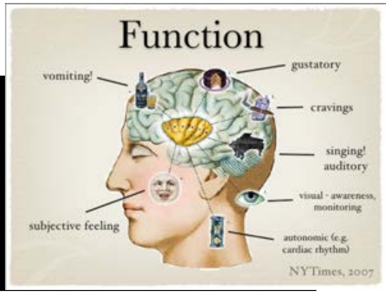
Default Mode network





Emotion Processing Neural Circuits



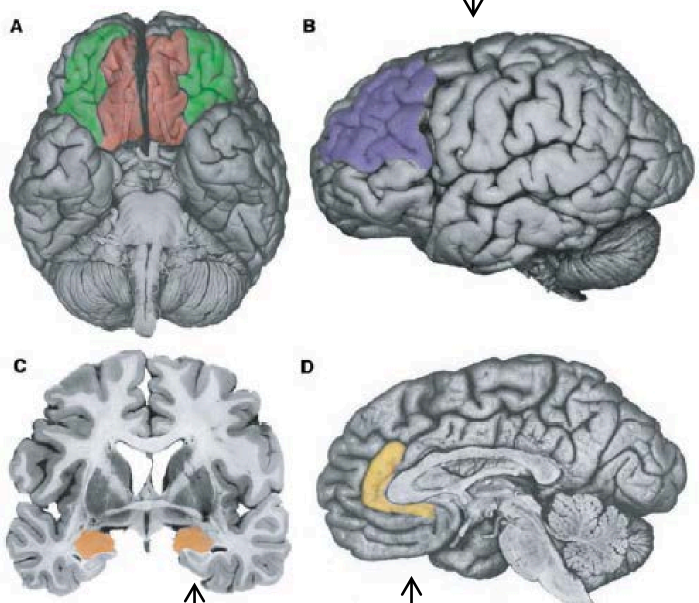


Insula

oPFC

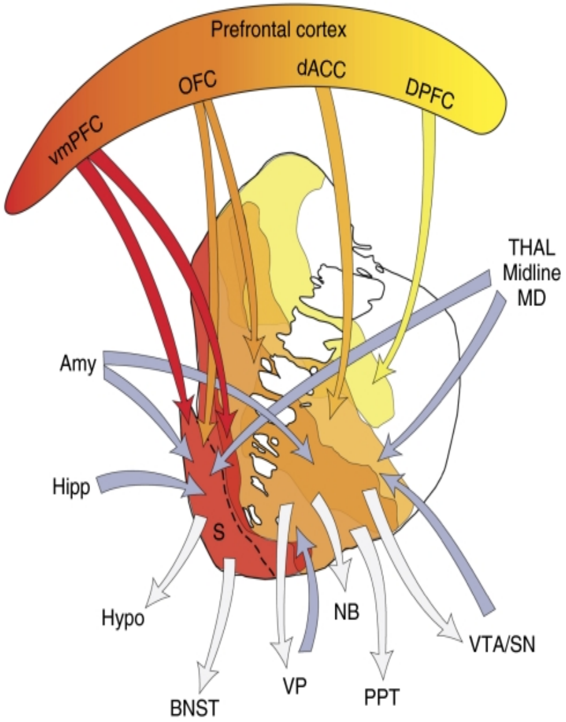
vmPFC

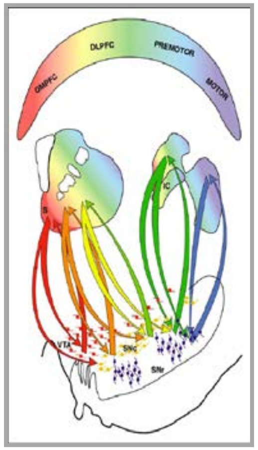
dlPFC

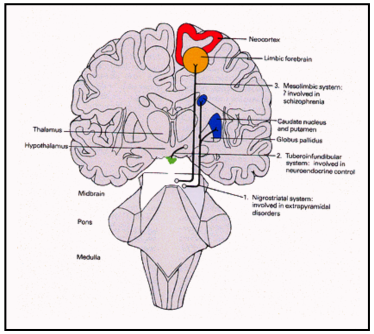


AMG

ACC







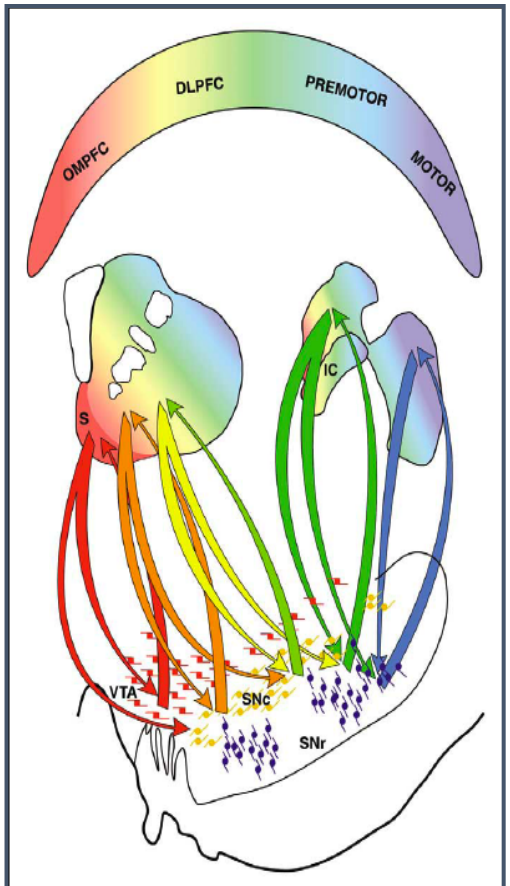
Davidson et al., Science 2000

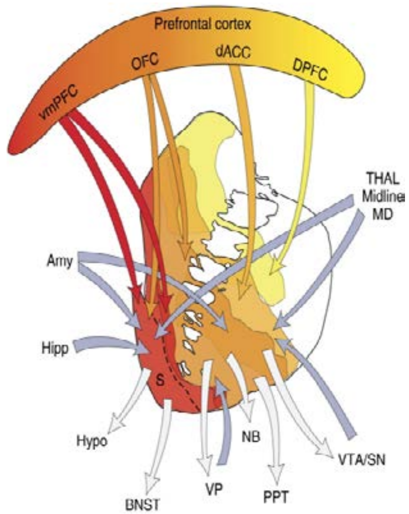
TiCS 2012

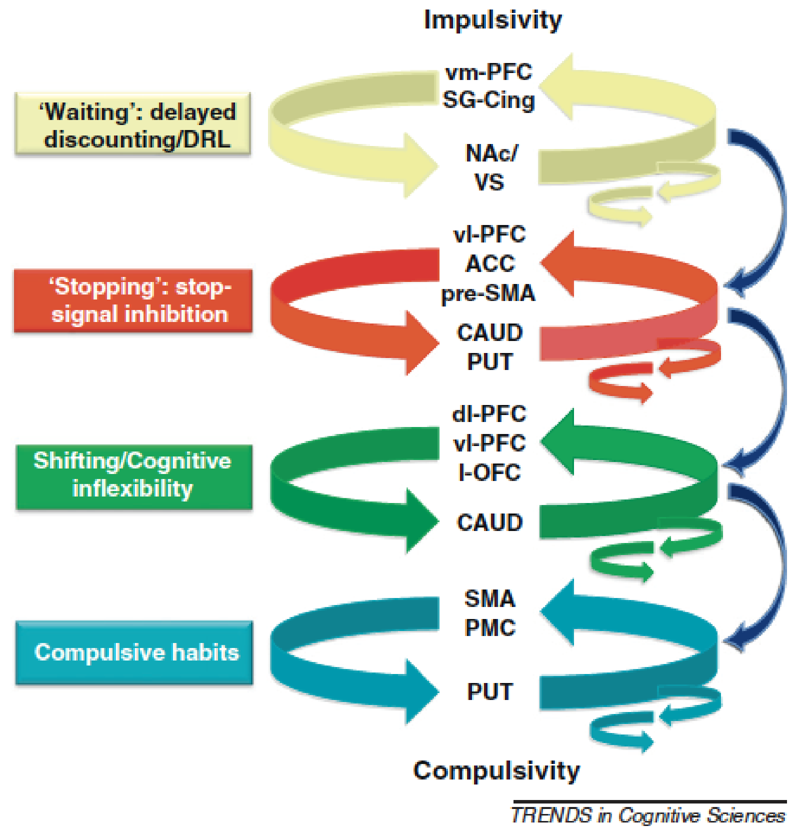
Special Issue: Cognition in Neuropsychiatric Disorders

Neurocognitive endophenotypes of impulsivity and compulsivity: towards dimensional psychiatry

Trevor W. Robbins[1,2], Claire M. Gillan[1,2], Dana G. Smith[1,2], Sanne de Wit[4] and Karen D. Ersche[1,3]







TiCS 2012

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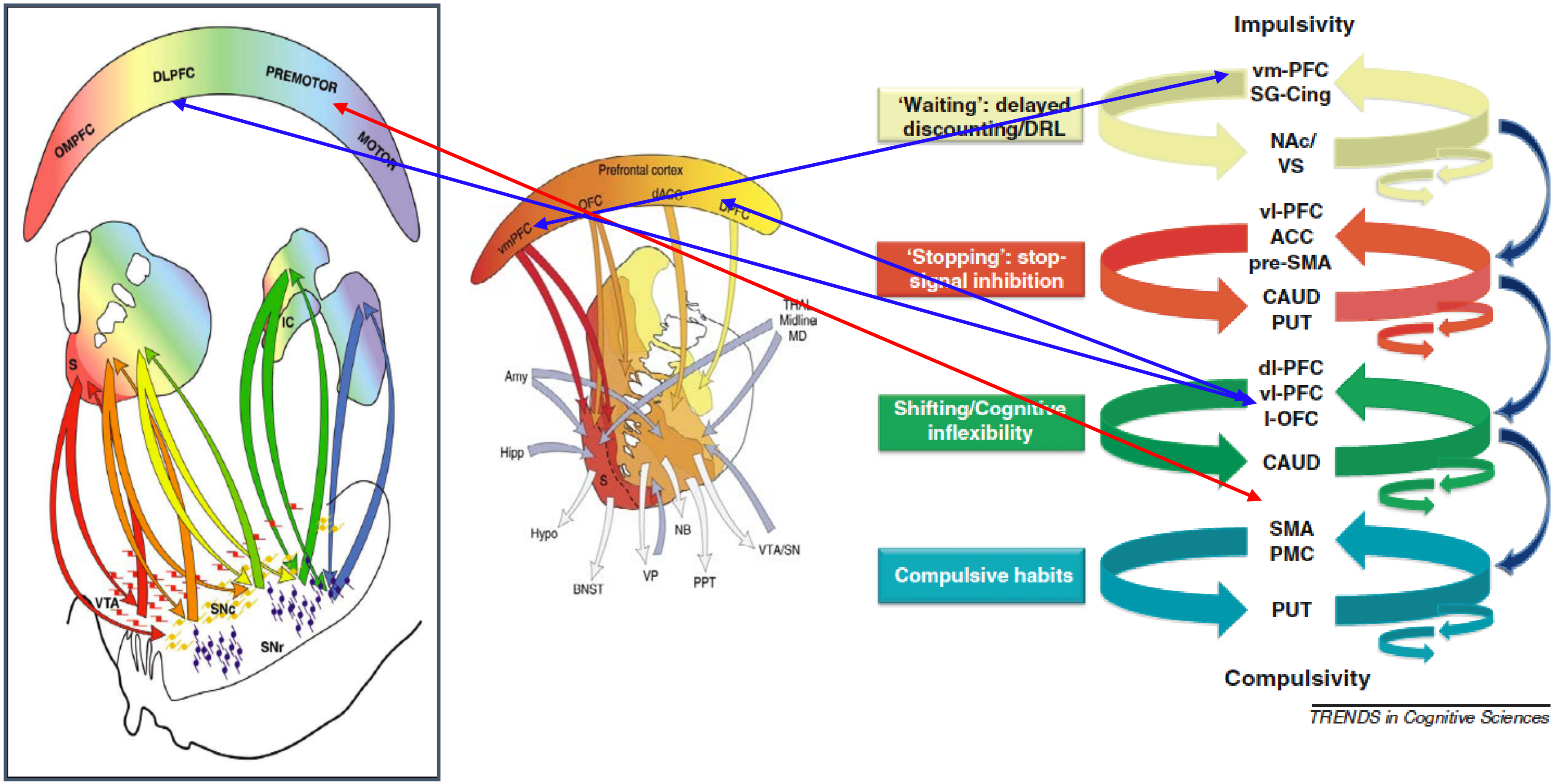
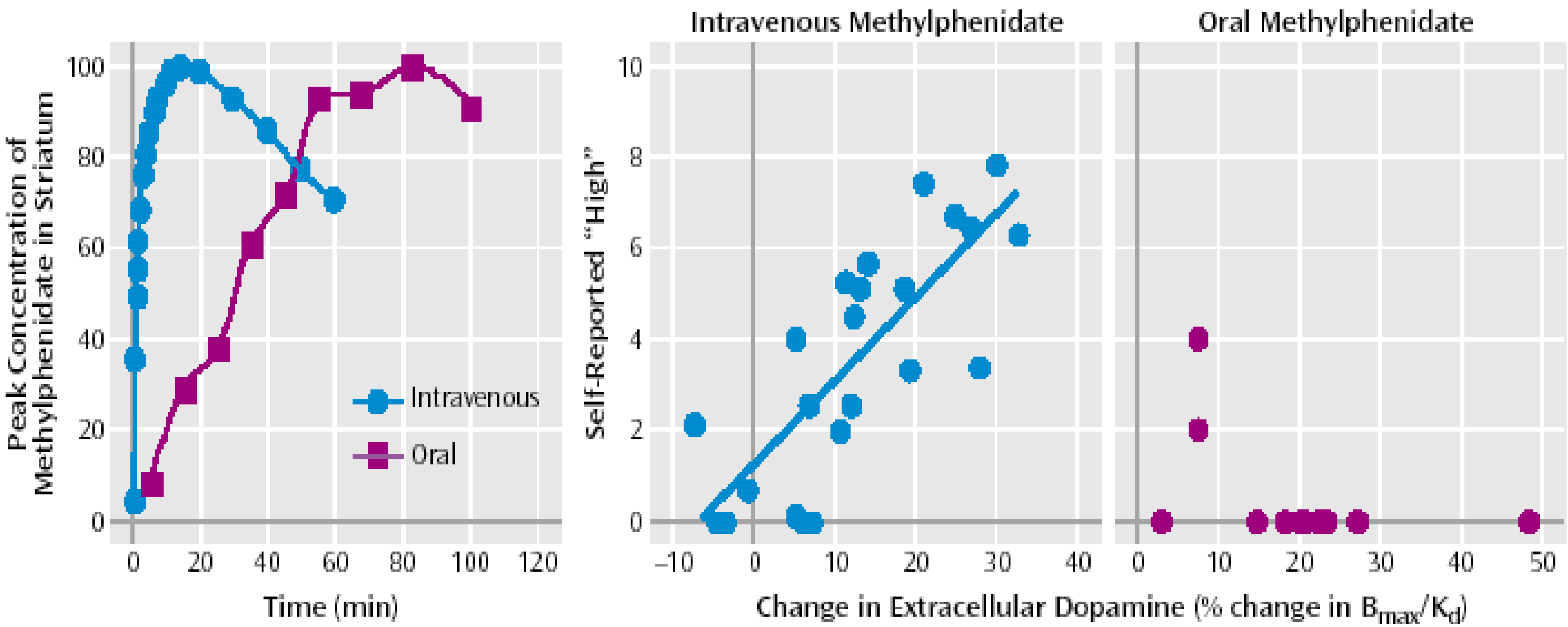


Variables That Affect the Clinical Use and Abuse of Methylphenidate in the Treatment of ADHD

FIGURE 4. Striatal Uptake and the Relationship Between Changes in Extracellular Dopamine and Self-Reports of Being "High" After Intravenous or Oral Administration of Methylphenidate[a]



Volkow & Swanson AJP 2003

Cognitive distorsion in Pathological Gambling

- ***«A win will follow a sequence of losses»***
  even though outcomes occur independently of each other and are therefore unpredictable

- **Themselves are able to influence gambling outcomes** (Illusion of control-IC)
  They can control the game and its outcome because of their experience, skills or knowledge, strategies, rituals, or lucky charms

- **Over-interpretation of signals of gambling skills,**
- **Attributional errors,**
- **Misunderstanding of probability**

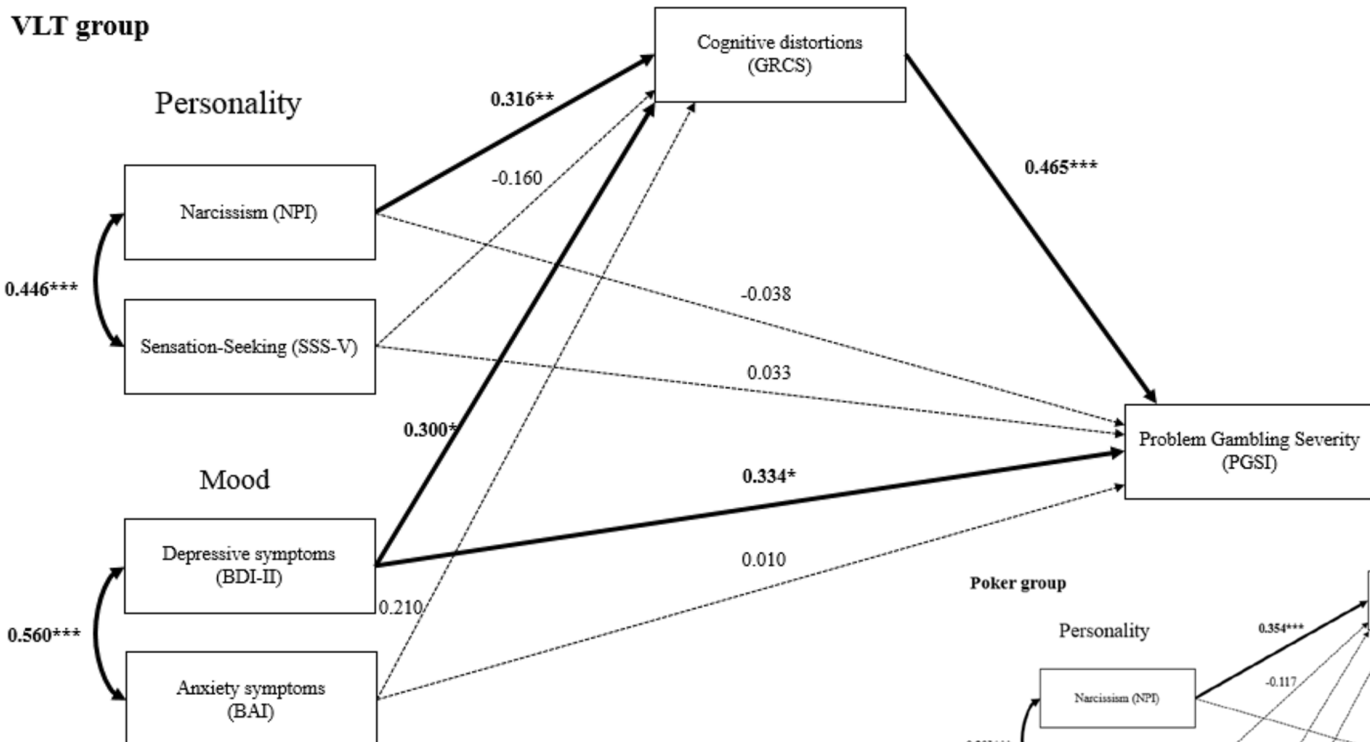
- **Selective memory,**
- **Probabilistic bias**
- **Superstitious thinking**

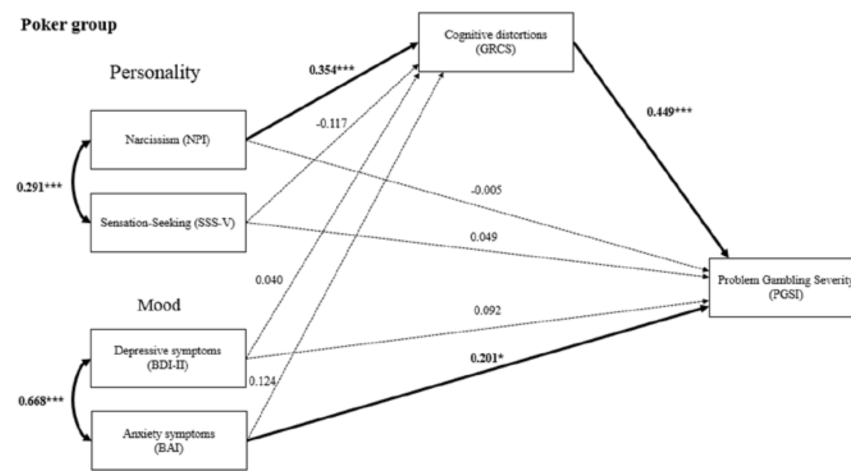
- **Sensation Seeking**

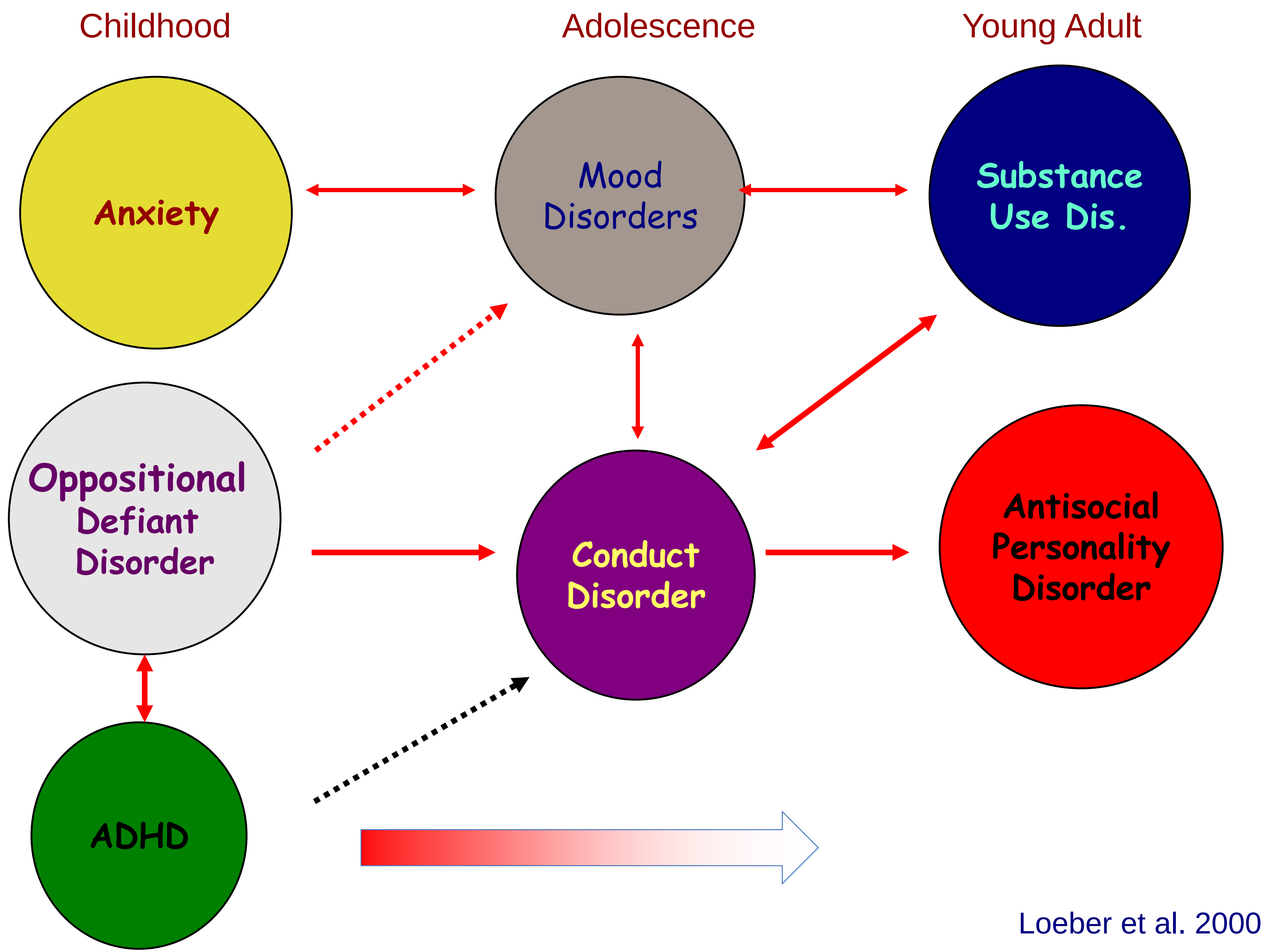
Psychological Vulnerability and Problem Gambling: The Mediational Role of Cognitive Distortions

J Gambl Stud (2018) 34:807–822

David Lévesque[1] · Serge Sévigny[2] · Isabelle Giroux[1] ·
Christian Jacques[1]

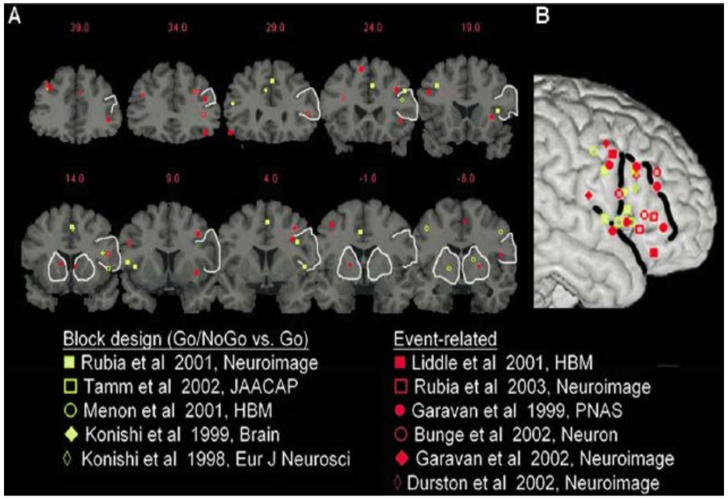


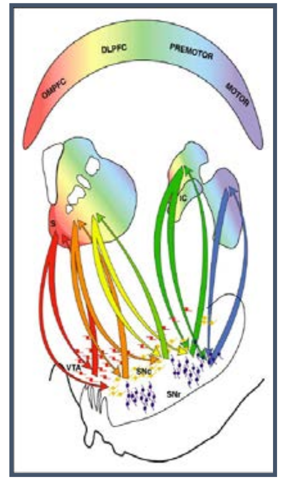



Childhood
Adolescence
Young Adult
Anxiety
Mood Disorders
Substance Use Dis.
Oppositional Defiant Disorder
Conduct Disorder
Antisocial Personality Disorder
ADHD
Loeber et al. 2000

Dorsolatereral prefrontal Ctx

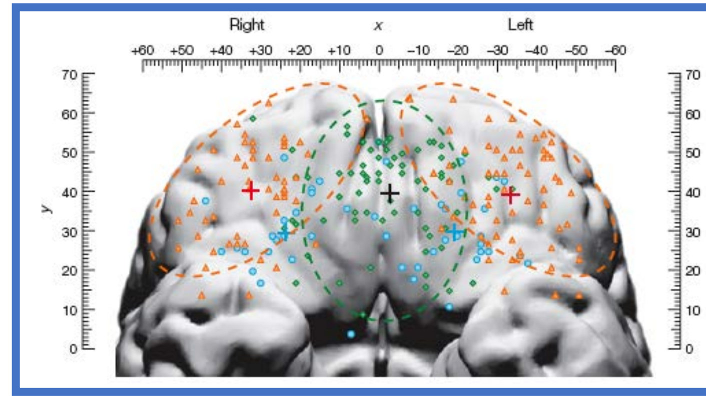
Executive





Orbito (Ventral) prefrontal Ctx

Reward/punishment



Reward

Punishment

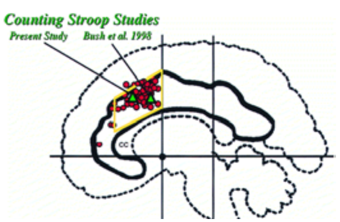
Reinforcement Motivational-independent

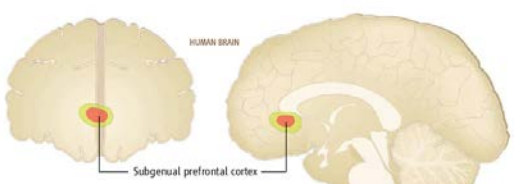
Monitoring Punishment

Monitoring Reward

Anterior Cingulate

Choice





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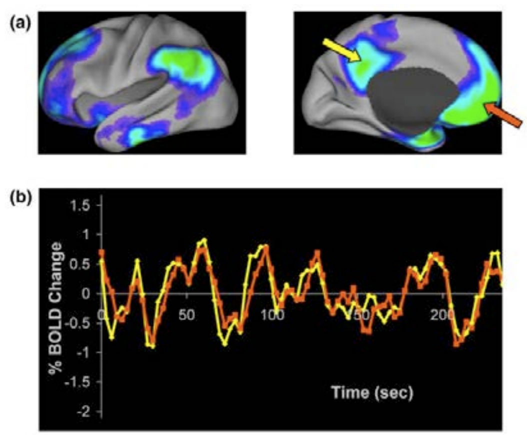
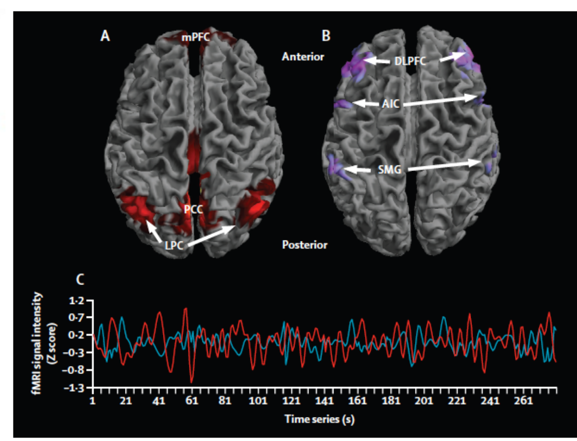
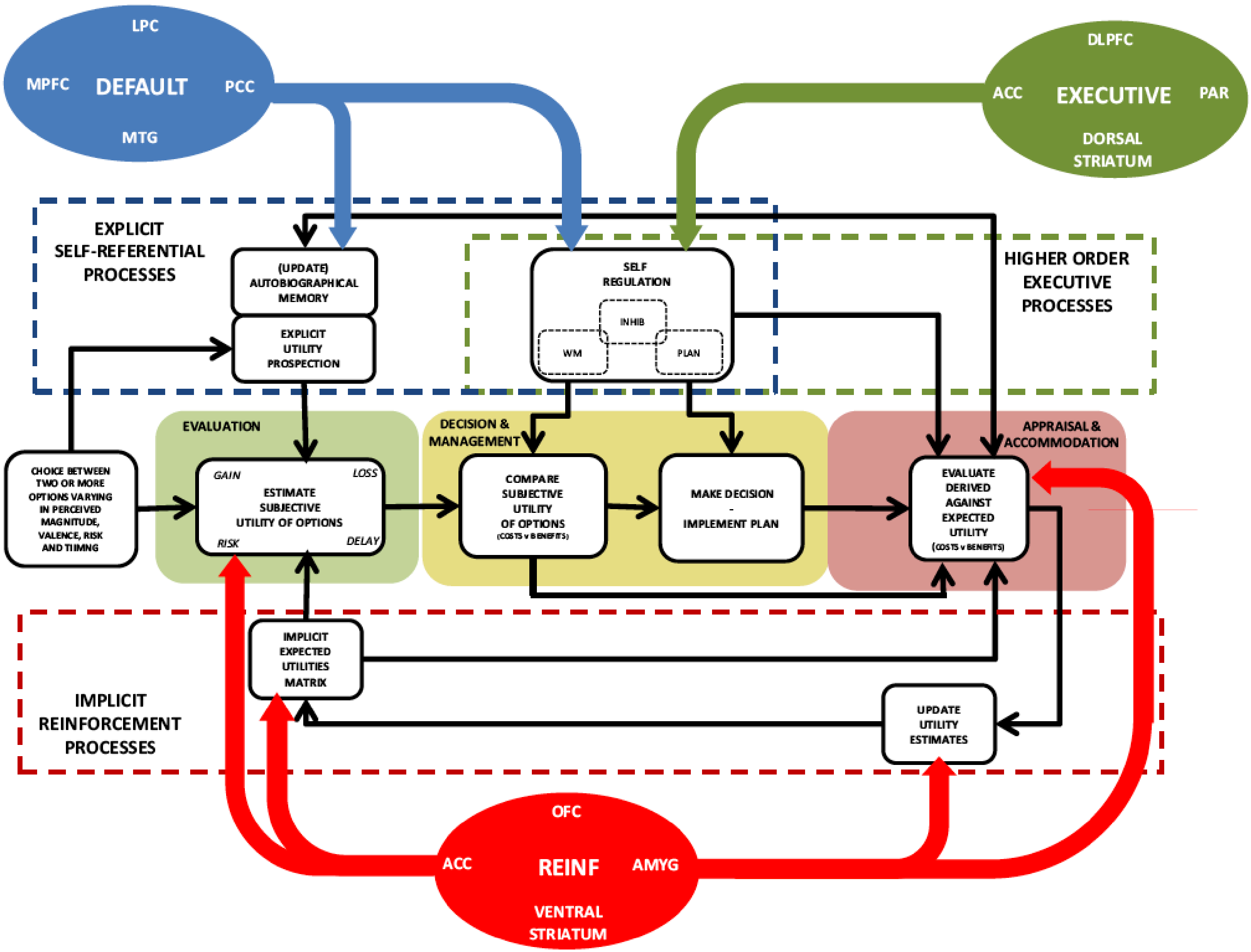
Default Mode network





Decision Making: a neuro-economic model



JCPP *Sonuga-Barke* et al. 2016

ADHD *Neuroeconomic Model:*

Inefficiency, inconsistency, impulsiveness

	Evaluation	**Decision & Managemnent**	**Appraisal & Accomodation**
Self referential *(Default Mode Network-DMN)*	Reducte integrity of DMN: *impaired prospection*	DMN interference linked to *attentional laspes*	
Executive		Dorsal fronto-striatal / fronto-parietal deficits reduce *decision speed & efficiency*	
Reinforcement	Ventral fronto-striatal deficits impair utility estimate and with ***Delay adversion*** *produce preference for immediacy*		Disconnectivity in Orbito-frontal Ctx affects *computation in predicting errors* , *impairing learning*

Sonuga-Barke et al. *JCPP 2016*

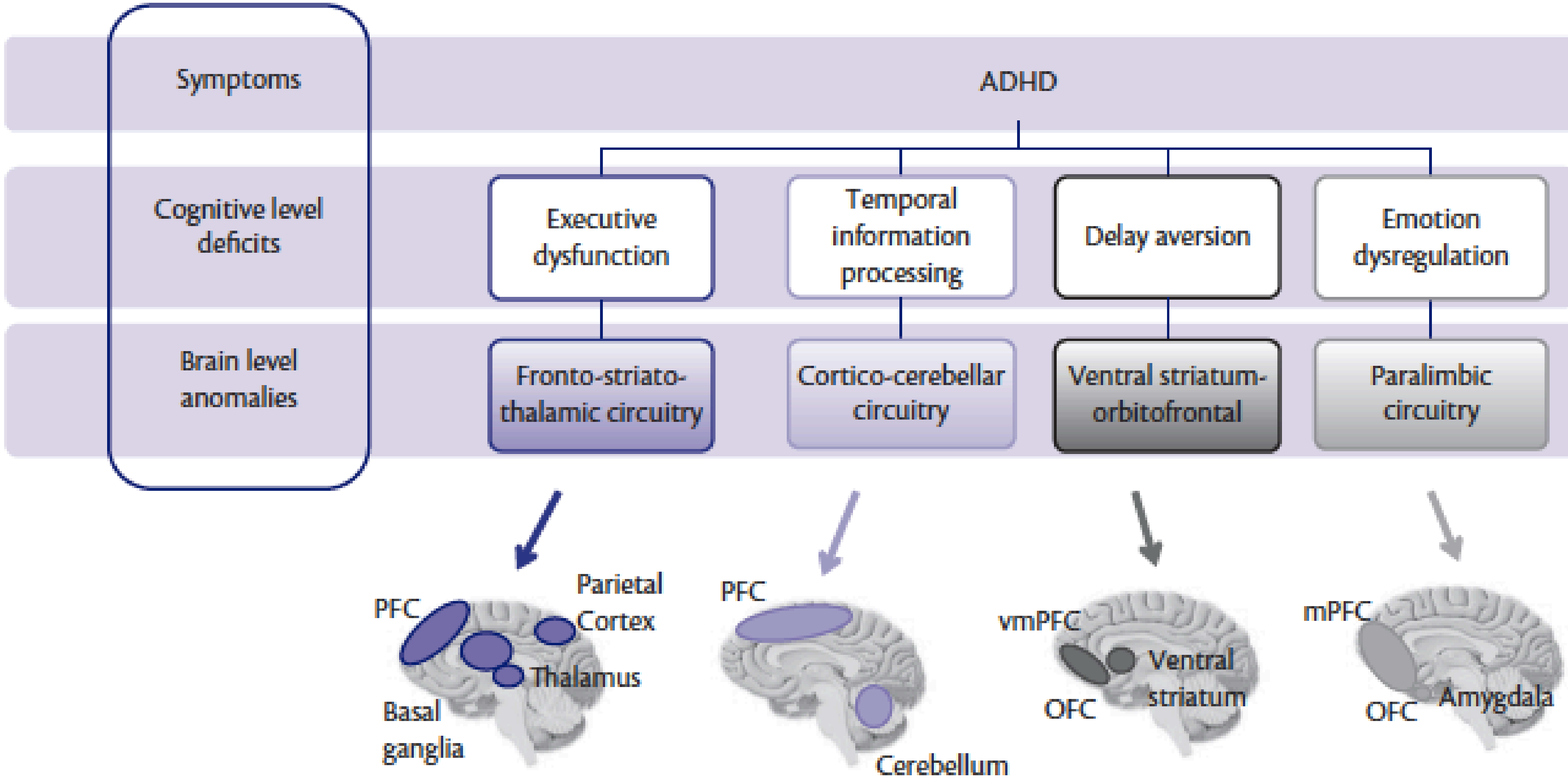
Sonuga-Barke et al. *JCPP 2016*

Depression *Neuroeconomic Model:*

Disengaged, perseverative, pessimistic

	Evaluation	Decision & Managemnent	Appraisal & Accomodation
Self referential *(Default Mode Network-DMN)*	DM-related excessive self-focus and negative bias leads to reluctance to engage in choice.	DMDM-related negative rumination reduces willingness to initiate/execute decisions.	Excessive rumination & DM hyper-activity leads to negative appraisal of outcomes.
Executive		Excessive rumination & DM hyper-activity leads to negative appraisal of outcomes.	
Reinforcement	Depreciation of prior outcomes/diminished reward anticipation, expressed as reduced VS activity to reward-predicting cues, creates a negative evaluation bias.		Excess VS activity creates hypersensitivity to negative outcomes

Neuropsychological models of ADHD



Shaw & Szekely in: in: *Banaschewski, Coghill & Zuddas OT-ADHD, 2018*

frontiers in
SYSTEMS NEUROSCIENCE
ORIGINAL RESEARCH ARTICLE
published: 04 February 2013
doi: 10.3389/fnsys.2012.00080

Distinct neural signatures detected for ADHD subtypes after controlling for micro-movements in resting state functional connectivity MRI data

Fair et al. 2013

Default network associato con:

- ricordare il passato,
- pianificare
- anticipare futuri eventi

" A set of processes by which mental simulation is used adaptively to imagine events beyond those that emerge from the immediate environment".
"Ricordare il passato, pianificare e anticipare futuri eventi" Buckner et al. 2008

Incapacità ad "esplorare" correttamente, anticipare e valutare correttamente le relazioni tra un'azione presente *ed* una ricompensa futura.

Compromissione dei processi di salienza, motivazione e percezione della ricompensa (affettività)

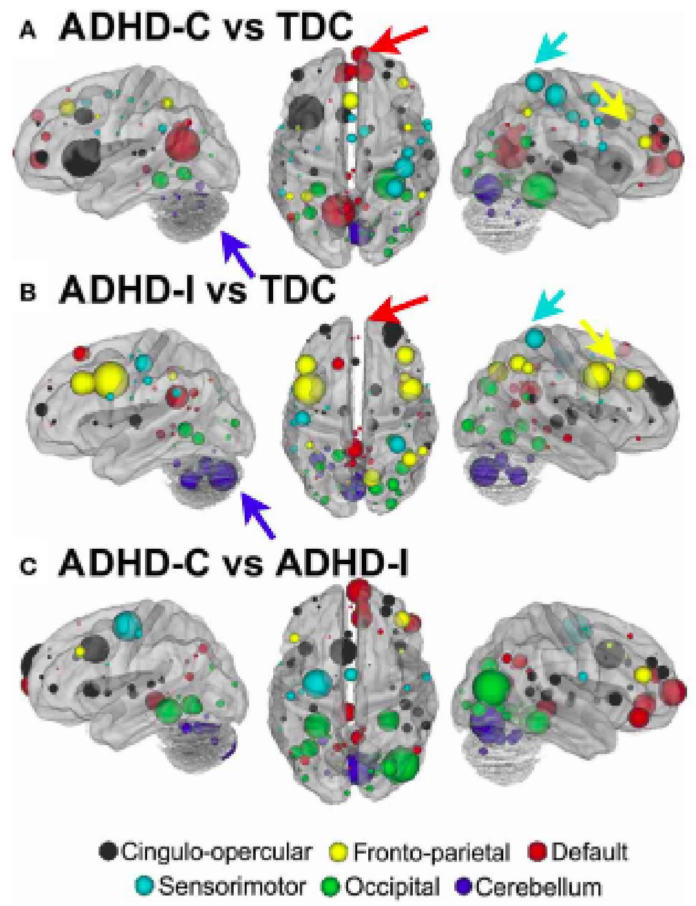
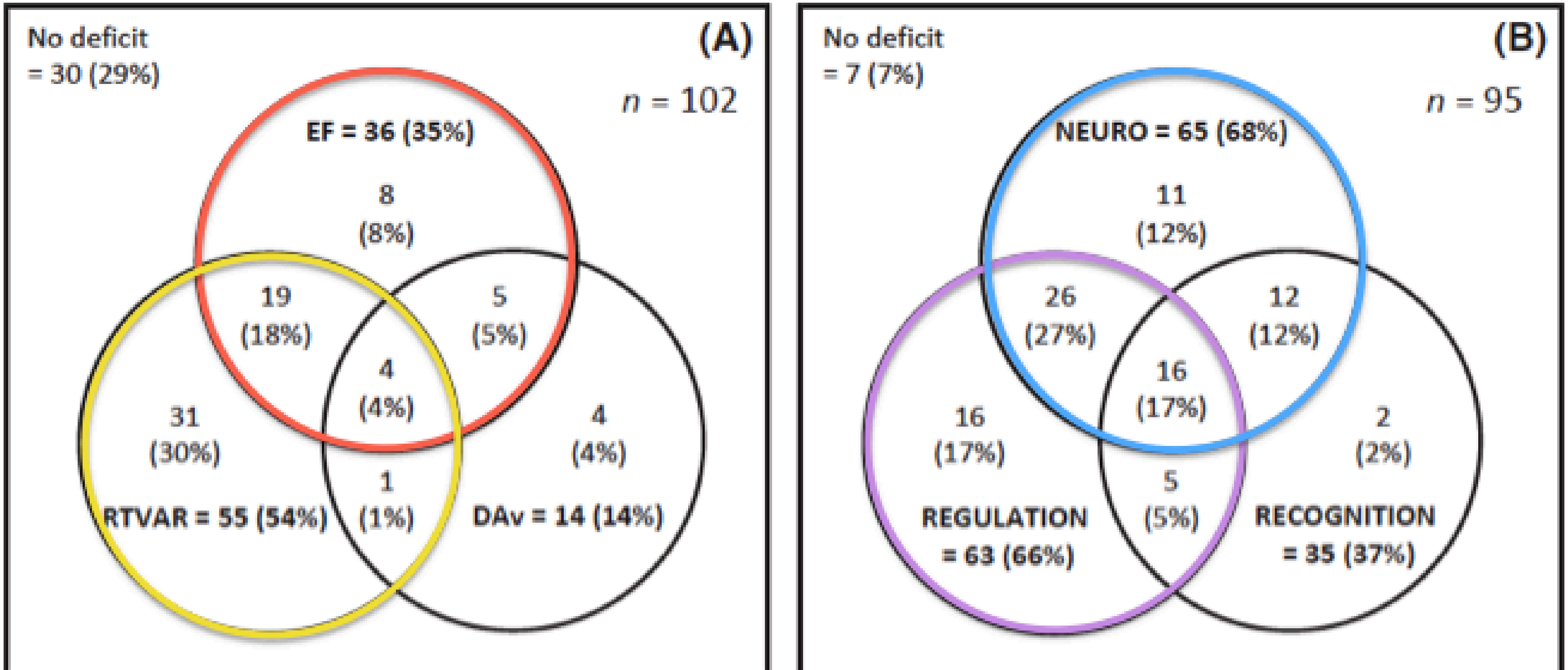


FIGURE 8 | *Post-hoc* comparisons on the consensus features from the 2-group classification for Procedure 10 (see SI Figure 4 for Procedures 5 and 8). The two most common subtypes of ADHD (ADHD-I and ADHD-C) show distributed patterns of atypical connectivity relative to TDC, as measured with node strength. **(A)** Node strength for TDC vs. ADHD-C shows strong differentiation in regions of the medial prefrontal cortex among other distributed systems. **(B)** Node strength for TDC vs. ADHD-I shows differentiation distributed throughout the cortex as well, with prominent nodes including bilateral dorsolateral prefrontal, and cerebellar regions among others. **(C)** Comparisons between the subtypes show similar trends. [Node colors represent network categorization from a community detection procedure performed for a previous report (Dosenbach et al., 2010). Red—default; blue—cerebellum; yellow—fronto-parietal; black—cingulo-opercular; green—occipital; cyan—sensorimotor].

Multiple deficits in ADHD: executive dysfunction, delay aversion, reaction time variability, and emotional deficits

THE JOURNAL OF CHILD PSYCHOLOGY AND PSYCHIATRY
Journal of Child Psychology and Psychiatry 54:6 (2013), pp 619–627

Douglas Sjöwall, [1] **Linda Roth,** [1] **Sofia Lindqvist,** [2] **and Lisa B. Thorell**[1]
[1]Department of Clinical Neuroscience and Stockholm Brain Institute, Karolinska Institutet, Stockholm, Sweden;
[2]Department of Psychology, Uppsala University, Uppsala, Sweden

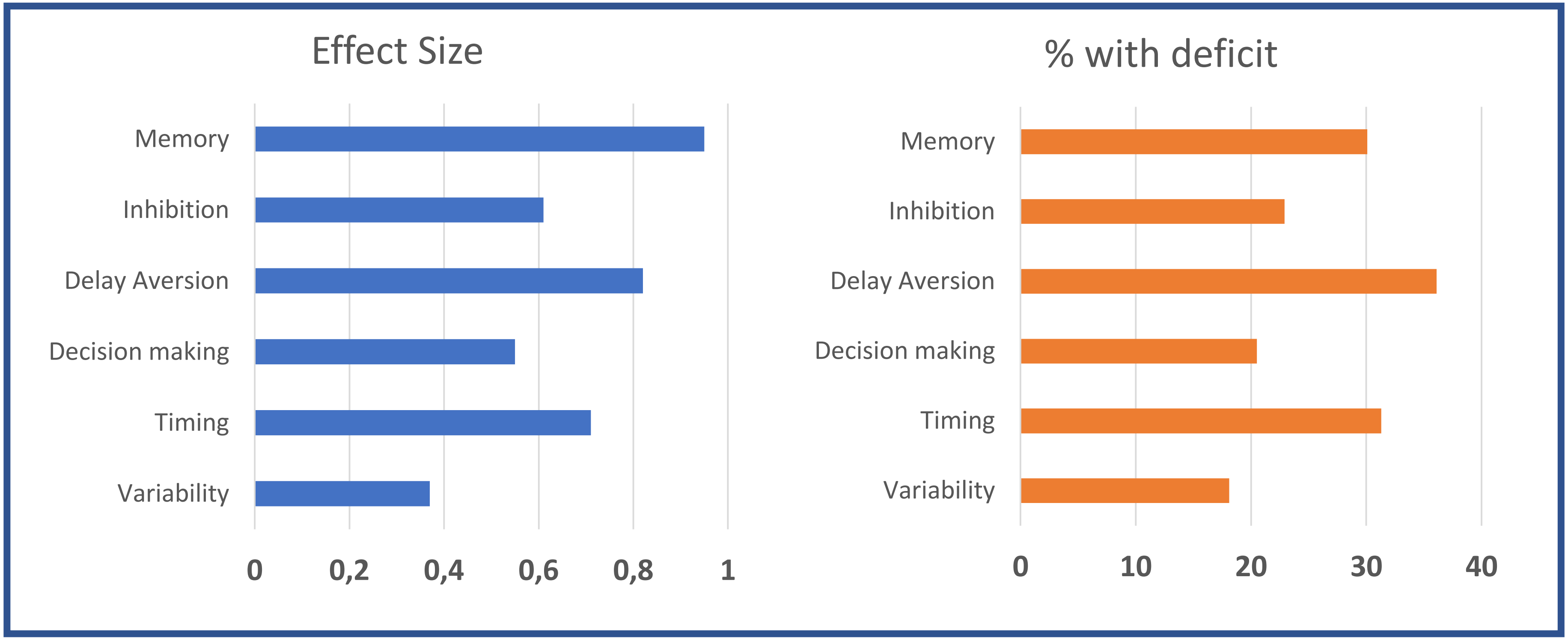


EF = Executive functioning (i.e., working memory, inhibition, shifting), RTVAR = Reaction time variability, DAv = Delay aversion, NEURO = Neuropsychological functioning, REGULATION = Emotion regulation, RECOGNITION = Emotion recognition

Proportion of ADHD cases with neuropsychological impairments (A) or impairments in neuropsychological and emotional functioning (B)

Neuropsychological Deficits in Treatment-Naïve Boys with ADHD

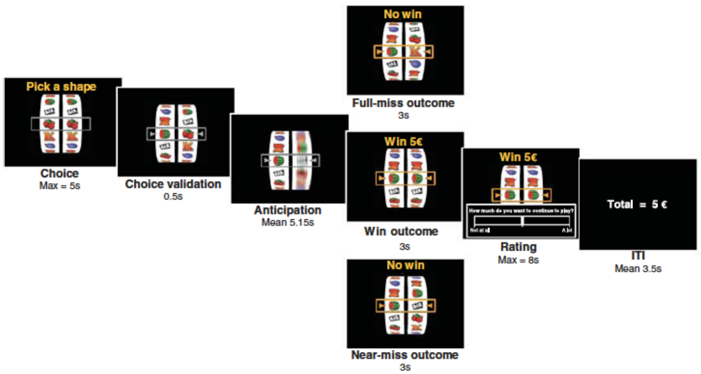
- 83 Drug naïve boys (6 – 12 years) with DSM IV ADHD
- 66 Healthy control boys matched for age
- All completed all tasks in one session with breaks
- Tasks were counterbalanced across two orders

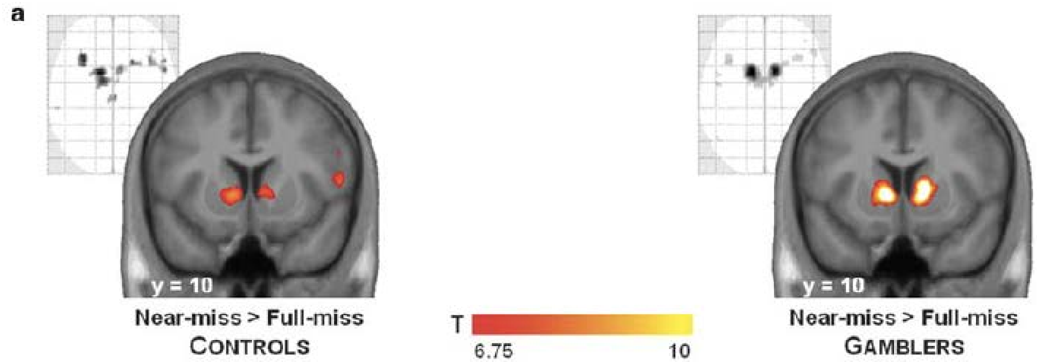


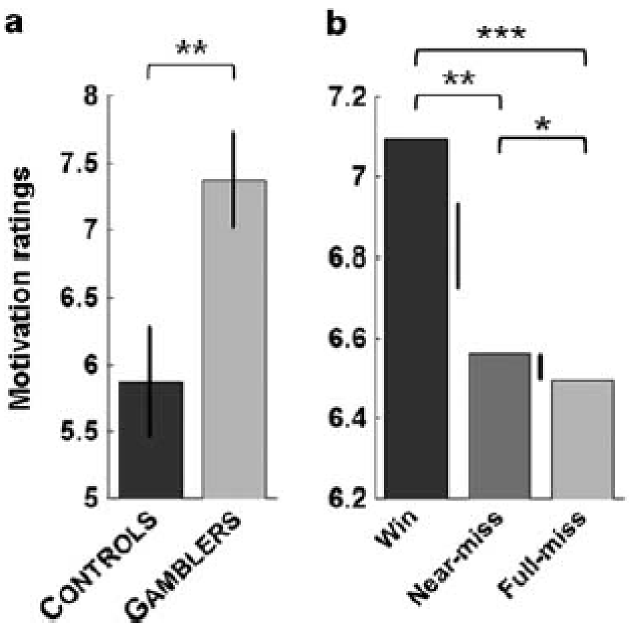
Coghill, Seth, Matthews, 2013

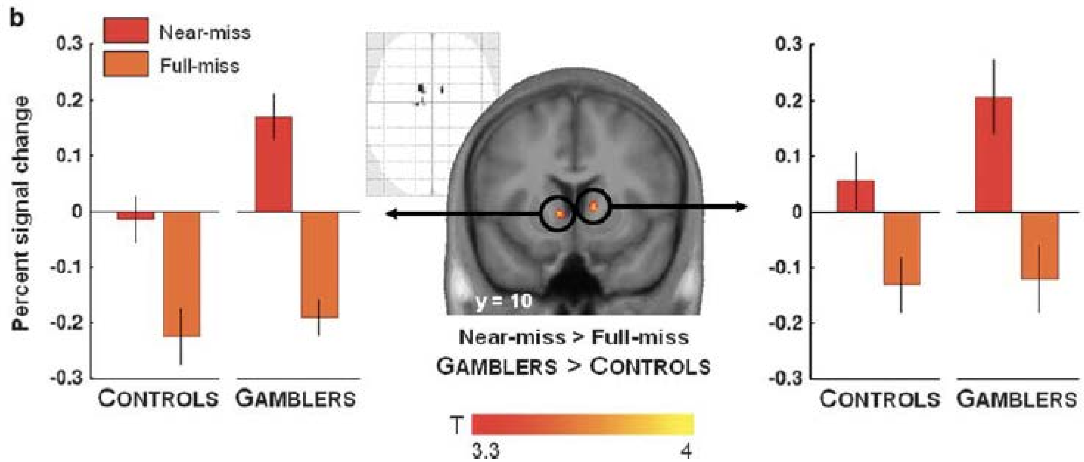
Amplified Striatal Responses to Near-Miss Outcomes in Pathological Gamblers

Sescousse et al. Neuropsychopharamcology 2016







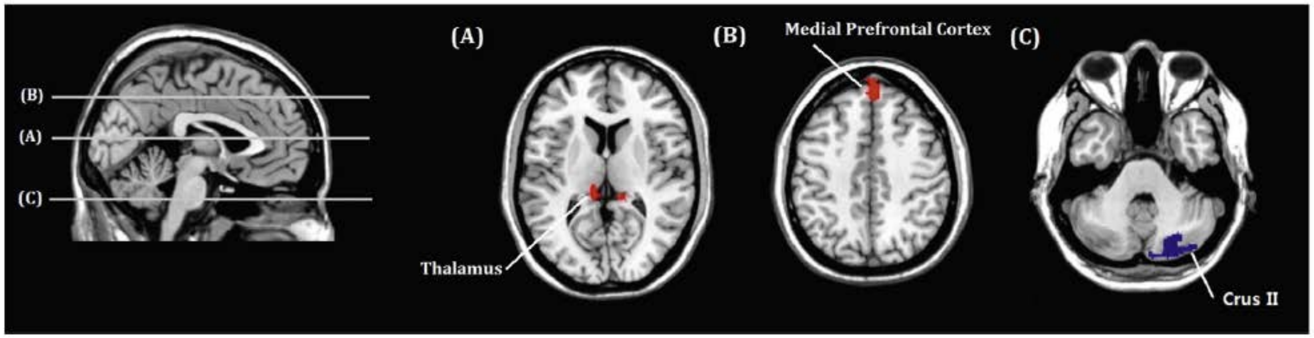


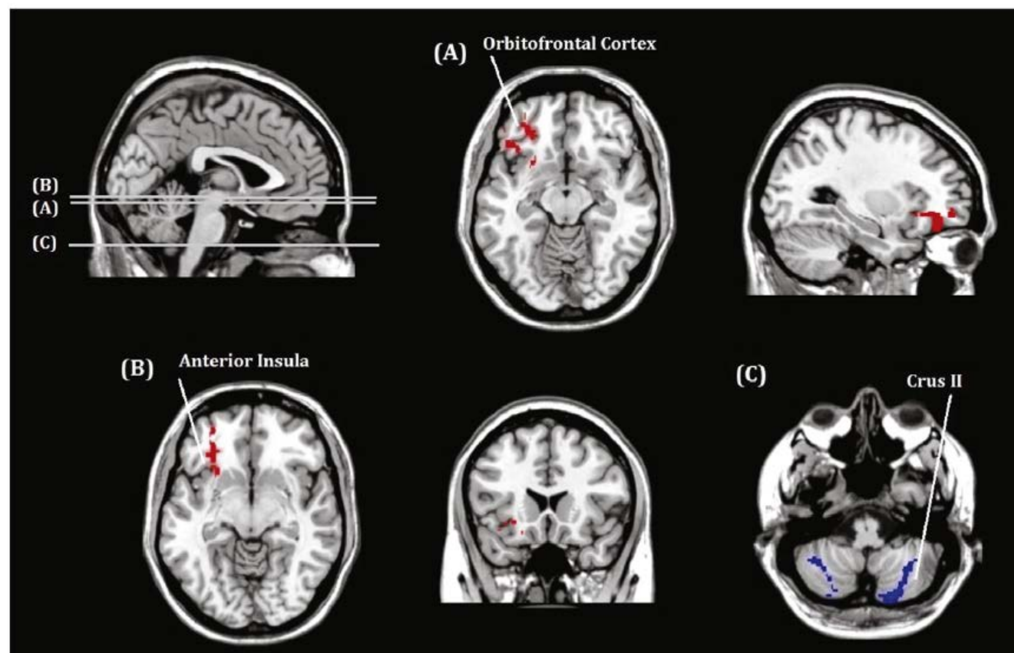
Altered functional connectivity in default mode network in Internet gaming disorder: Influence of childhood ADHD

Deokjong Lee, Junghan Lee, Jung Eun Lee, Young-Chul Jung *

Progress in Neuro-Psychopharmacology & Biological Psychiatry 75 (2017) 135–141

PCC seed
Red: NoADHD > ADHD+
Blue: ADHD+ > No ADHD

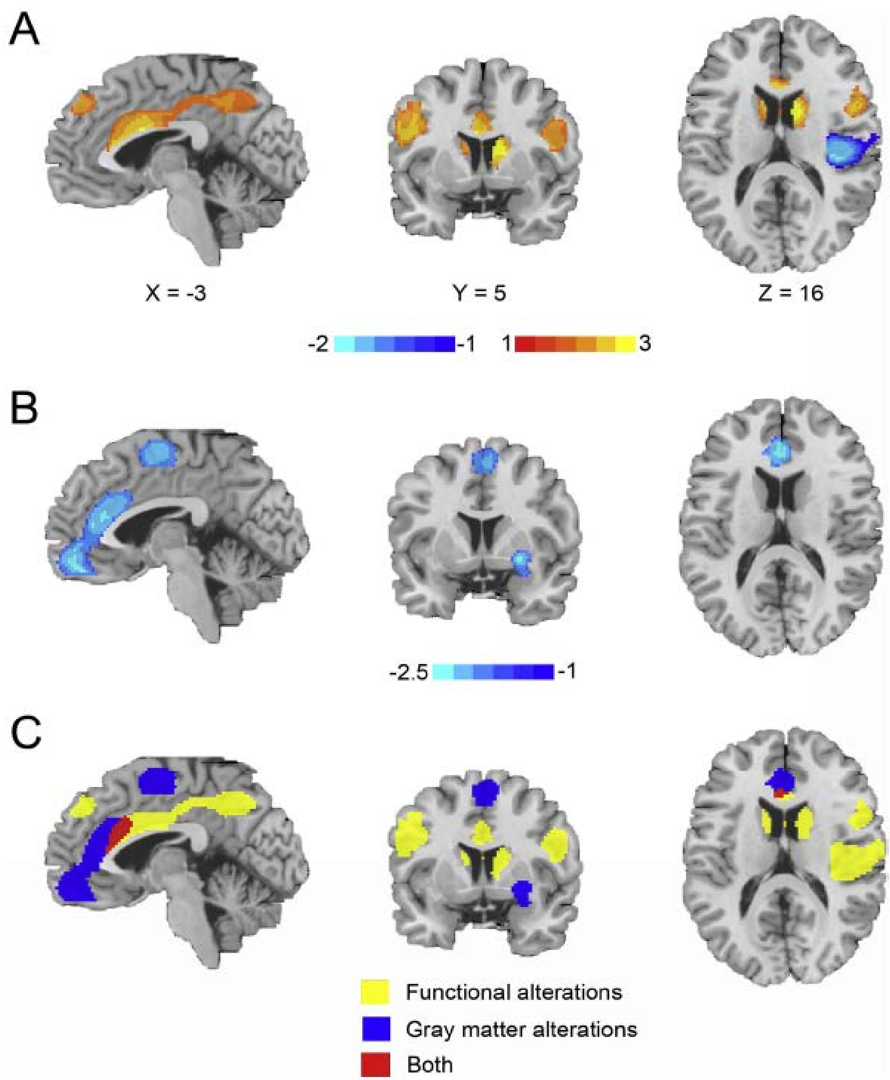




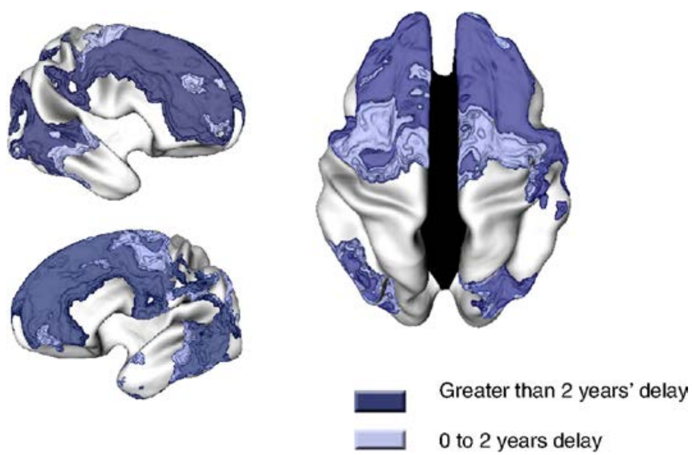
Functional and structural neural alterations in Internet gaming disorder: A systematic review and meta-analysis

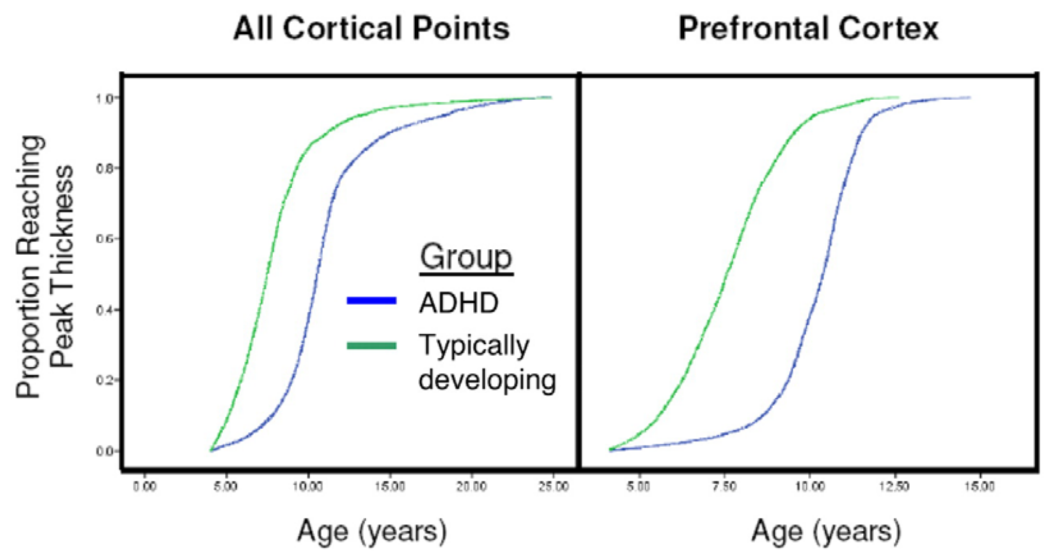
Yuan-Wei Yao[a], Lu Liu[b], Shan-Shan Ma[a], Xin-Hui Shi[a], Nan Zhou[b], Jin-Tao Zhang[a,*], Marc N. Potenza[c,d]

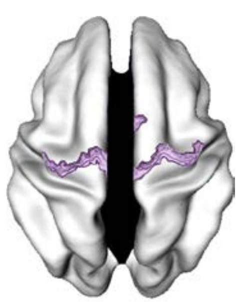
Neuroscience and Biobehavioral Reviews 83 (2017) 313–324



Attention-deficit/hyperactivity disorder is characterized by a delay in cortical maturation

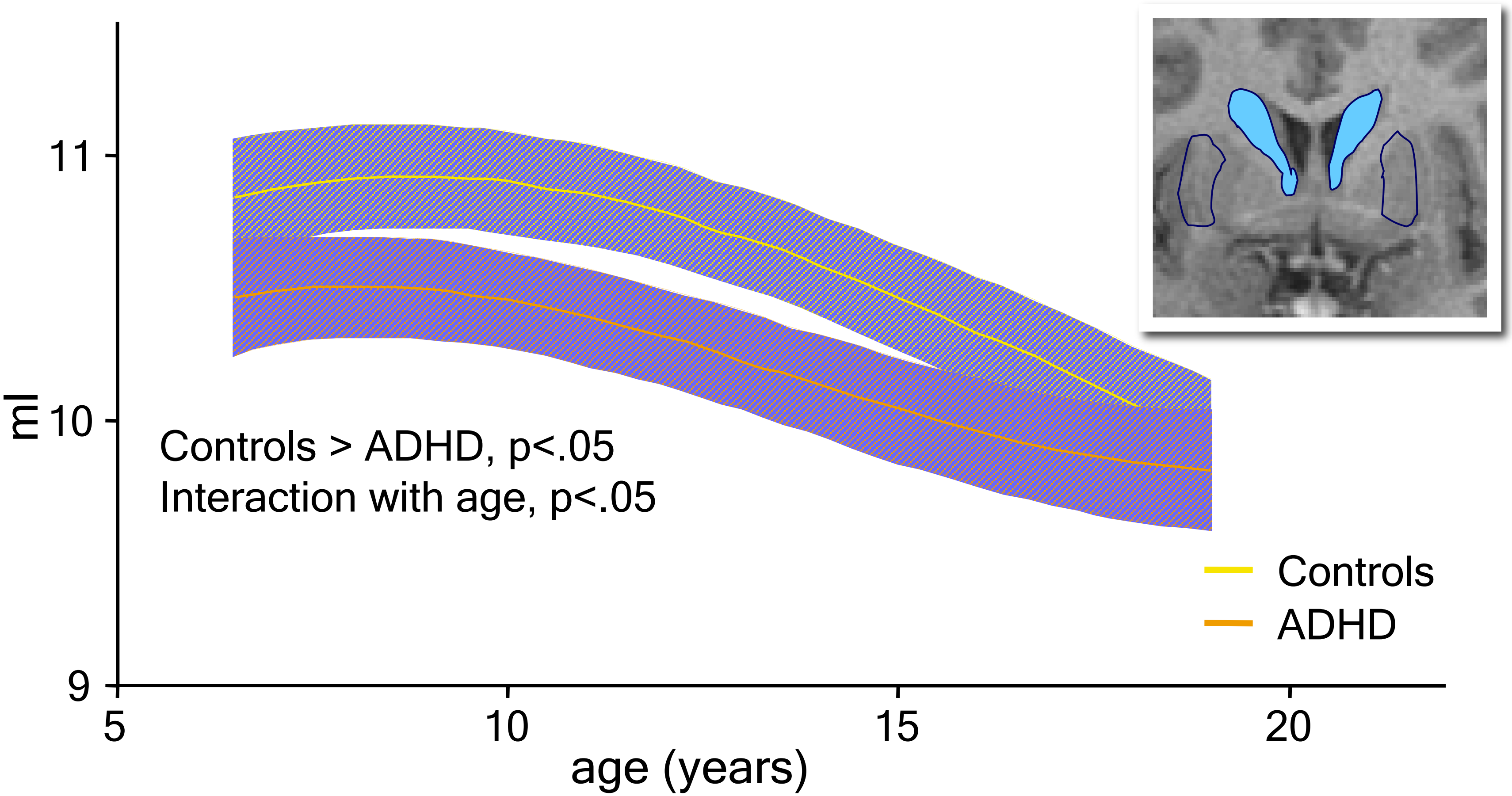






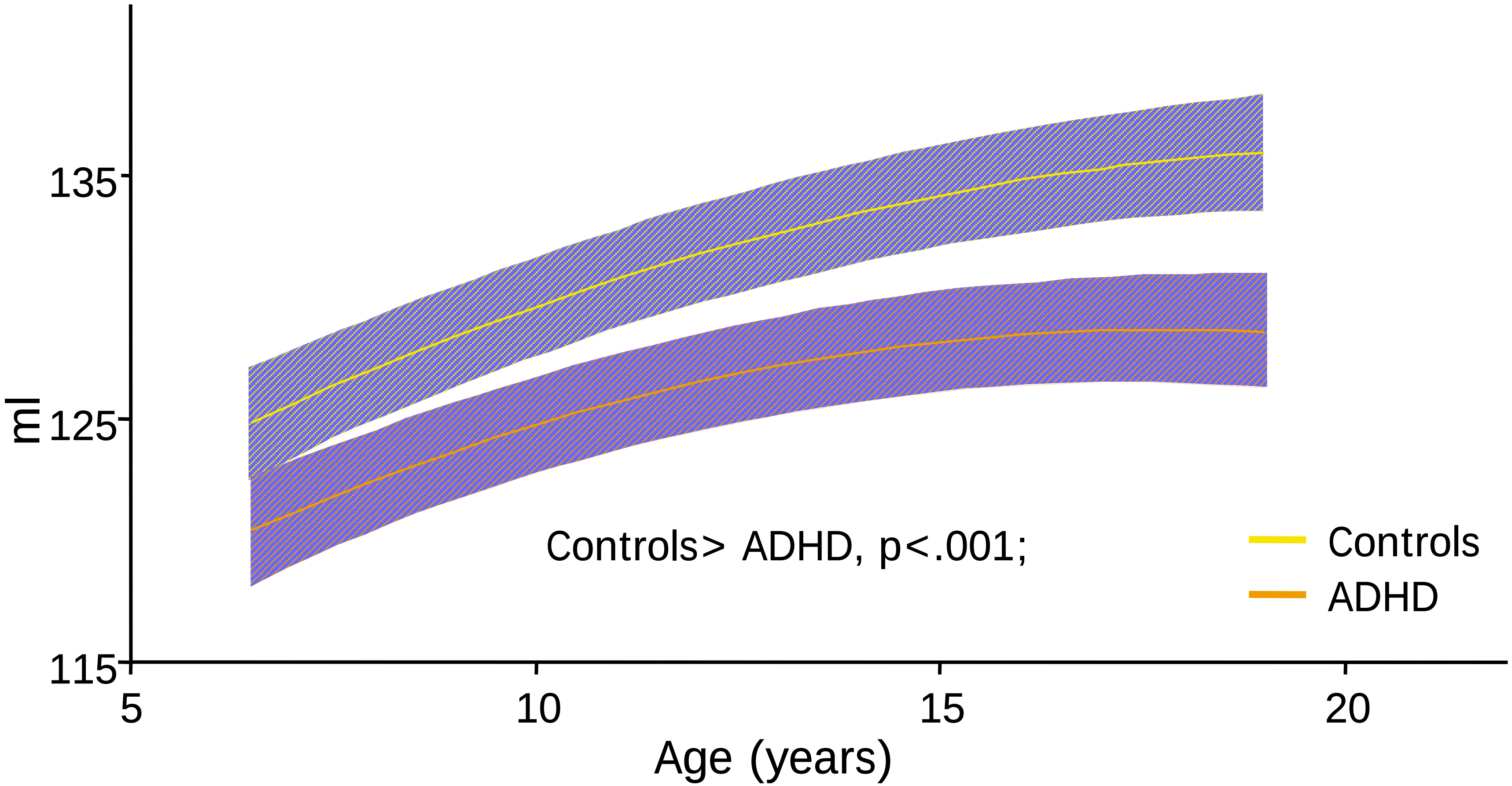
Shaw P et al. PNAS 2007;104:19649-19654

Sviluppo morfologico del N. Caudato



Castellanos *et al* 2002

Sviluppo morfologico del Cervelletto



Castellanos *et al* 2002

Functional and structural neural alterations in Internet gaming disorder: A systematic review and meta-analysis

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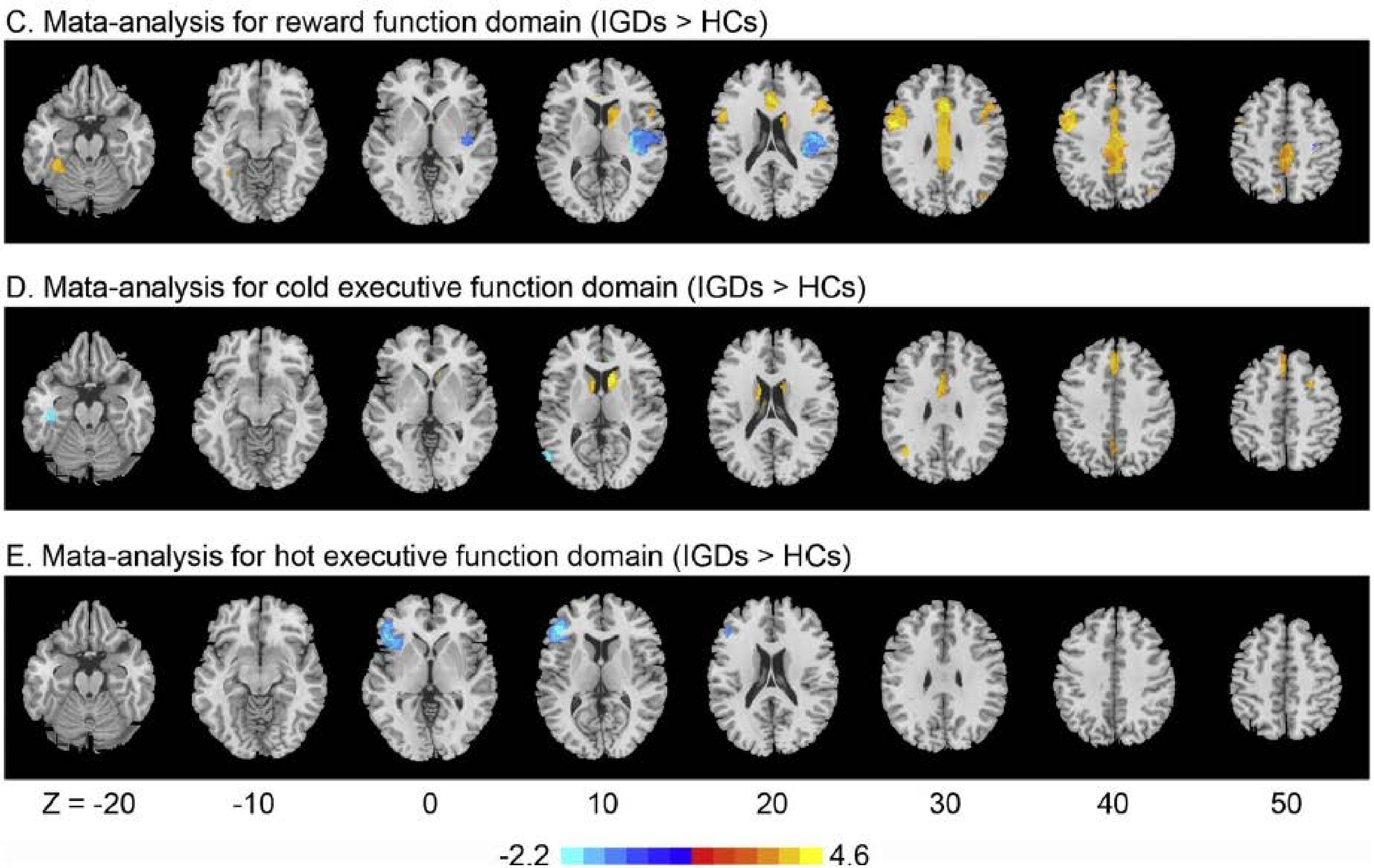
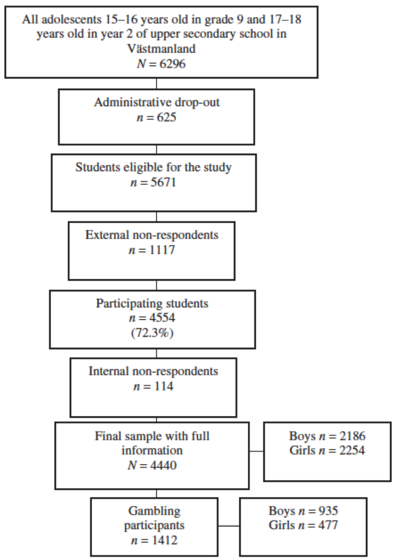


Gambling frequency and symptoms of attention-deficit hyperactivity disorder in relation to problem gambling among Swedish adolescents: a population-based study

UJMS 2017

Charlotta Hellström[a,b], Philippe Wagner[a], Kent W. Nilsson[a], Jerzy Leppert[a] and Cecilia Åslund[a]



Model I. Analysis of the chance of not becoming susceptible to developing gambling problems.[a]

	OR	p	95% CI	
Age	0.48	0.001	0.30	0.75
ADHD symptoms index	0.95	0.041	0.90	1.00
Gambling frequency index	0.46	0.009	0.26	0.82
ADHD symptoms × Gambling frequency index	0.92	0.023	0.85	0.99

Model II. Analysis of adolescents already susceptible to problem gambling.[b]

	IRR	p	95% CI	
ADHD symptoms index	1.03	0.031	1.003	1.07
Gambling frequency index	1.34	<0.001	1.20	1.51
Sex (ref: boys)	0.25	<0.001	0.16	0.38
Sex × Gambling frequency index	1.67	<0.001	1.34	2.13

[a]Model I: adjusted for covariates sex and parents' country of birth.
[b]Model II: adjusted for covariate age.

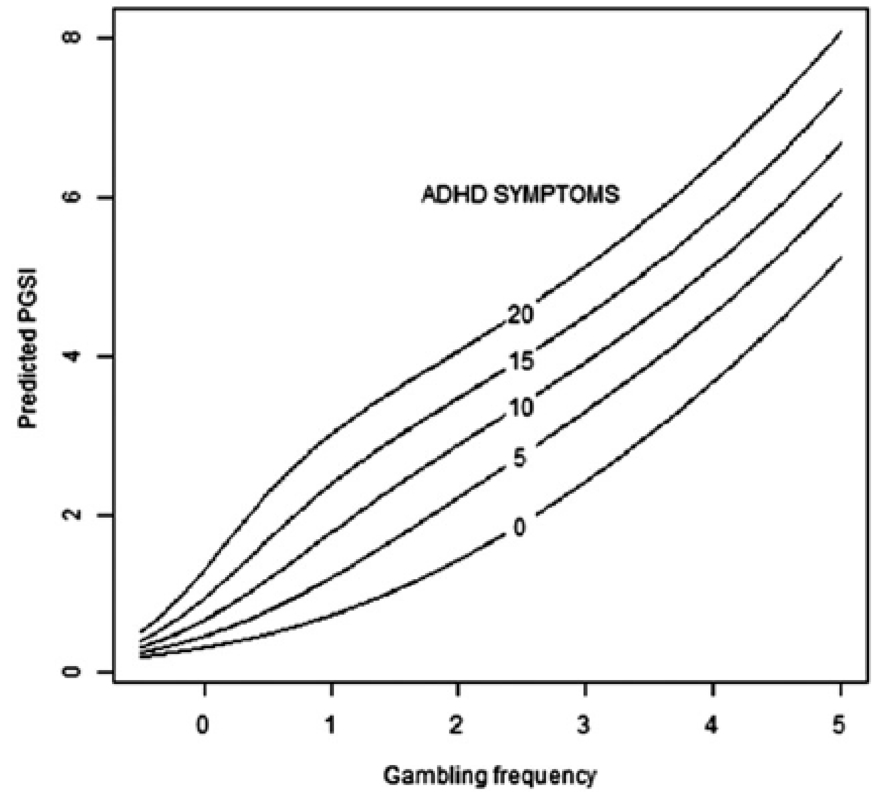
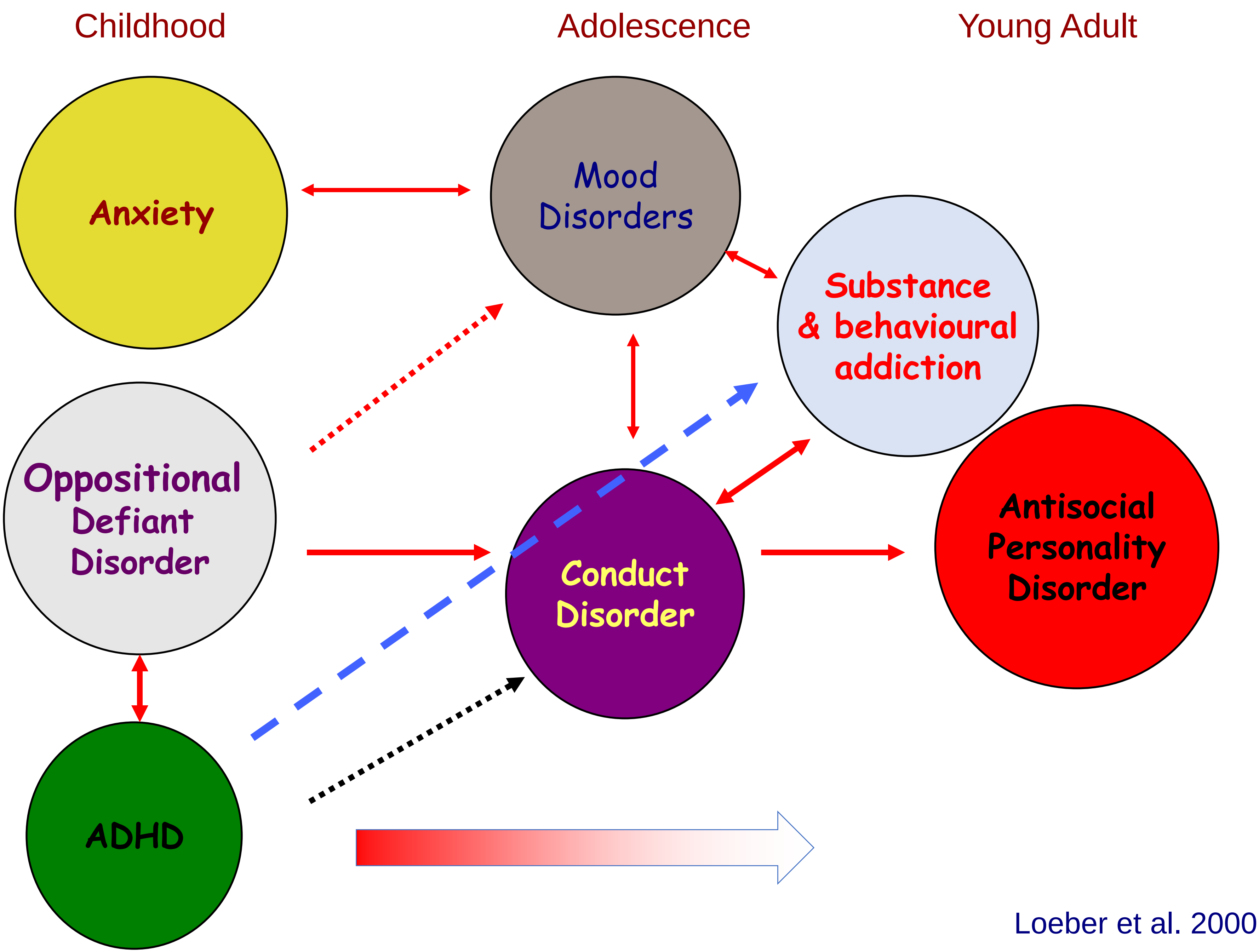


Figure 2. Illustration of the association between gambling frequency and the Problem Gambling Severity Index (PGSI). The expected degree of gambling problems in the study sample, irrespective of susceptibility to gambling problems, plotted against gambling frequency for different degrees of ADHD symptoms according to the ADHD symptom index.


Childhood
Adolescence
Young Adult
Anxiety
Mood Disorders
Substance & behavioural addiction
Oppositional Defiant Disorder
Conduct Disorder
Antisocial Personality Disorder
ADHD
Loeber et al. 2000

Misure di efficacia delle terapie

Effect Size

Differenza nei cambiamenti dal *baseline* tra due trattamenti (es. farmaco e placebo), diviso la media delle dev. standard (es. placebo e farmaco ad *end point*).

L'*effect size* standardizza le unità di misura nei diversi studi.

	Basaline	EndPoint
Farmaco	38.5 ± 5.8	25.5 ± 4.2
Placebo	40.4 ± 6.1	32.7 ± 5.0

$$d = \frac{(38.5-25.5) - (40.4-32.7)}{(4.2+5.0)/2} = \frac{13.0 - 7.7}{4,6} = \textbf{ES } 1.1$$

Secondo la definizione di Cohen, ES > 0.2 è considerato basso, ES > di 0.5 è considerato medio; oltre 0.8 è considerato alto

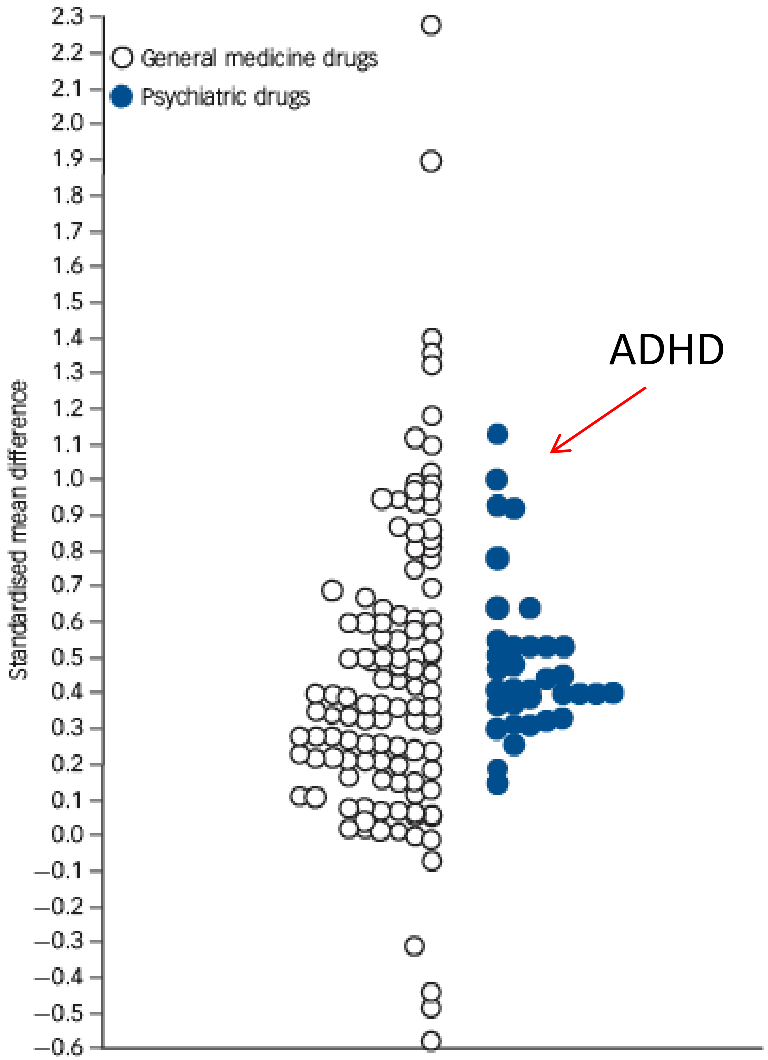


Fig. 1 Summary of effect sizes.

All effect sizes in online Tables DS3 and DS4 are presented except for duplicates (e.g. effect size on dichotomous response and continuous reduction of severity in schizophrenia). Online Fig. DS25 identifies which dot corresponds to which result, and Figs DS26–29 present the results of dichotomous outcomes as relative and absolute risk/responder differences. Data on older meta-analyses from Table DS1 are not included. Effect sizes of dichotomous outcomes were converted to standardised mean differences expressed as Hedges' *g*. Effect sizes of general medicine medication are presented on the left-hand side (median 0.37, mean 0.45, 95% CI 0.37–0.53) and psychiatric drugs on the right-hand side (median 0.41, mean 0.49, 95% CI 0.41–0.57).

ES in General Medicine

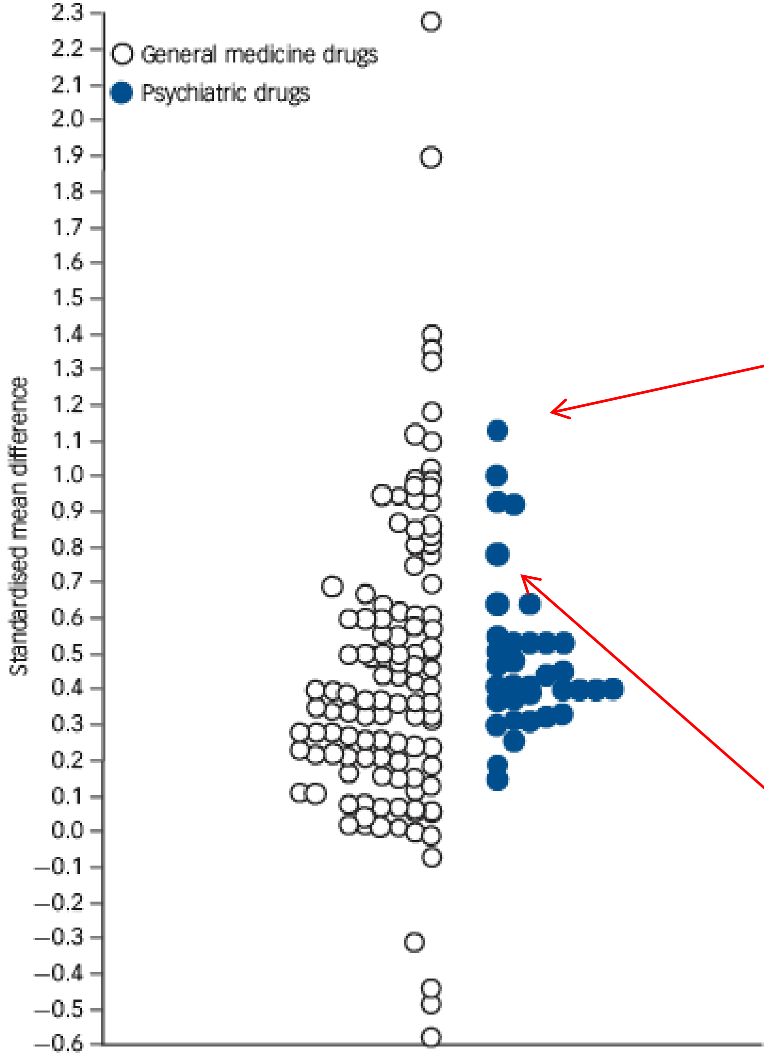
Aspirine for prevention cardiovascular disease	0.06
Antypertensive on long term mortality	0.11
Corticosteroids for asthma	0.54
Antypertensive for high blood pressure	0.55
Interferone for Chronic Hepatitis C	2.27

ES in General (Adult) Psychiatry

SGA for schizophrenia (PANS)	0.51
SSRI for depression (HAMD)	0.32
SSRI/ Bdz for Panic	0.41
SSRI for OCD	0.44

Leucht et al.2012

BJPsych
The British Journal of Psychiatry (2012)
200, 97–106. doi: 10.1192/bjp.bp.111.096594



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European Neuropsychopharmacology (2013) 23, 1208–1218

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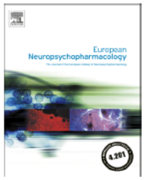


European, randomized, phase 3 study of lisdexamfetamine dimesylate in children and adolescents with attention-deficit/hyperactivity disorder

CrossMark

David Coghill[a,*], Tobias Banaschewski[b], Michel Lecendreux[c], Cesar Soutullo[d], Mats Johnson[e], Alessandro Zuddas[f], Colleen Anderson[g], Richard Civil[g], Nicholas Higgins[g], Andrew Lyne[h], Liza Squires[g]

Relapse Prevention in Pediatric Patients With ADHD Treated With Atomoxetine: A Randomized, Double-Blind, Placebo-Controlled Study

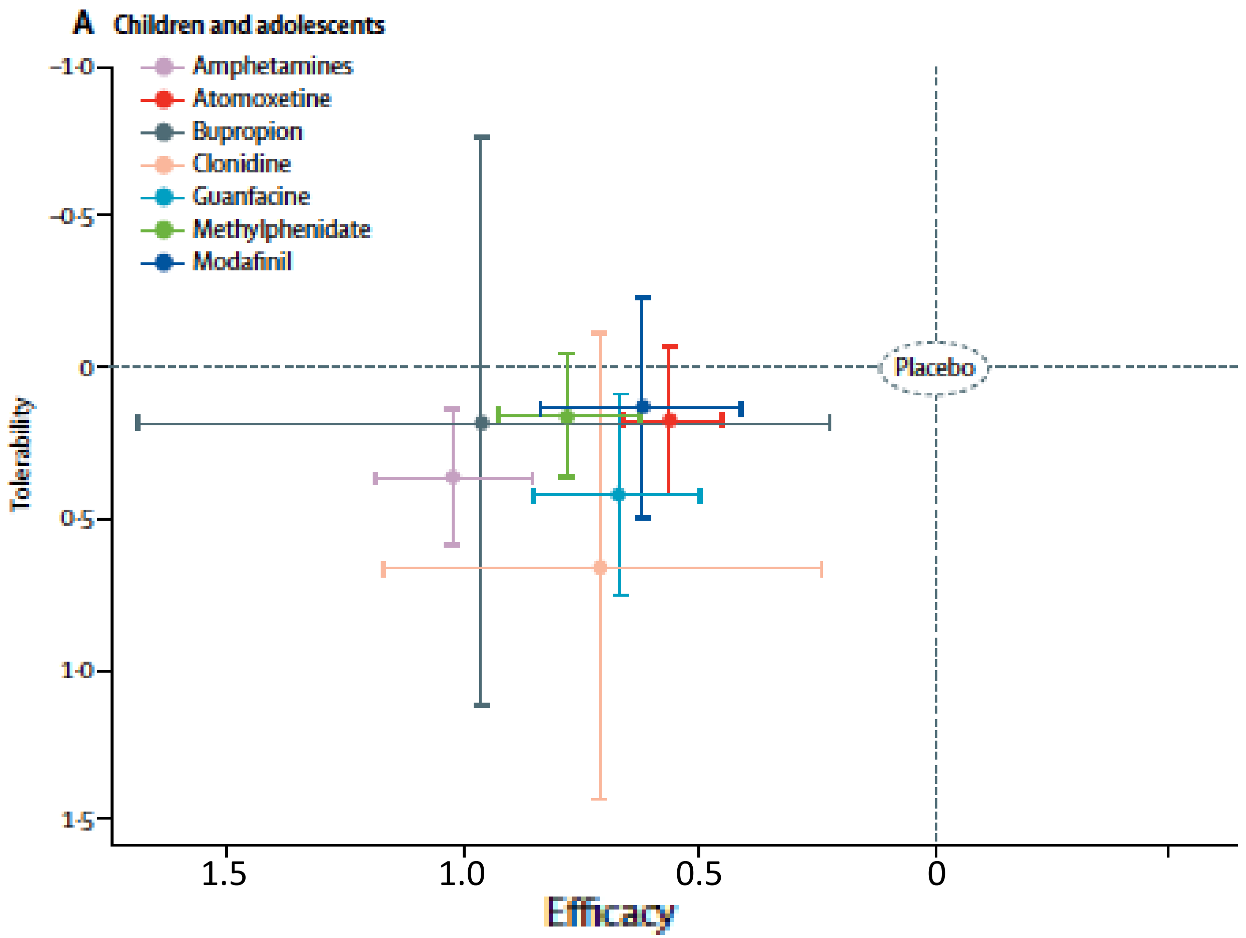
DAVID MICHELSON, M.D., JAN K. BUITELAAR, M.D., PH.D., MARINA DANCKAERTS, M.D., PH.D., CHRISTOPHER GILLBERG, M.D., PH.D., THOMAS J. SPENCER, M.D., ALESSANDRO ZUDDAS, M.D., DOUGLAS E. FARIES, PH.D., SHUYU ZHANG, M.S., AND JOSEPH BIEDERMAN, M.D.

J. Am. Acad. Child Adolesc. Psychiatry, 2004;43(7):896–904.

Comparative efficacy and tolerability of medications for attention-deficit hyperactivity disorder in children, adolescents, and adults: a systematic review and network meta-analysis

Samuele Cortese, Nicoletta Adamo, Cinzia Del Giovane, Christina Mohr-Jensen, Adrian J Hayes, Sara Carucci, Lauren Z Atkinson, Luca Tessari, Tobias Banaschewski, David Coghill, Chris Hollis, Emily Simonoff, Alessandro Zuddas, Corrado Barbui, Marianna Purgato, Hans-Christoph Steinhausen, Farhad Shokraneh, Jun Xia, Andrea Cipriani

Lancet Psychiatry 2018



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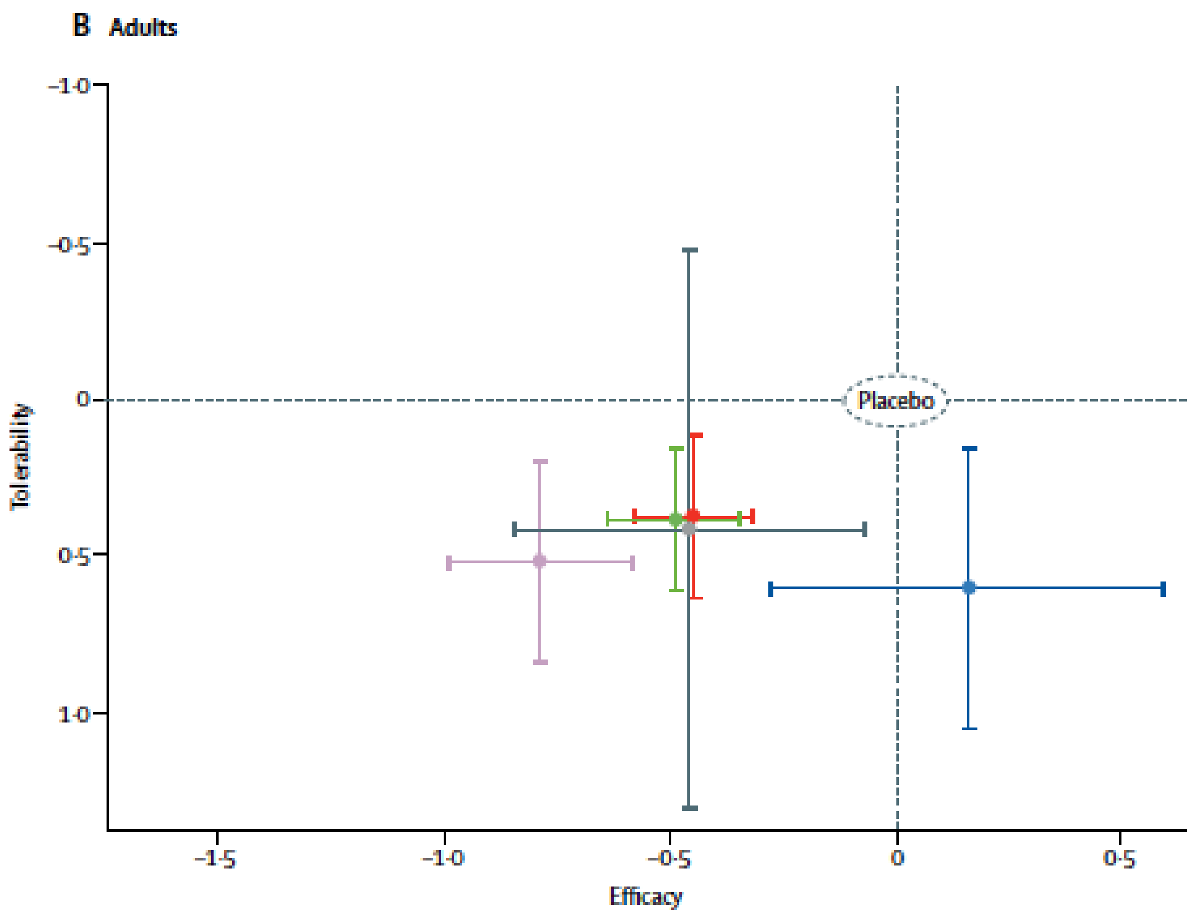


Age of Methylphenidate Treatment Initiation in Children With ADHD and Later Substance Abuse: Prospective Follow-Up Into Adulthood

Mannuzza et al. *AJP* 2008

207 ADHD, caucasian boys (age 6-12)

DSM-II criteria but reviewed for DSM-IV combined subtype)

ADHD but not Conduct disorder

182 treated with methylphenidte b.i.d

25 no stimulants history. **6** refused---> total 178 proband

178 non ADHD caucasian boys (matched for age, social class, geogr.residence)

Follow up (age 18.4)

Assessment

Teenagers and Young Adult Schedule form DISC

Schedule for Assesment of Conduct, Hyperattivity, Anxiety, Mood and Psychoactive substances

Parent or Spouse Informant Schedule

Factors:

Characteristic of MPH treatmnet (dose, duration)

Characteristic of the participants (IQ, ADHD severity by Conners teatcher)

Other variable (SES, parent psychopathology)

Age of Methylphenidate Treatment Initiation in Children With ADHD and Later Substance Abuse: Prospective Follow-Up Into Adulthood

Mannuzza et al. *AJP* 2008

Effect of Age — **Age of medication onset**

subst. use disorder (No-alcohol) (n=65) — **9.10**+1.74

t=2.31; df=174, p=0.02

Absence of subst. use disorder (n=111) — **8.52**+1.55

***Rate of* subst. use disorder (No-alcohol):**

Starting before age 8 **27**%

Starting after age 8 **47**%

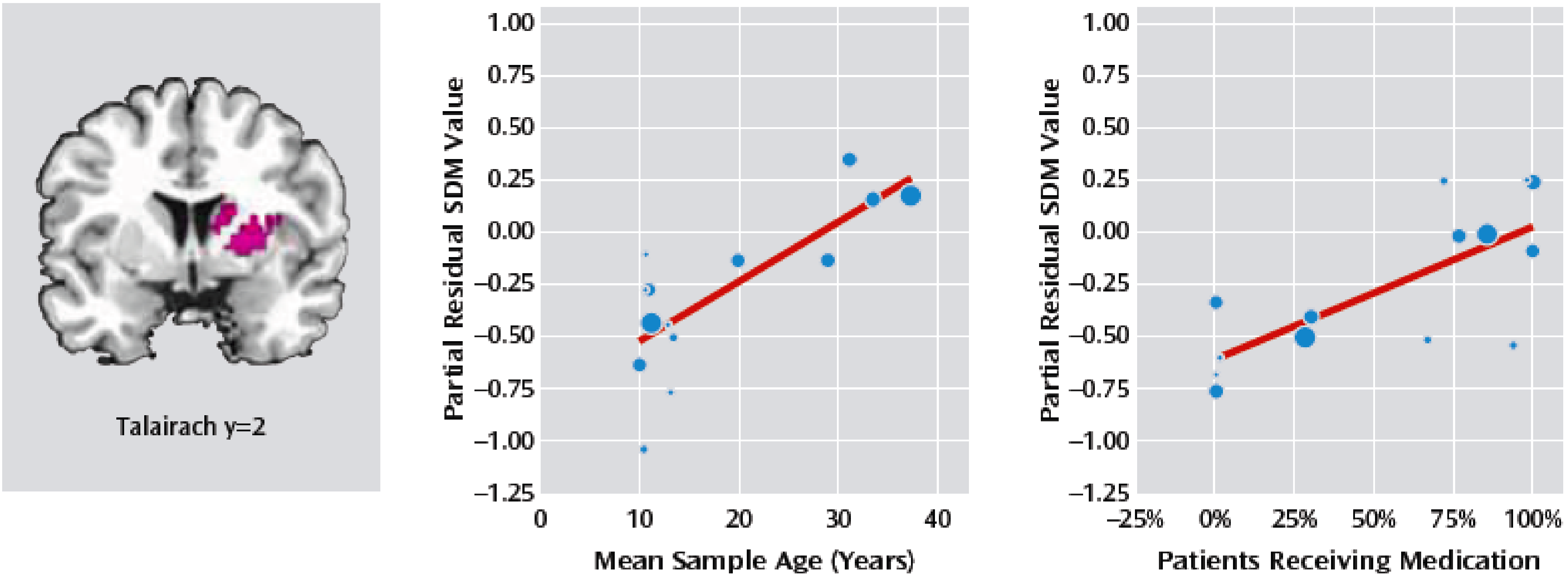
p=0.02

Control non ADHD group **29**% — **p=0.10**

No effect of ADHD duration per se

Gray Matter Volume Abnormalities in ADHD: Voxel-Based Meta-Analysis Exploring the Effects of Age and Stimulant Medication

FIGURE 2. Results of the Metaregression Analysis Showing Independent Associations of Mean Age and Percentage of Patients Receiving Stimulant Medication With More Normal Gray Matter Volumes in the Right Basal Ganglia[a]



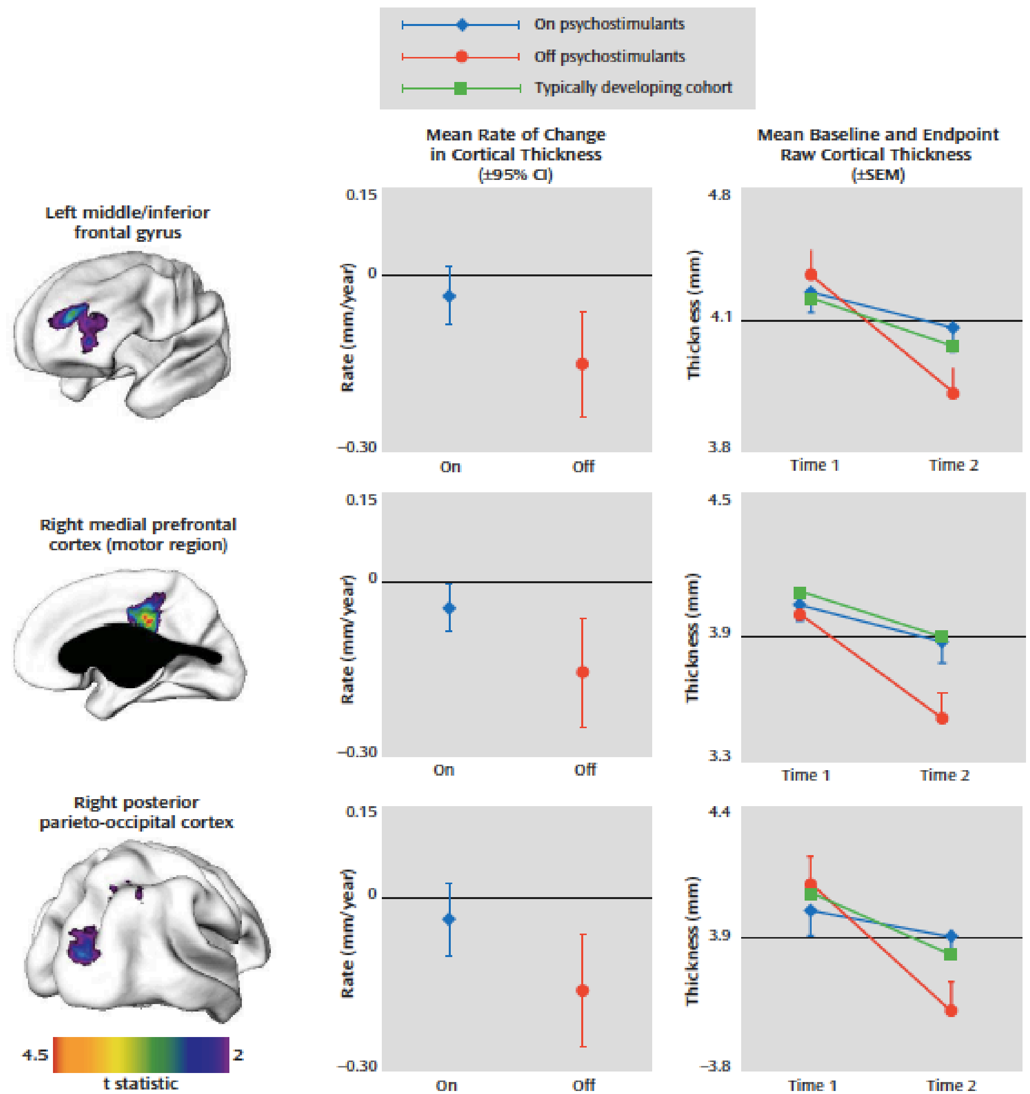
[a] In the graphs, each study is represented as a dot, with dot size reflecting sample size: large dots indicate samples with over 40 patients; medium dots, samples with 20–40 patients; and small dots, samples with under 20 patients. The regression line (metaregression signed differential mapping slope) is presented as a straight line. SDM refers to the signed differential mapping meta-analytic method (www.sdmproject.com).

Nakao et al. *AJP* 2011

Psychostimulant Treatment and the Developing Cortex in Attention Deficit Hyperactivity Disorder

Shaw et al AJP 2009

FIGURE 1. Differences in Rate of Cortical Growth in Adolescents With ADHD Taking or Not Taking Psychostimulant Medication[a]



The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Medication for Attention Deficit–Hyperactivity Disorder and Criminality

Paul Lichtenstein, Ph.D., Linda Halldner, M.D., Ph.D., Johan Zetterqvist, M.Ed., Arvid Sjölander, Ph.D., Eva Serlachius, M.D., Ph.D., Seena Fazel, M.B., Ch.B., M.D., Niklas Långström, M.D., Ph.D., and Henrik Larsson, M.D., Ph.D.

November 22, 2012 Vol. 367 No. 21

Characteristic	Men (N=16,087)	Women (N=9569)
Person-years at risk	62,637	37,963
Age group (%)		
15–24 yr	54.3	46.3
25–39 yr	30.0	35.4
≥40 yr	15.7	18.3

Table 2. Hazard Ratio for Conviction for Any Crime during a Period of Treatment with an ADHD Medication, as Compared with a Nontreatment Period (2006–2009).*

Sex	No. of Patients	No. of Crimes	Hazard Ratio (95% CI)	
			Cox Regression	Stratified Cox Regression
Men	16,087	23,693	0.70 (0.66–0.75)	0.68 (0.63–0.73)
Women	9,569	4,112	0.78 (0.68–0.90)	0.59 (0.50–0.70)

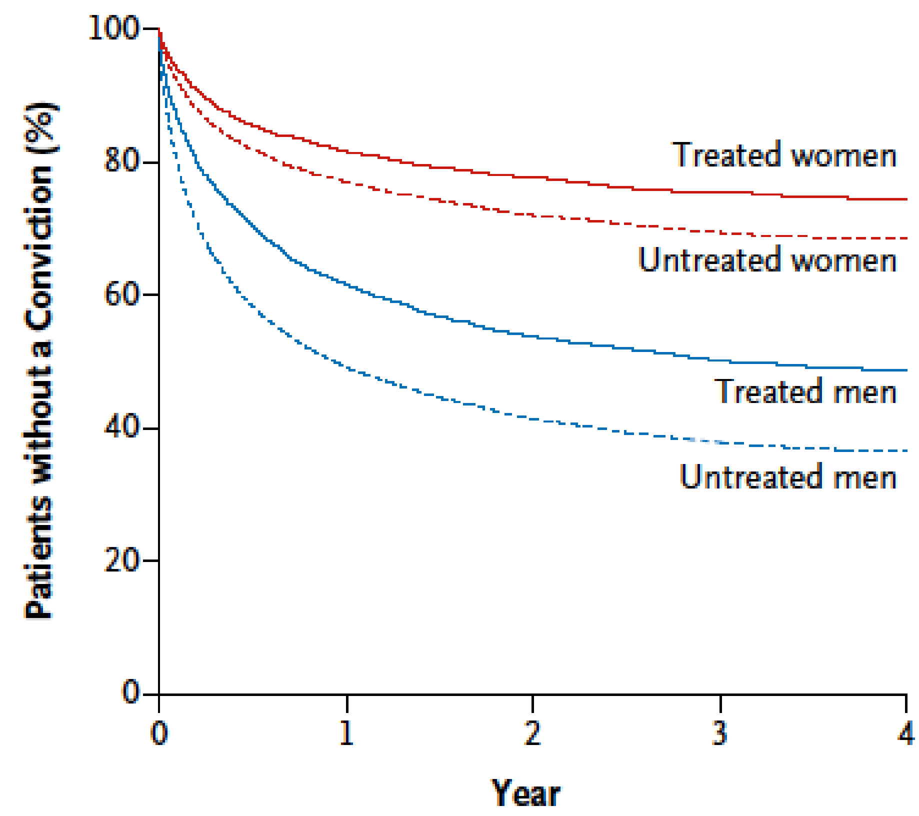
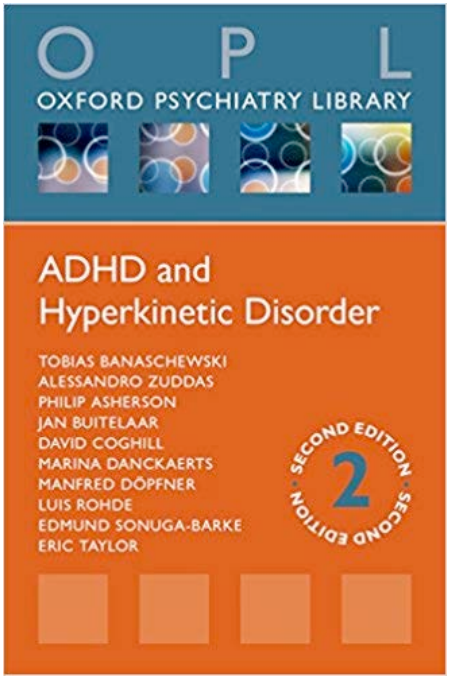


Figure 1. Extended Kaplan–Meier Curves for Patients in the Swedish Patient Register with a Diagnosis of ADHD Who Were Born No Later Than 1990, According to Sex and Medication Status.


O P L
OXFORD PSYCHIATRY LIBRARY
ADHD and
Hyperkinetic Disorder
TOBIAS BANASCHEWSKI
ALESSANDRO ZUDDAS
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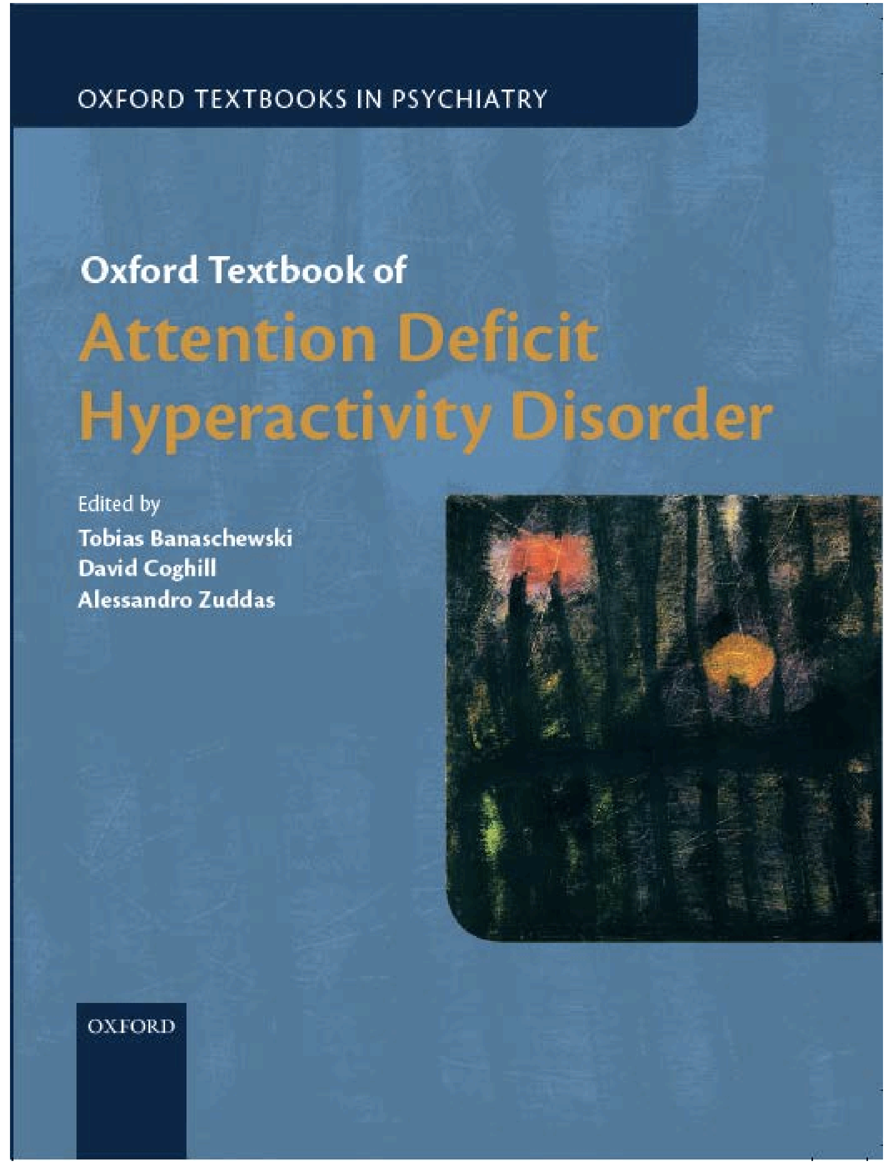

OXFORD TEXTBOOKS IN PSYCHIATRY
Oxford Textbook of
Attention Deficit
Hyperactivity Disorder
Edited by
Tobias Banaschewski
David Coghill
Alessandro Zuddas
OXFORD

Grazie per l'attenzione

azuddas@unica.it

Meccanismo d’azione dei farmaci per l’ADHD

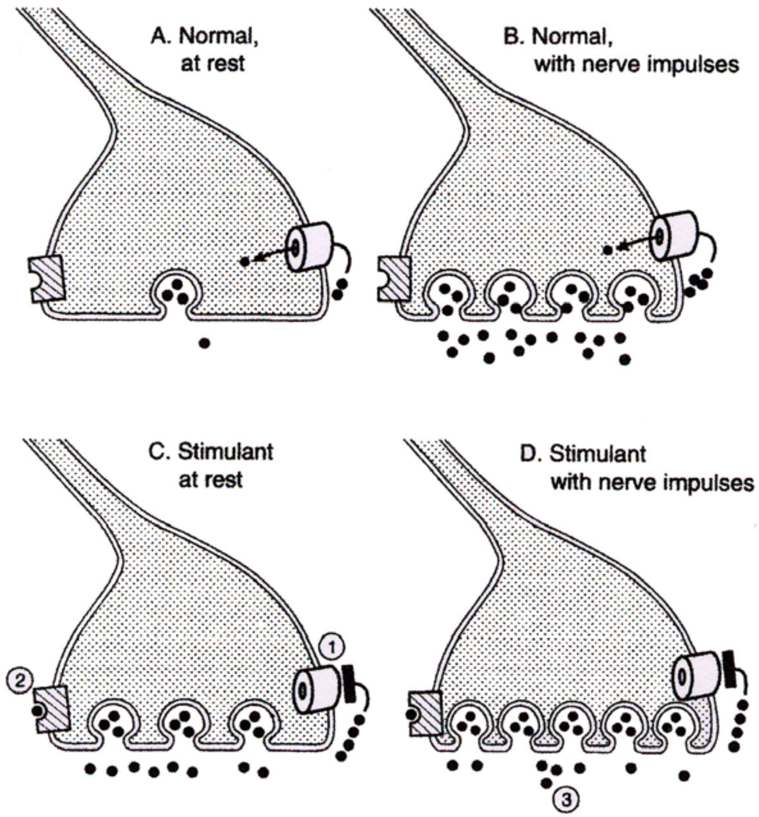
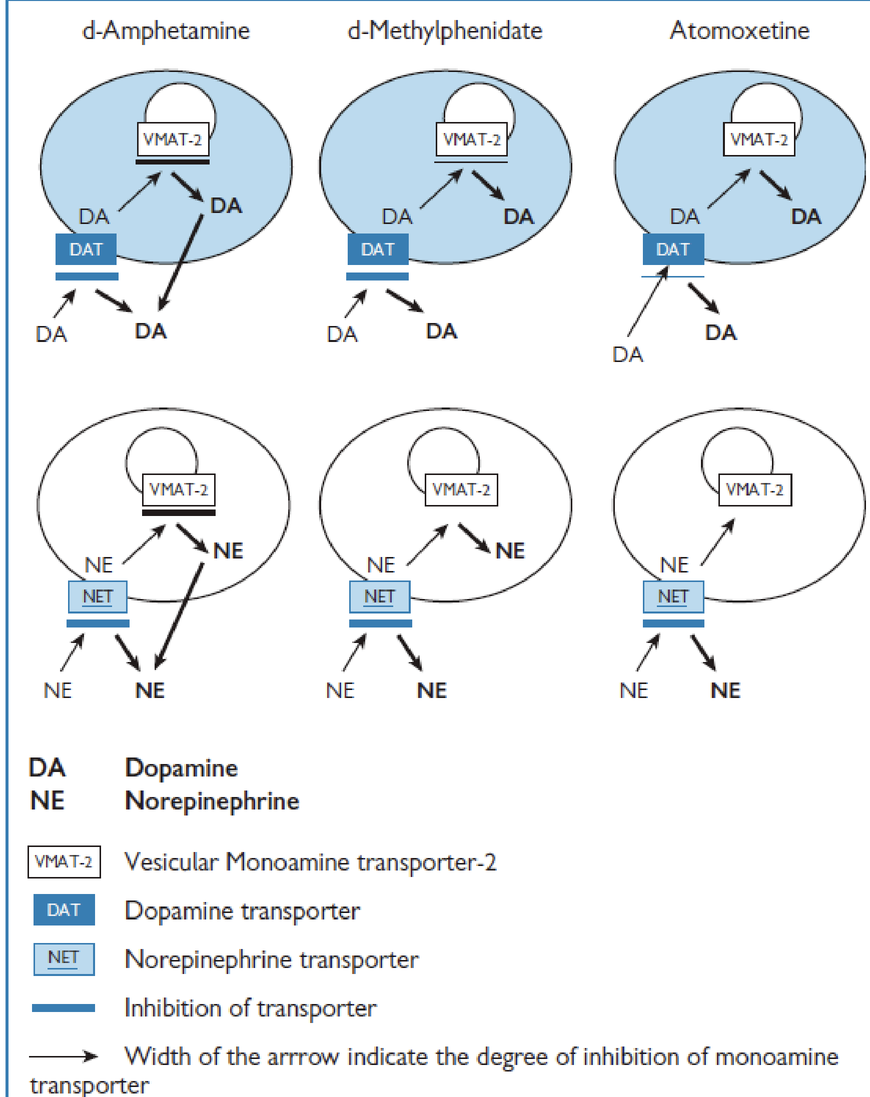
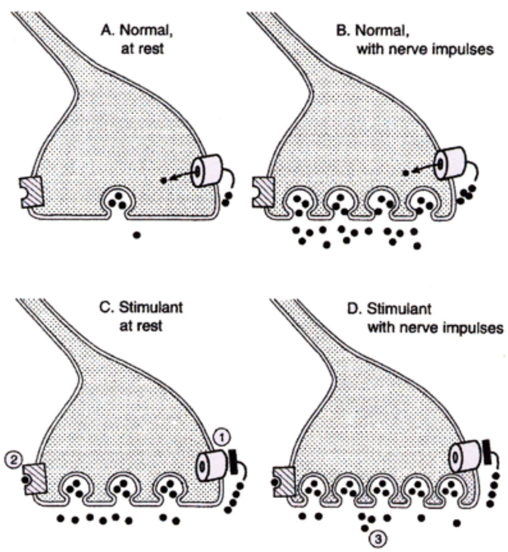


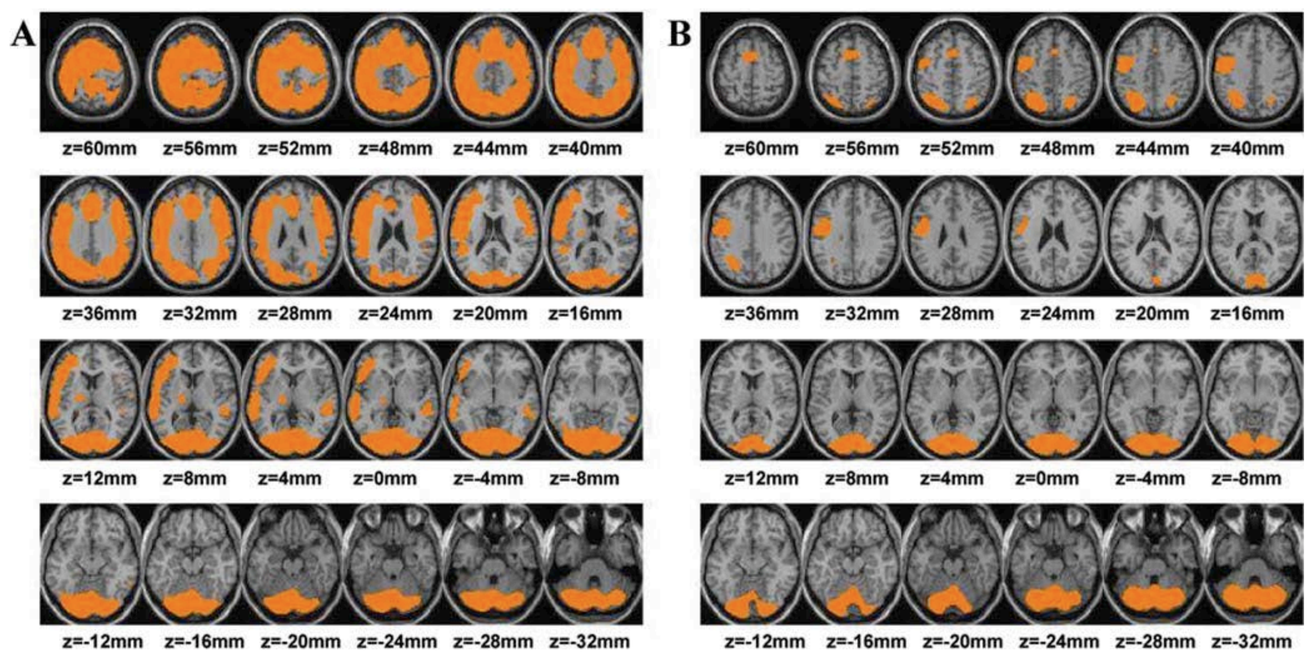
Figure 5.1 Molecular mechanisms of ADHD medication (from Easton *et al.*, 2006, modified)



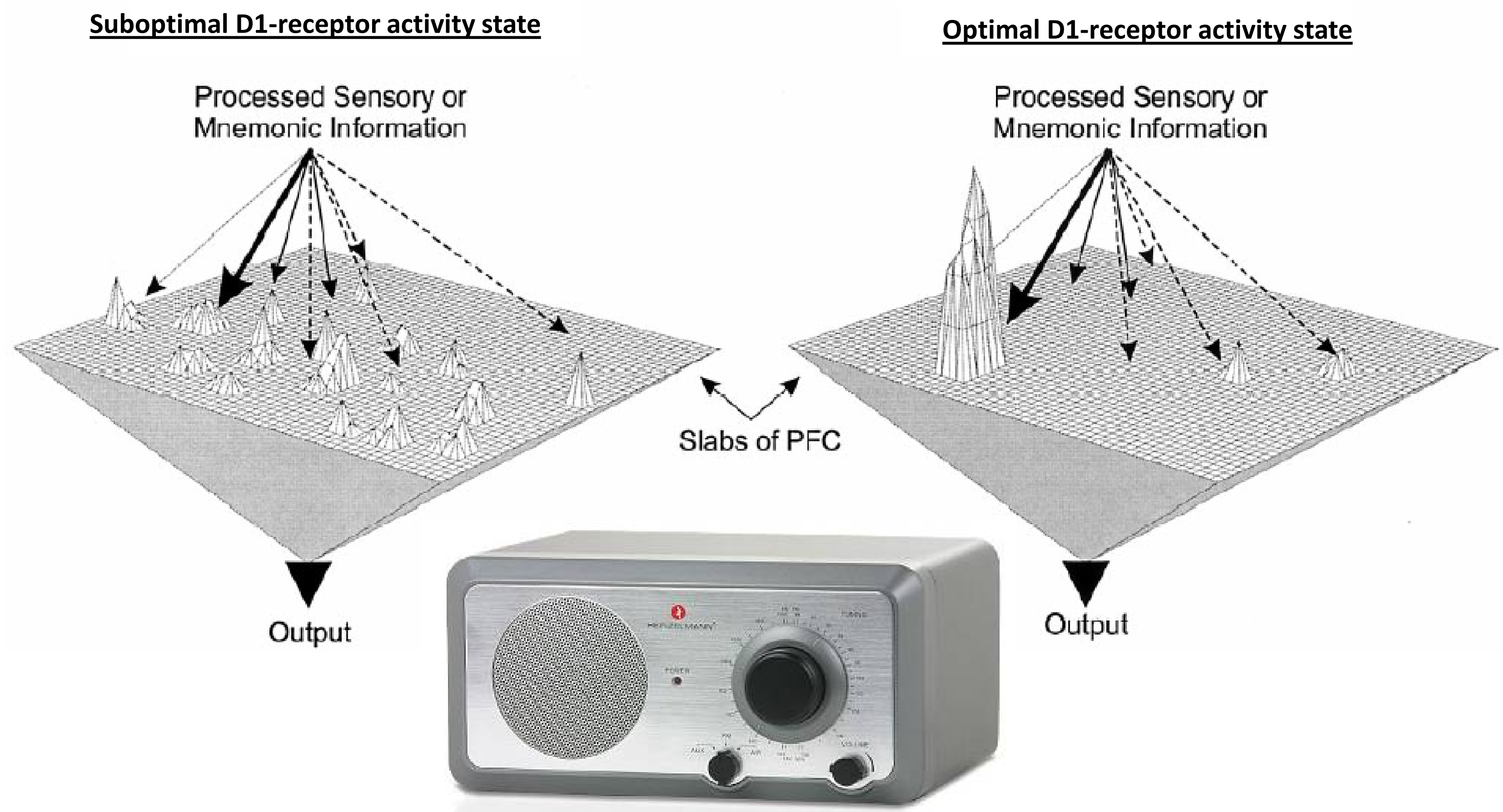
Methylphenidate Decreased the Amount of Glucose Needed by the Brain to Perform a Cognitive Task

Volkow *et al., 2008*





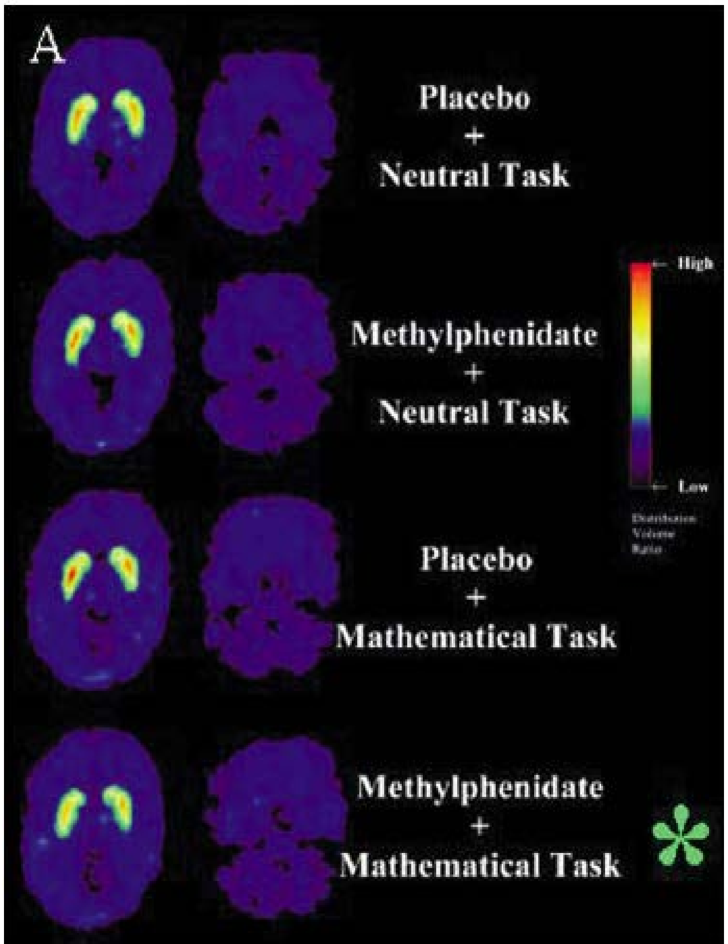
What is the action of dopamine on prefrontal cortex ?

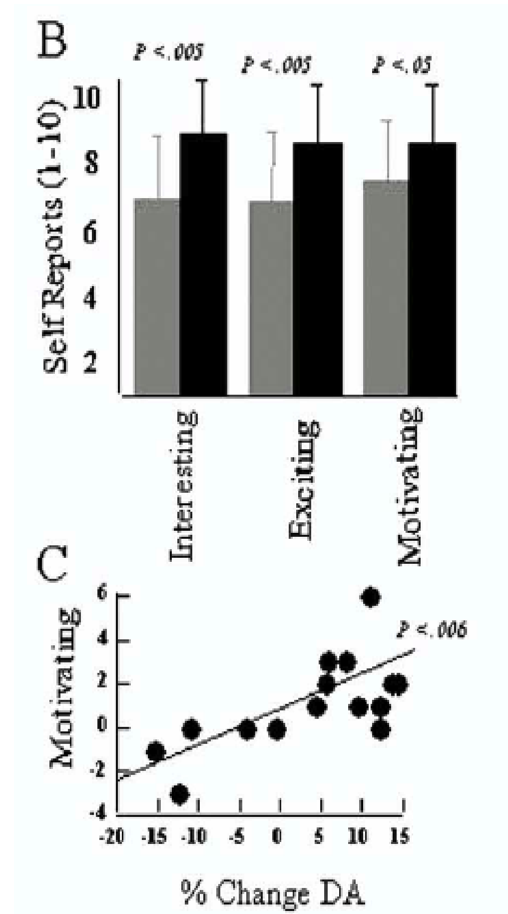


Optimal signal-to-noise ratio
in interaction with other neurotransmitter systems

Nach Seamans et al. J Neurosci 2001

Effect of MPH on cognitive tasks





Volkow et al. 2004