

Kokainkonsum bei Jugendlichen und jungen Erwachsenen: Verbreitung und kognitive Folgen

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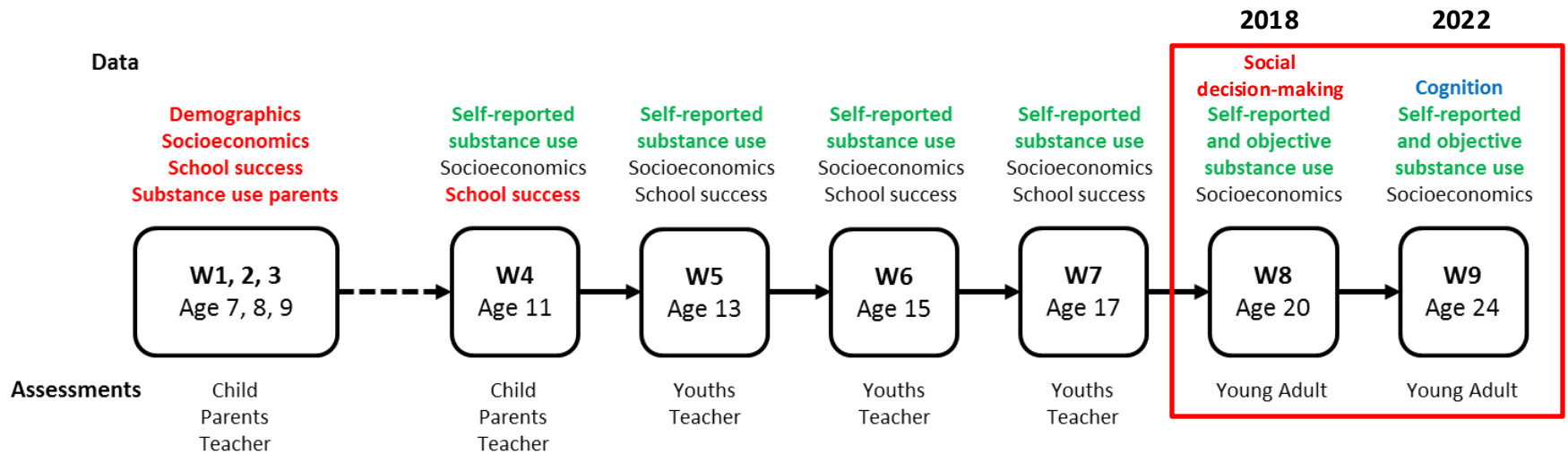


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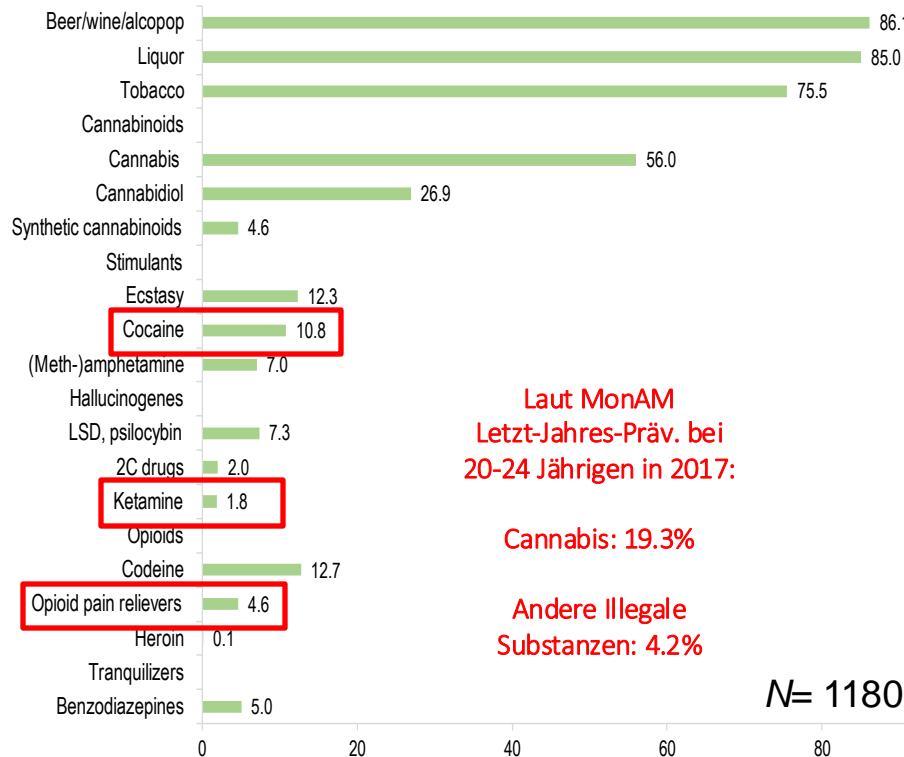
The Zurich Project on the Social Development of Children and Youths (z-proso)



- In 2004, 1,675 children from 56 primary schools in the Zurich area were selected using a cluster-stratified randomized sampling approach.
- Regular follow-up assessments were carried out until 2022, when the participants were 24 years old ($n=1,160$).
- Since 2018 (W8), computer-administered self-interviews (CASI) were conducted with most participants in a university laboratory environment (38 participants were interviewed via telephone).

Substance use among young adults – 12-months prevalence

age 20 assessment (2018) 12-month prevalence



Laut MonAM
Letzt-Jahres-Präv. bei
20-24 Jährigen in 2017:

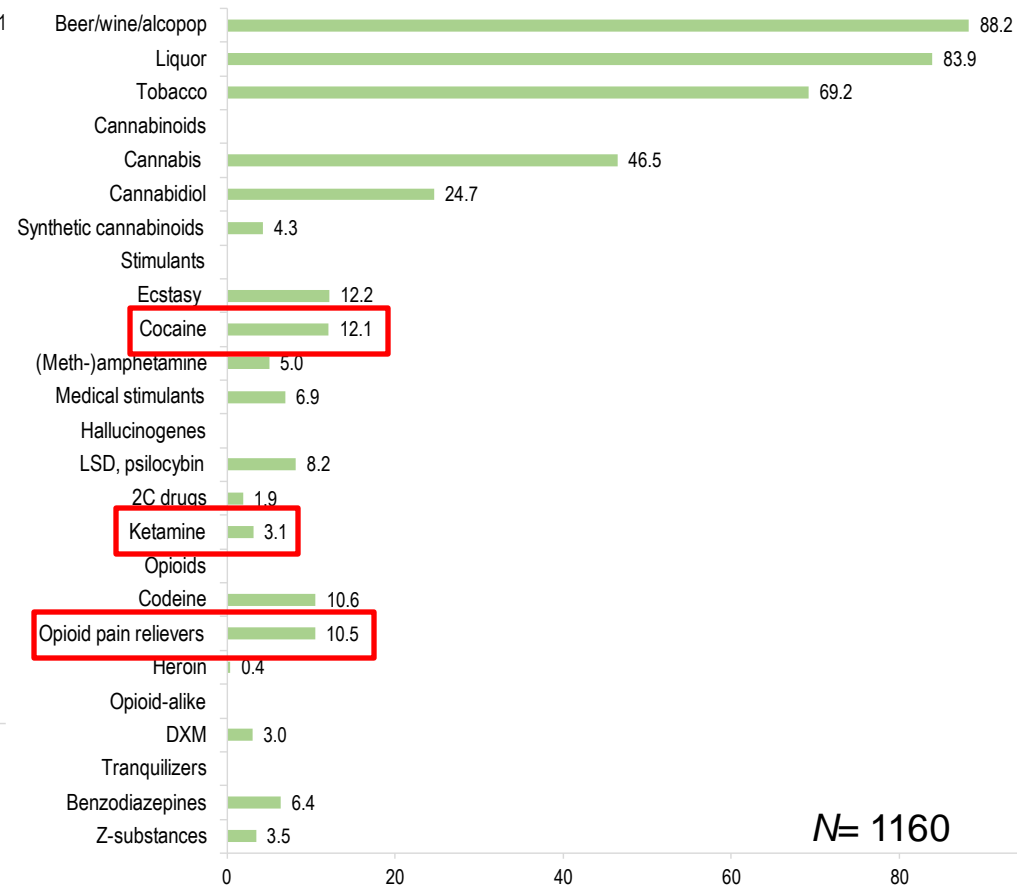
Cannabis: 19.3%

Andere illegale
Substanzen: 4.2%

N= 1180

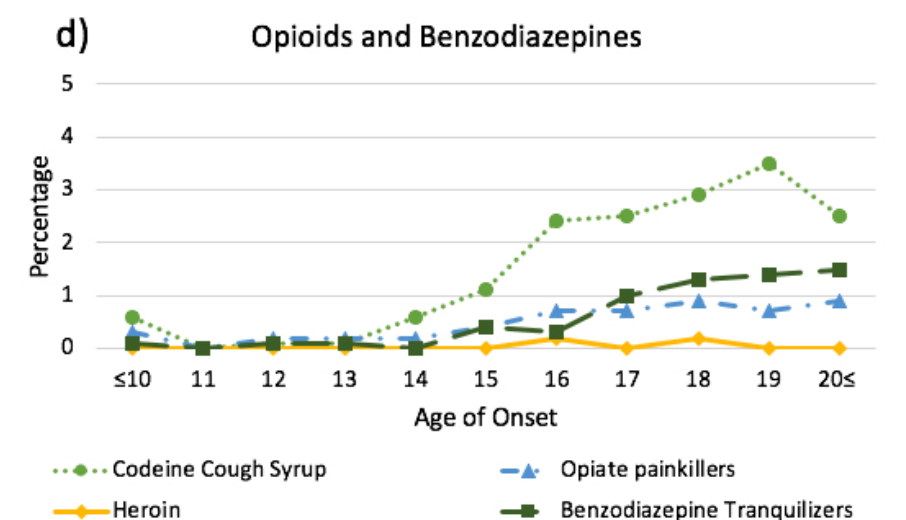
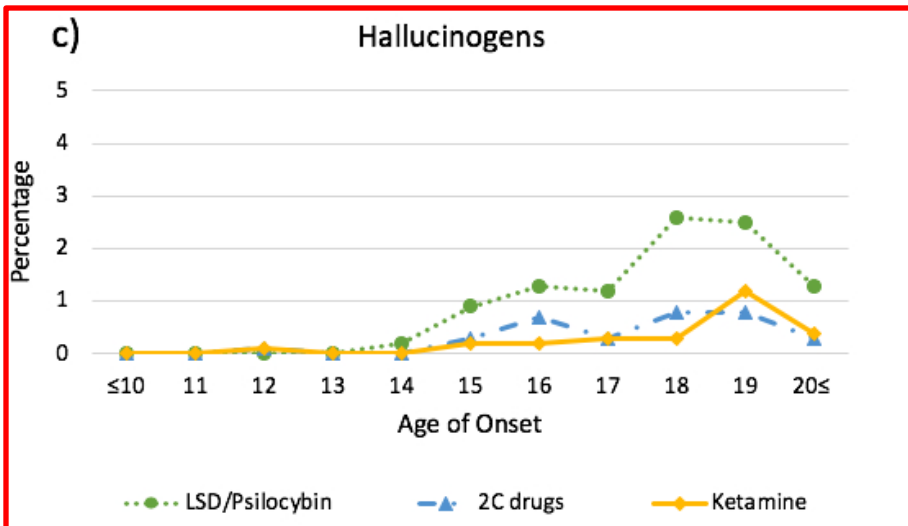
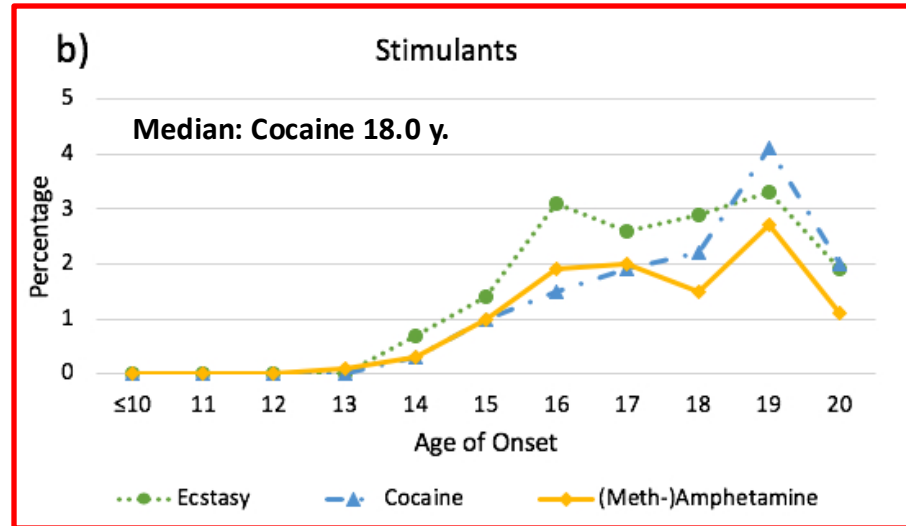
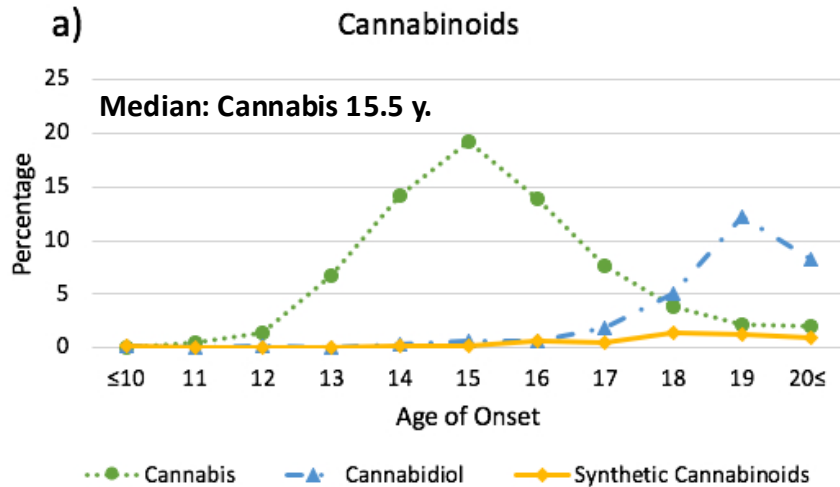
Quednow et al. 2022, Eur Addict Res

age 24 assessment (2022) 12-month prevalence

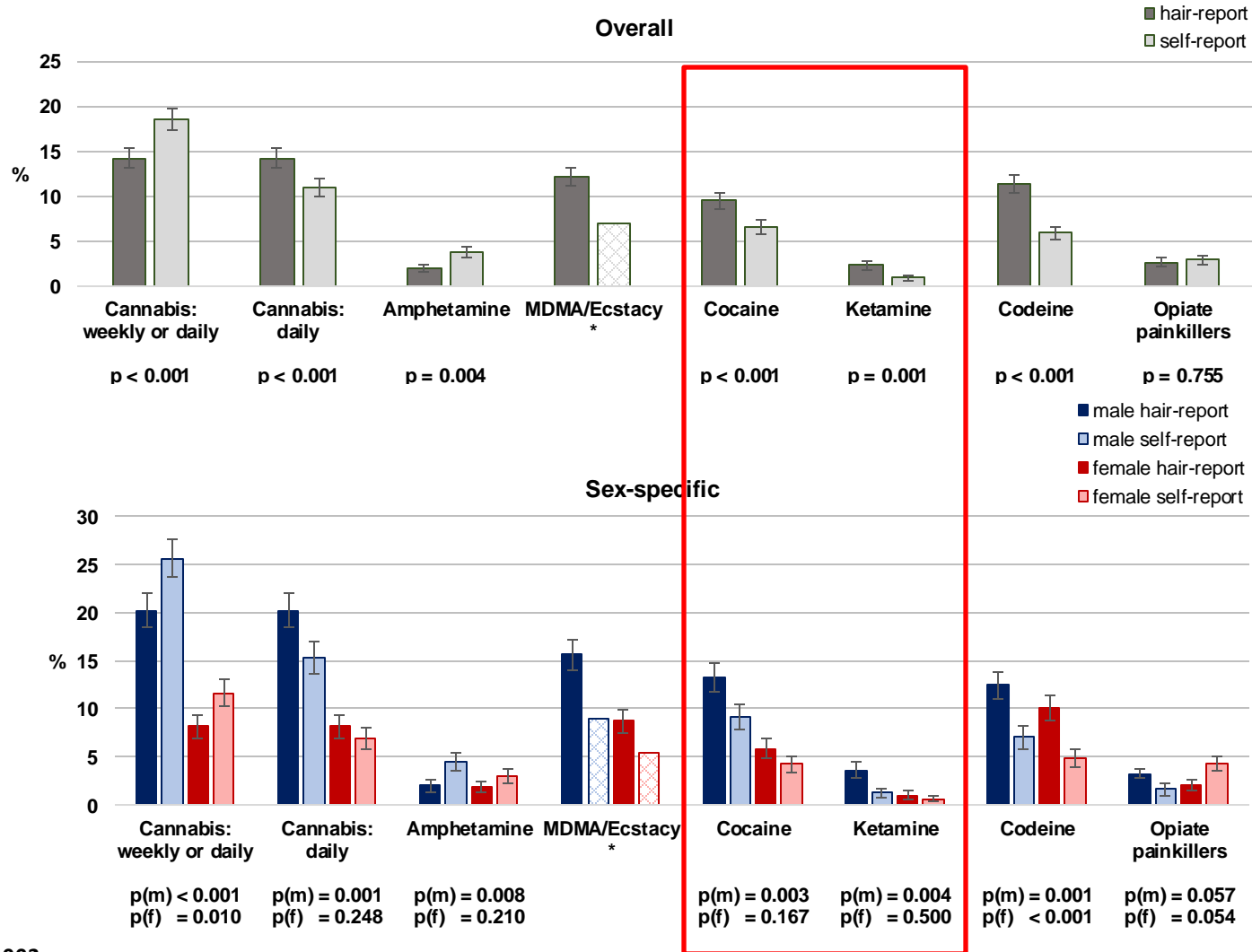


N= 1160

Age of substance use onsets in z-proso



Subjective and objective 3-months prevalence

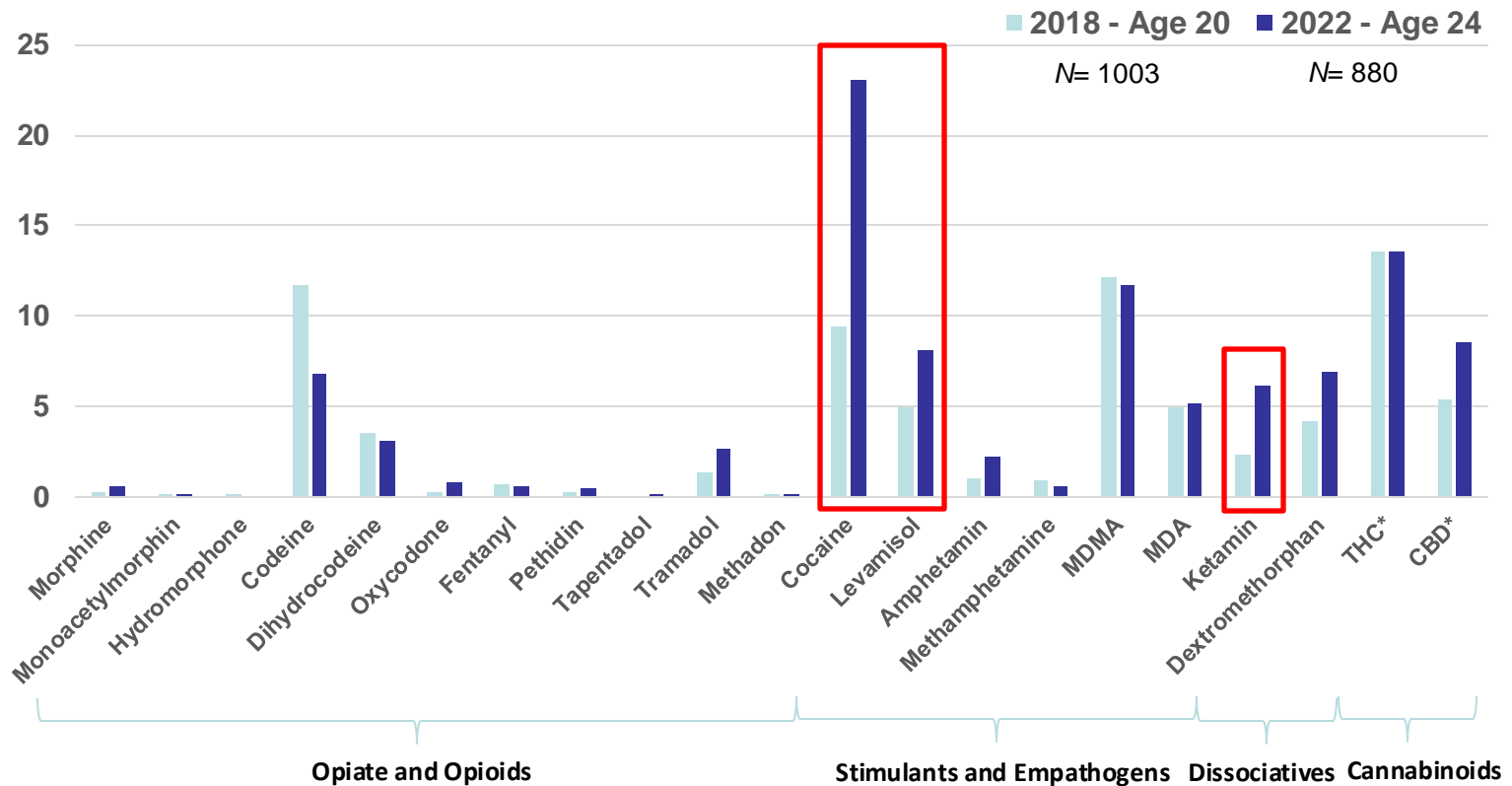


N=1001/1002

Hair data on codeine and opioids corrected for medical use. For MDMA/ecstasy, 3-month-self-reports were not available and the self-report prevalence was therefore estimated

Substance use among young adults – 3-months hair analysis

Substances positive in %

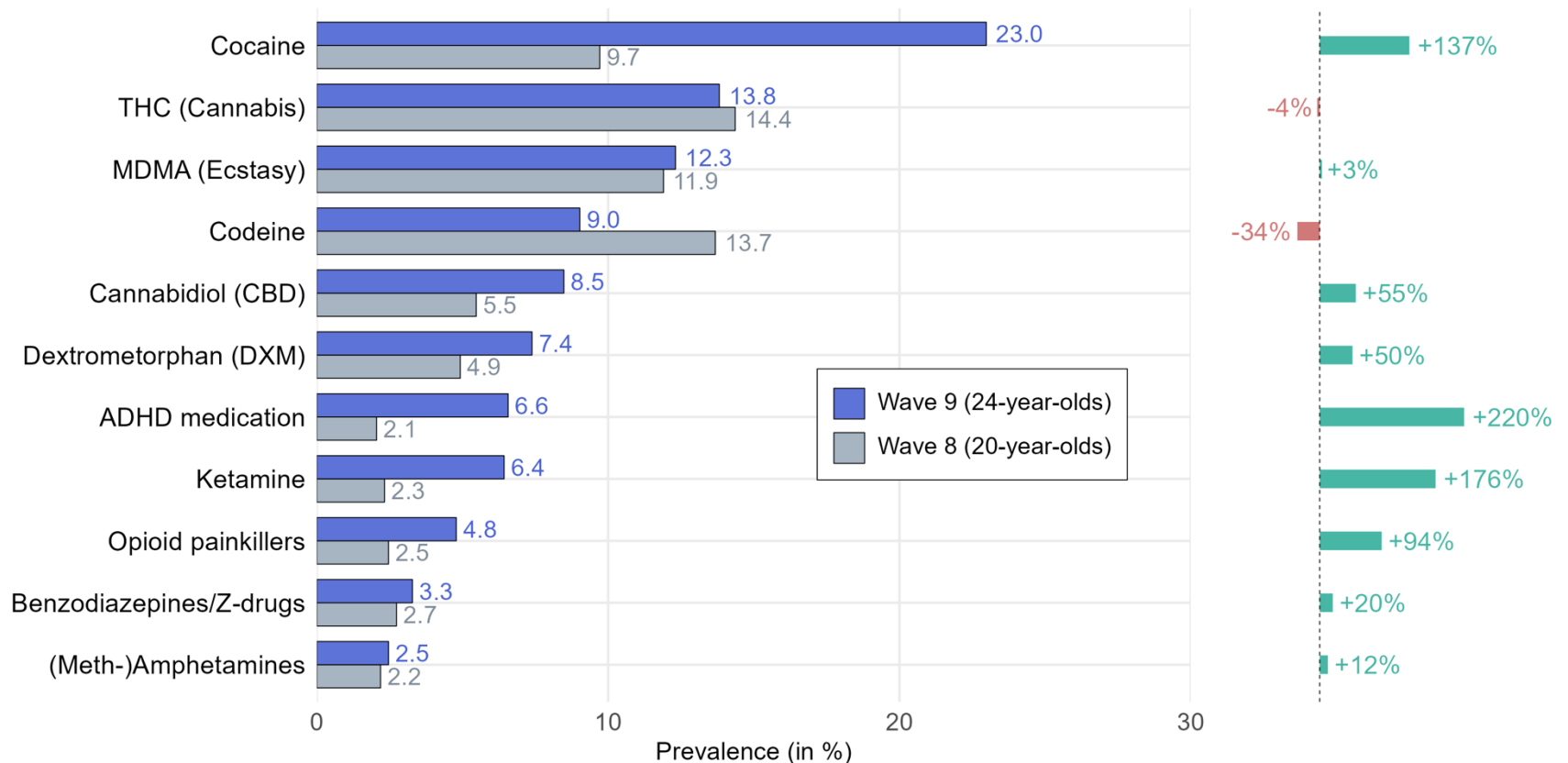


Steinhoff et al. 2023, J Am Acad Child Adolesc Psychiatry
Janousch et al. 2024, Eur Addict Res

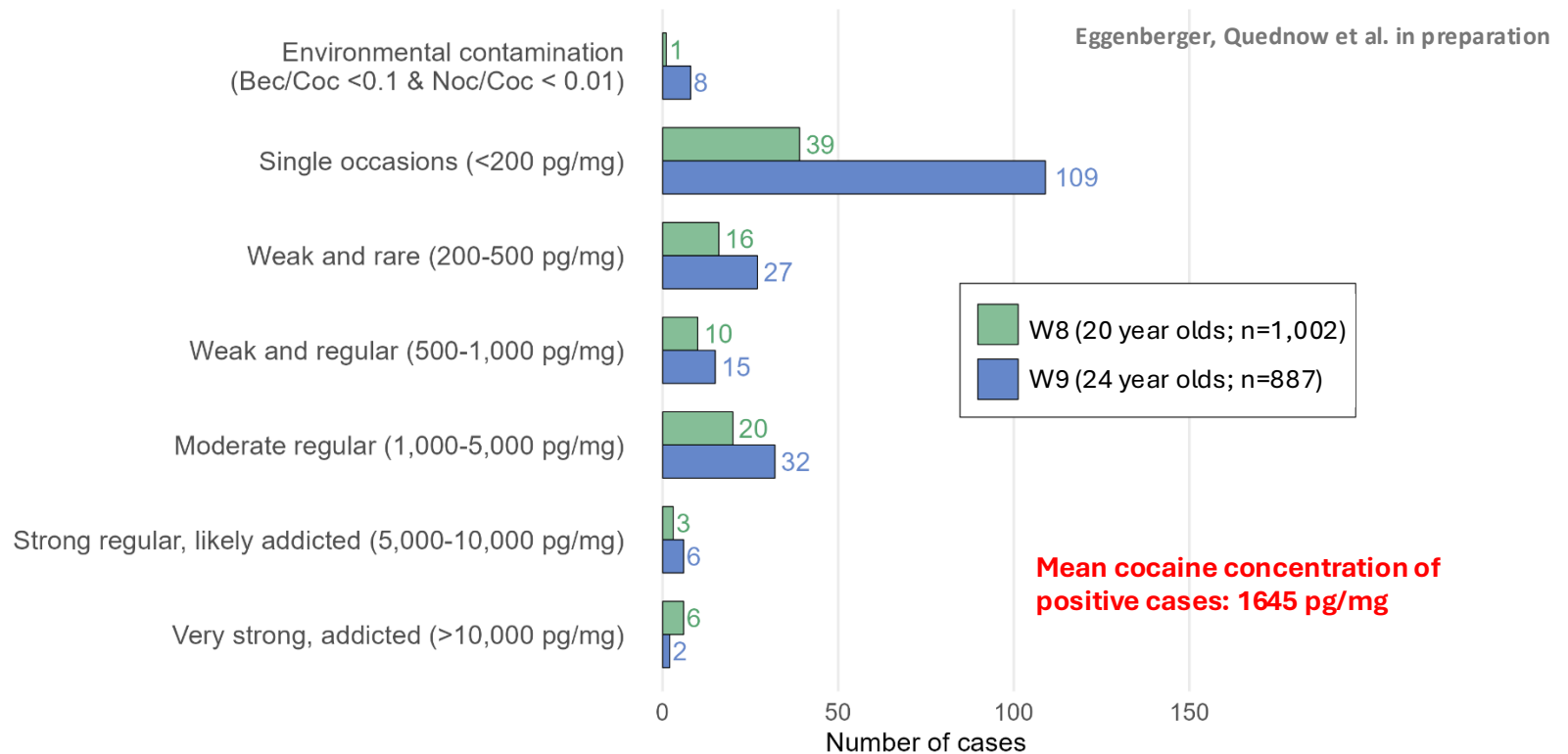
*reflecting only
highly regular use

Change of substance use in hair at age 20→24

Figure 1 | Substance Prevalence in Hair (n=731)



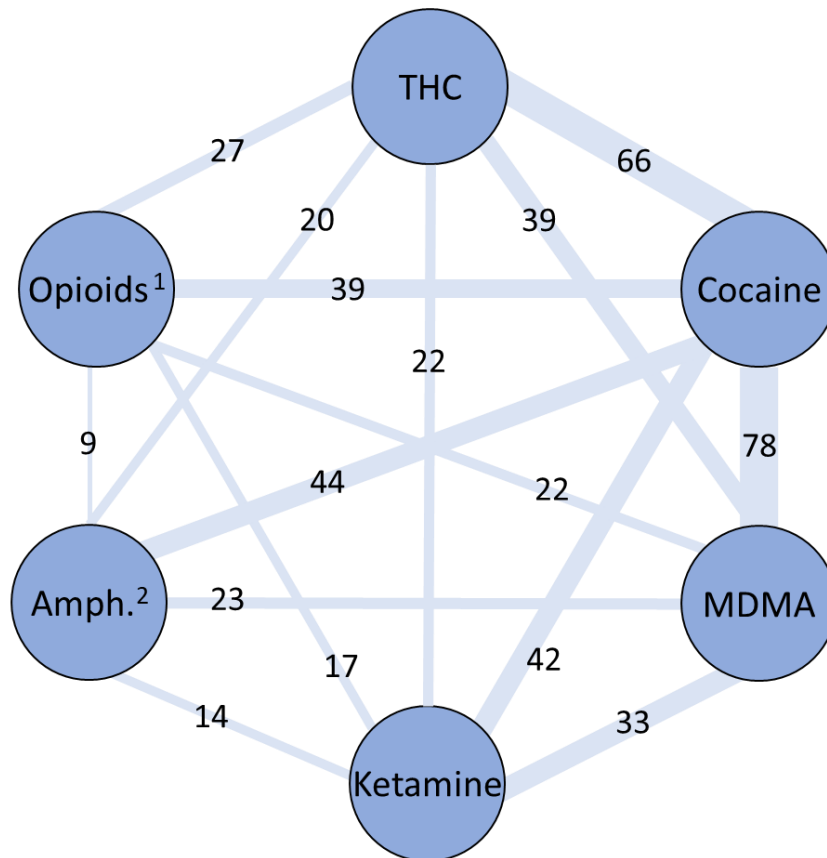
Intensity of cocaine use in z-proso



- In z-proso, 94 of 1003 (9.4%, age 20) and 191 of 887 (21.5%, age 24) were confirmed positive for cocaine in hair, from which 29 and 40 participants (30.8% and 20.9% of the users), respectively, showed at least moderate regular use including 9 and 8 individuals, respectively, who were likely addicted at test date.

A substance in hair rarely comes alone

Wave 9 (age 24, n=887)



n (%)	Users	Pure users
THC	122 (13.8)	34 (3.8)
Cocaine	205 (23.1)	59 (6.7)
MDMA	104 (11.7)	15 (1.7)
Ketamine	54 (6.1)	4 (0.5)
Opioids¹	107 (12.1)	54 (6.1)
Amph.²	72 (8.1)	23 (2.6)

¹ Codeine, opioid painkillers, and heroin

² (Meth-)amphetamine and medical stimulants (e.g., ADHD medication)

Neuropsychological assessment in z-proso

Computerized assessment of cognition

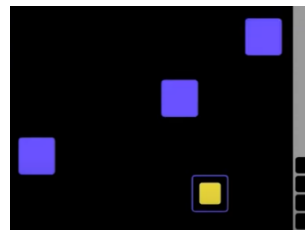
Cambridge Neuropsychological Test Automated Battery (CANTAB)

- RVP: Rapid Visual Processing → Sustained attention/vigilance
- SWM: Spatial Working Memory → Visuo-spatial working memory
- PAL: Paired Associates Learning → Visuo-spatial learning and declarative memory

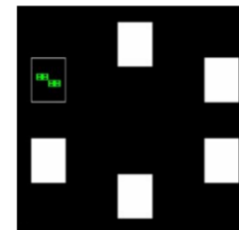
RVP



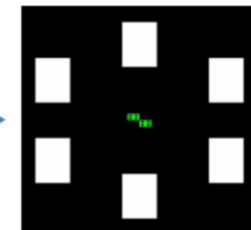
SWM



PAL



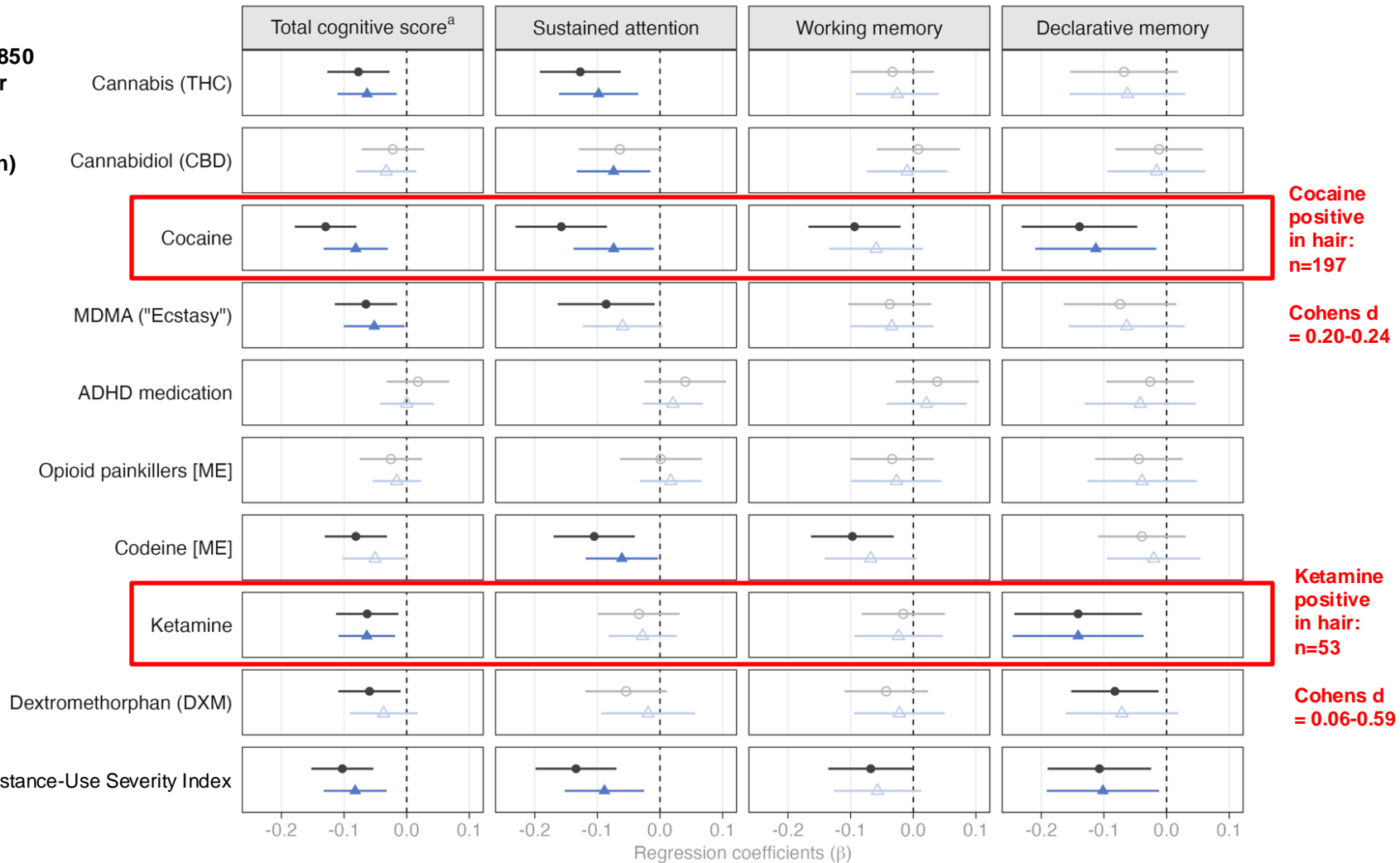
Acquisition



Recall

Recreational drug use and cognition

Total N=850
(with hair
samples
and
cognition)



Cocaine
positive
in hair:
n=197

Cohens d
= 0.20-0.24

Ketamine
positive
in hair:
n=53

Cohens d
= 0.06-0.59

Study design: Zurich Cocaine Cognition Study

Neuropsychology +
Psychophysiology +
Genetics

1. Baseline (cross-sectional)

73 recreational users
35 dependent users
96 stimulant-naïve controls
204 participants

12 month

Neuropsychology +
Psychophysiology

2. Follow-up (longitudinal)

64 recreational users
17 dependent users
51 stimulant-naïve controls
132 participants

PET + MRS + MRI

Glutamate PET + MRS (cross-sect.)

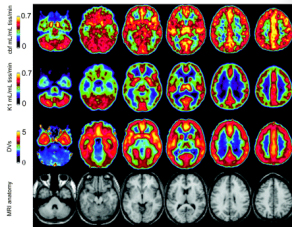
18 chronic users
18 stimulant-naïve controls
36 participants

fMRI + resting-state + ASL (cross-sect.)

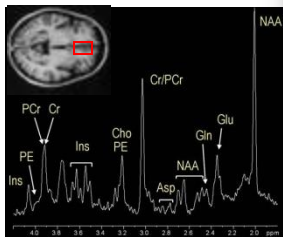
25 chronic users
25 stimulant-naïve controls
50 participants

Structural MRI + resting-state (longitud.)

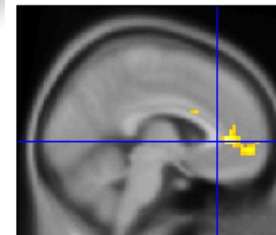
41 chronic users
43 stimulant-naïve controls
84 participants



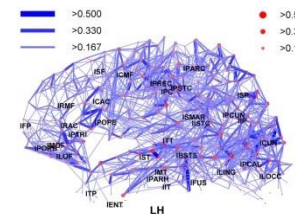
[11C]-ABP688 PET



[1H]NMR spectroscopy



Functional MRI



Resting-state connectivity

Early information
processing

Classical
neuropsychology

Social Cognition

Decision-making and
impulsivity

Social decision-making
and neuroeconomics

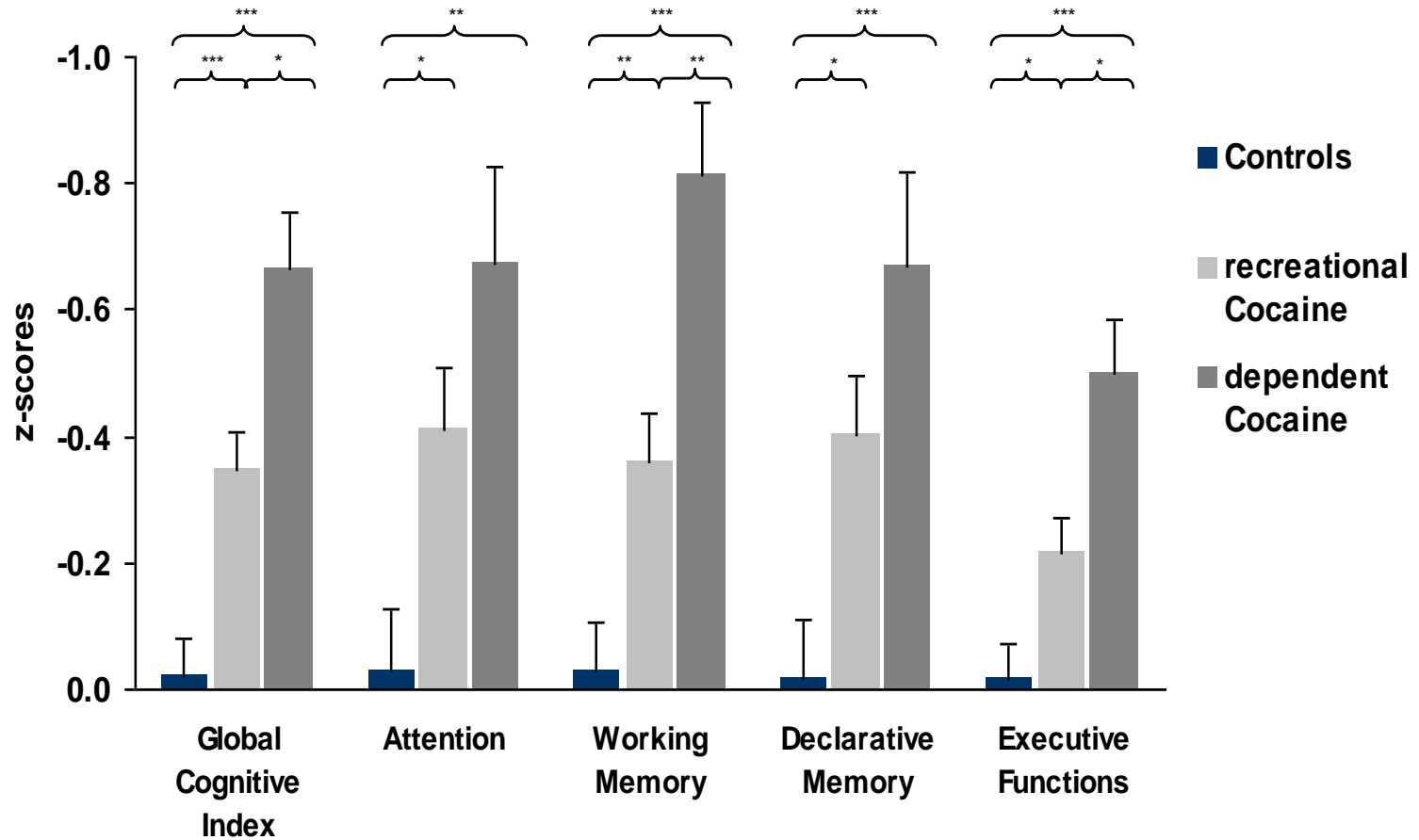
Genetics and
gene expression

Psychometrics

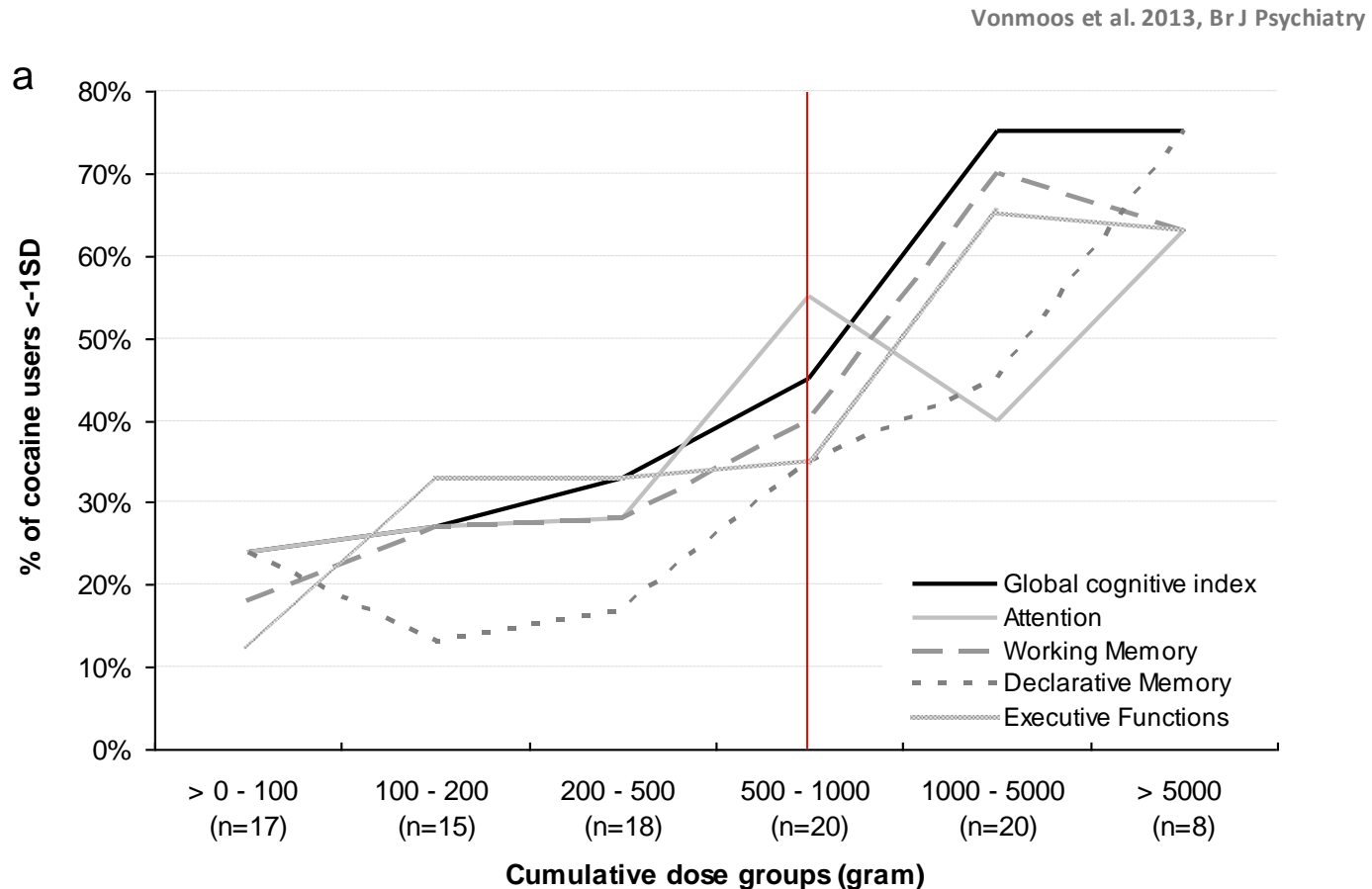
Sample characteristics ZuCo²St

Mean and SD, numbers	Stimulant-naive controls (n=68)	Recreational cocaine users (n=68)	Dependent cocaine users (n=30)	F/Chi ² /t	df/df _{err}	P
Age	30.3 (9.2)	28.7 (6.2)	32.5 (9.0)	2.38	2/163	0.10
Sex (m, f)	47 / 21	50 / 18	22 / 8	0.38	2	0.83
Years of school education	10.7 (1.8)	10.5 (2.0)	9.5 (1.2)	4.82	2/163	<0.01
Verbal IQ (MWT-B)	104.4 (9.7)	103.2 (9.6)	99.7 (9.1)	2.46	2/163	0.09
Smoker/non-smoker	53 / 15	53 / 15	24 / 6	0.06	2	0.97
Cocaine Craving (CCQ)	-	19.0 (9.1)	20.3 (11.4)	0.36	96	0.55
Cocaine self report						
g/week	-	1.1 (1.0)	7.9 (15.8)			
Duration (years)	-	6.5 (4.0)	9.4 (6.5)			
Cumulative lifetime dose (g)	-	520 (751)	5501 (9635)			
Last consumption (days)	-	27.5 (37.6)	21.0 (33.6)			
Quantitative hair toxicology						
Cocaine (pg/mg)	-	2739 (4628)	22164 (32609)			
Benzoylcegonine (pg/mg)	-	546 (919)	5048 (7711)			
Cocaethylene (pg/mg)	-	276 (318)	2006 (3656)			
Norcocaine (pg/mg)	-	62.4 (100)	586 (758)			
Alcohol (g/week)	116.8 (122.6)	167.8 (117.5)	188.5 (260.6)			
Amphetamine (g/week)	-	0.1 (0.2)	0.0 (0.2)			
MDMA (tablets/week)	-	0.1 (0.3)	0.4 (1.8)			
Cannabis (g/week)	0.5 (1.0)	0.9 (2.1)	1.2 (3.7)			

Cognitive impairment and cocaine

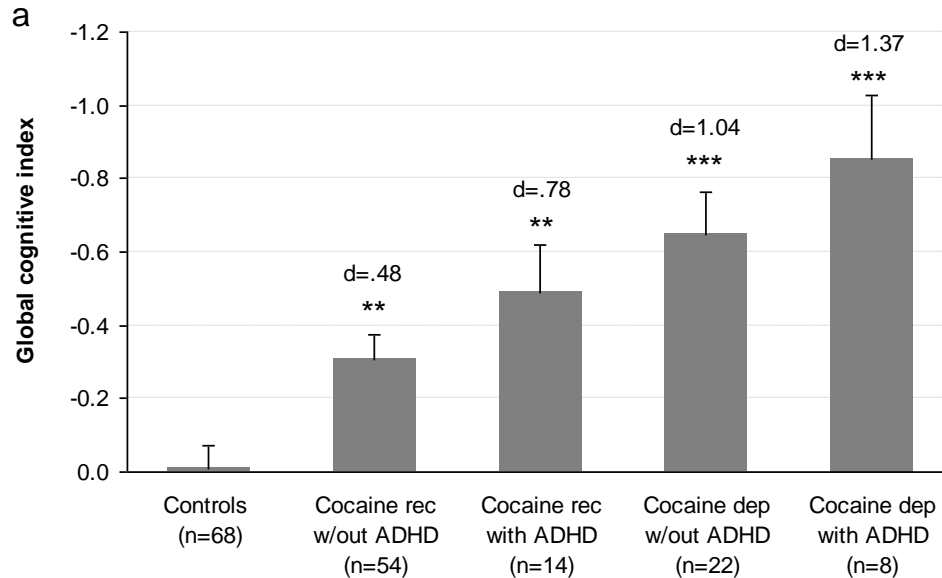


Cognitive impairment in cocaine users



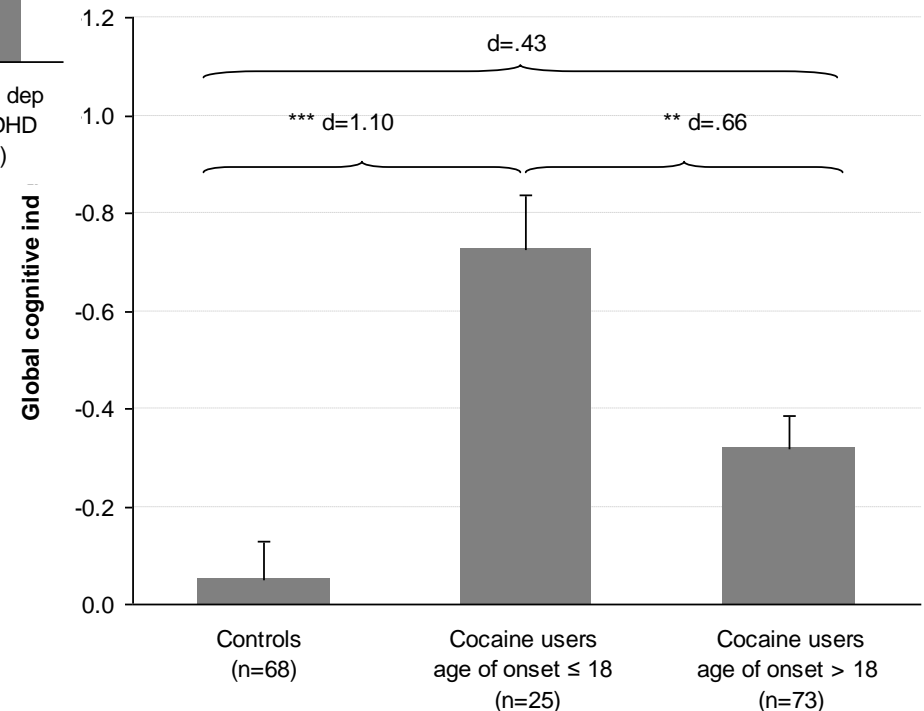
- From a cumulative lifetime dose of 500-1000g cocaine ~50% of the users display subclinical deficits (>1 SD), while ~20% show clinically relevant cognitive decline (>1.5 SD).

The role of ADHD and age of onset



Vonmoos et al. 2013, Br J Psychiatry

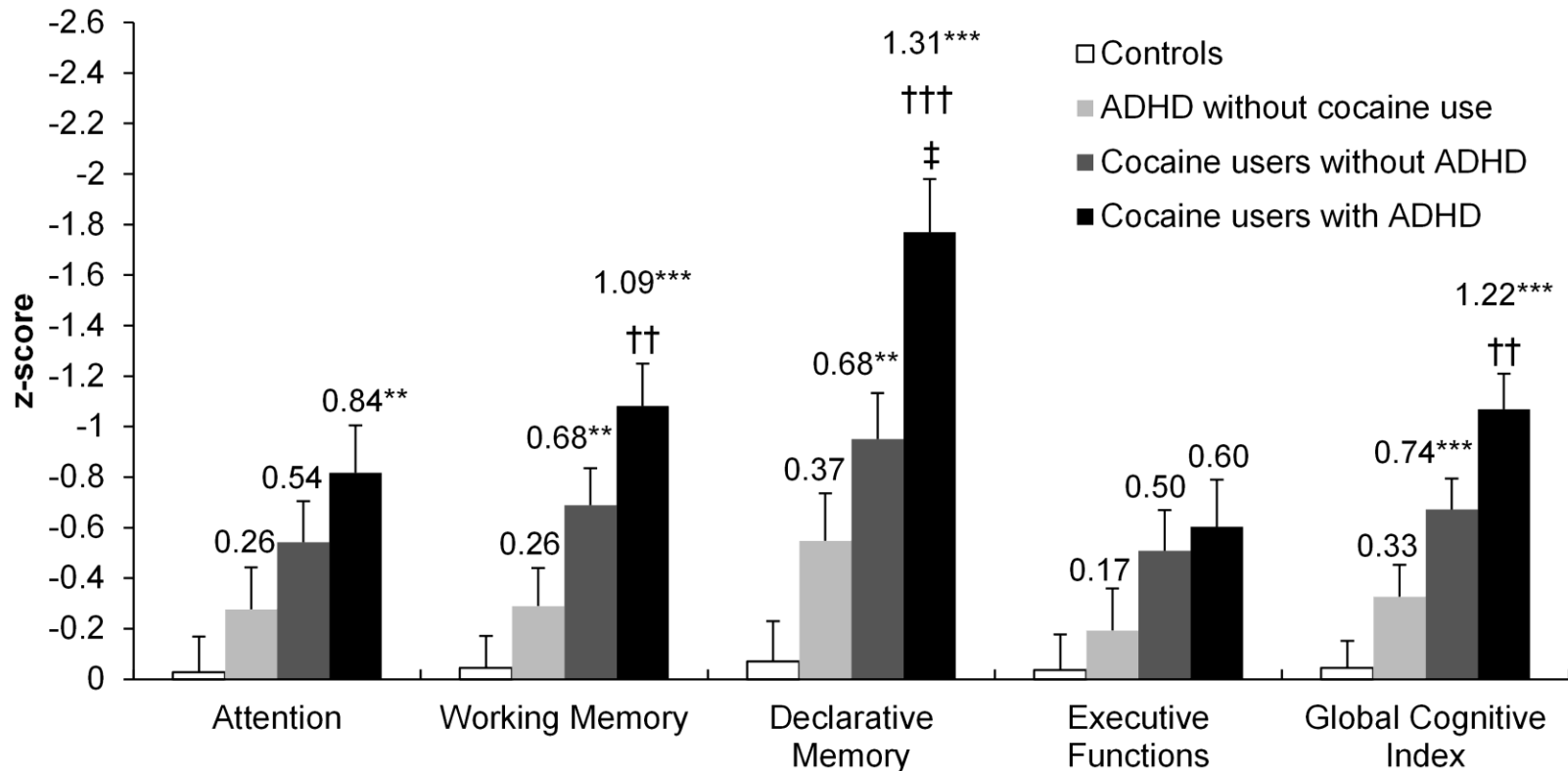
- Early age of cocaine use onset had a great impact on cognitive performance.



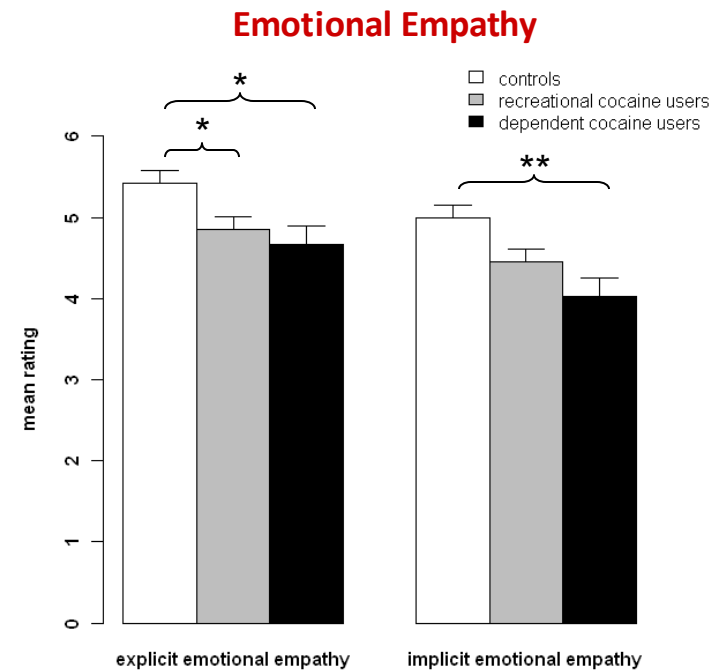
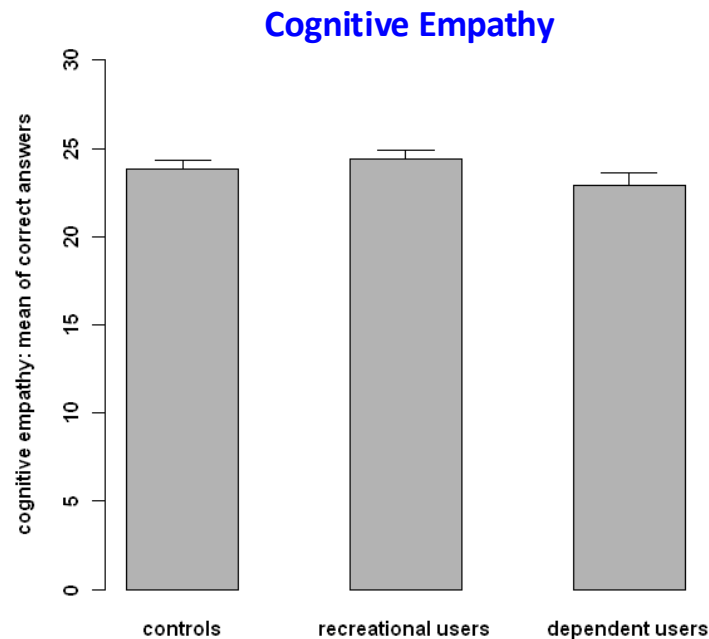
- Comorbid ADHD had an additional impact on cognition but did not explain the impairment in general.

Sidak post hoc tests: * $p < .05$; ** $p < .01$; *** $p < .001$

ADHD, cocaine, and cognition



Empathy in cocaine users

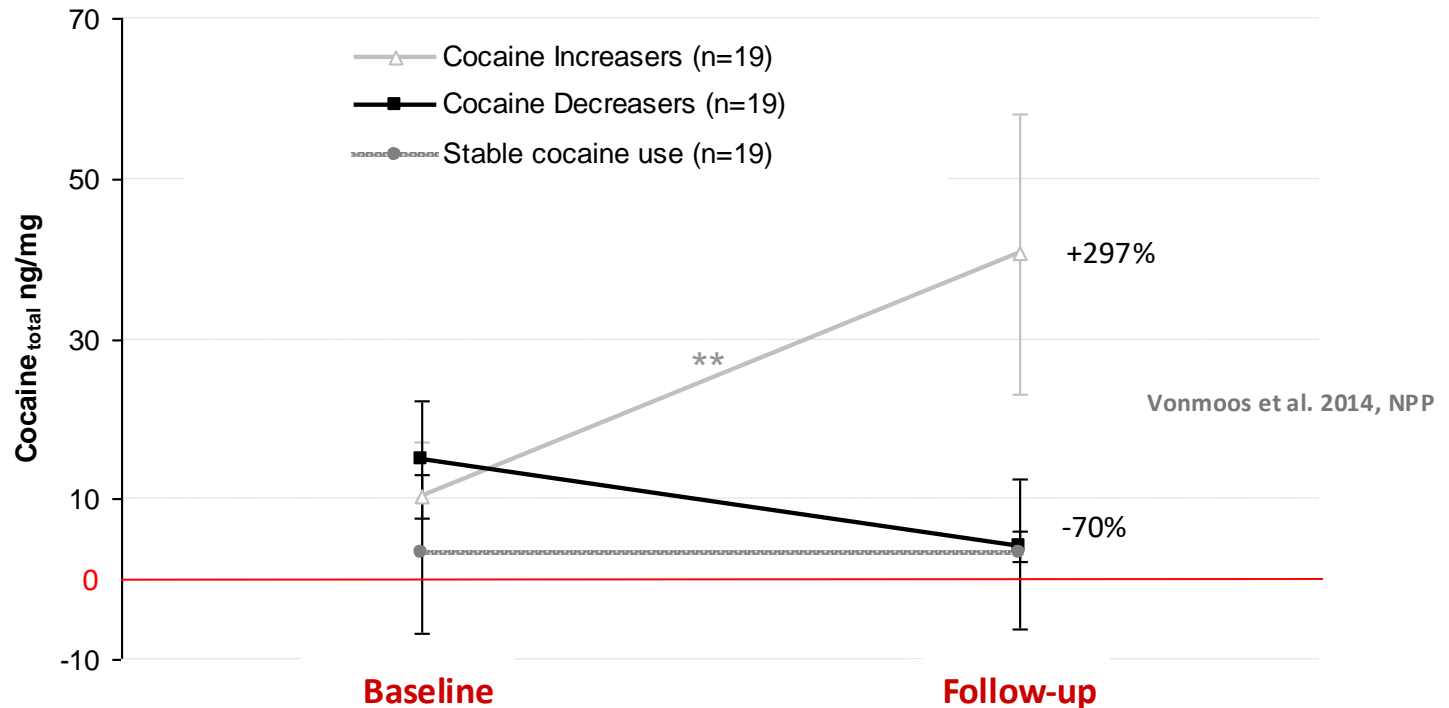


- Emotion recognition is not impaired in cocaine users but implicit and explicit Emotional Empathy seem to decrease with increasing cocaine consumption.
- Implicit Emotional Empathy was correlated with cumulative lifetime cocaine dose ($r=.23$, $p<.05$) and with cocaine g/week ($r=.33$, $p<.01$).



Longitudinal change of cocaine use

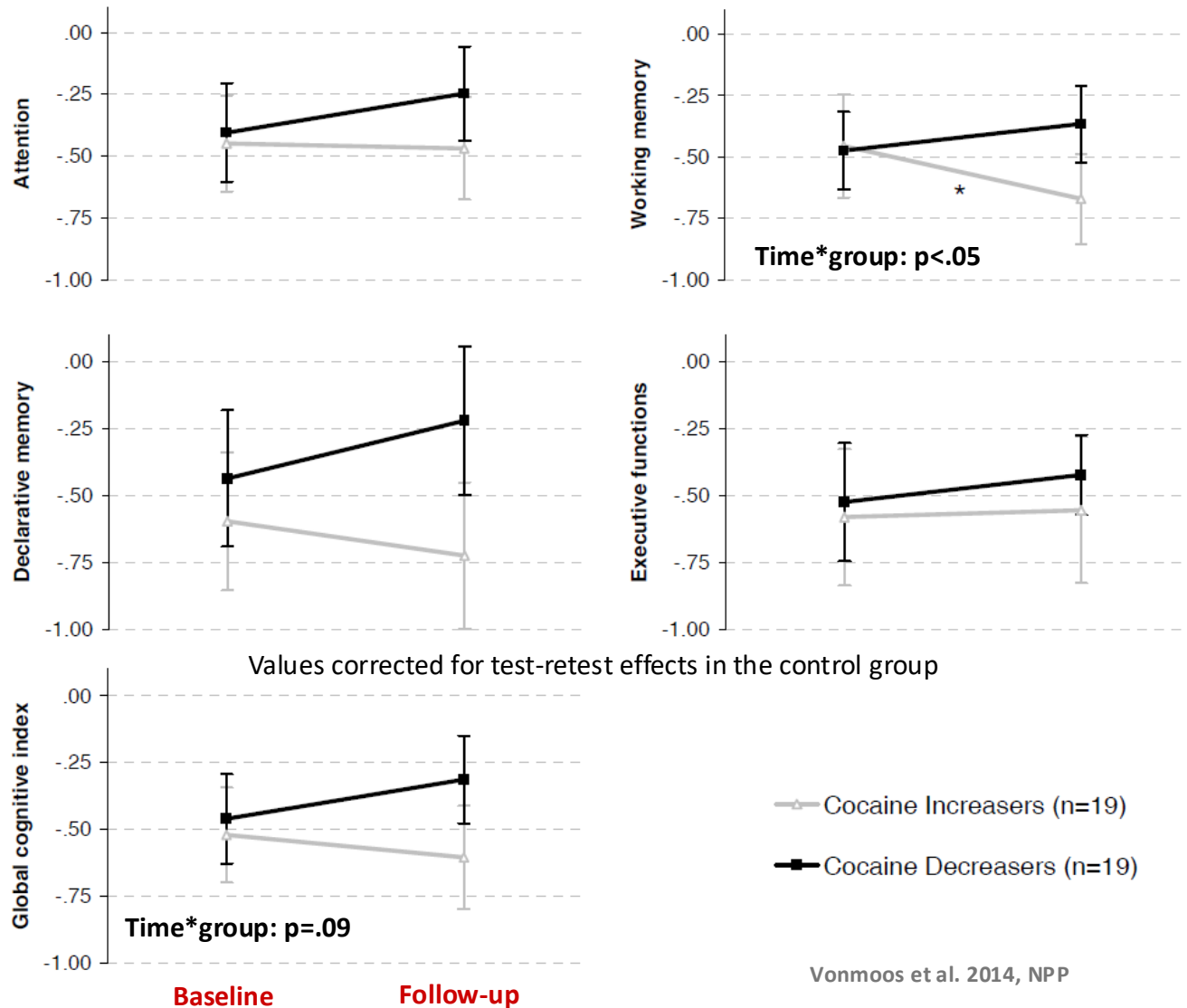
Change in cocaine concentration in hair



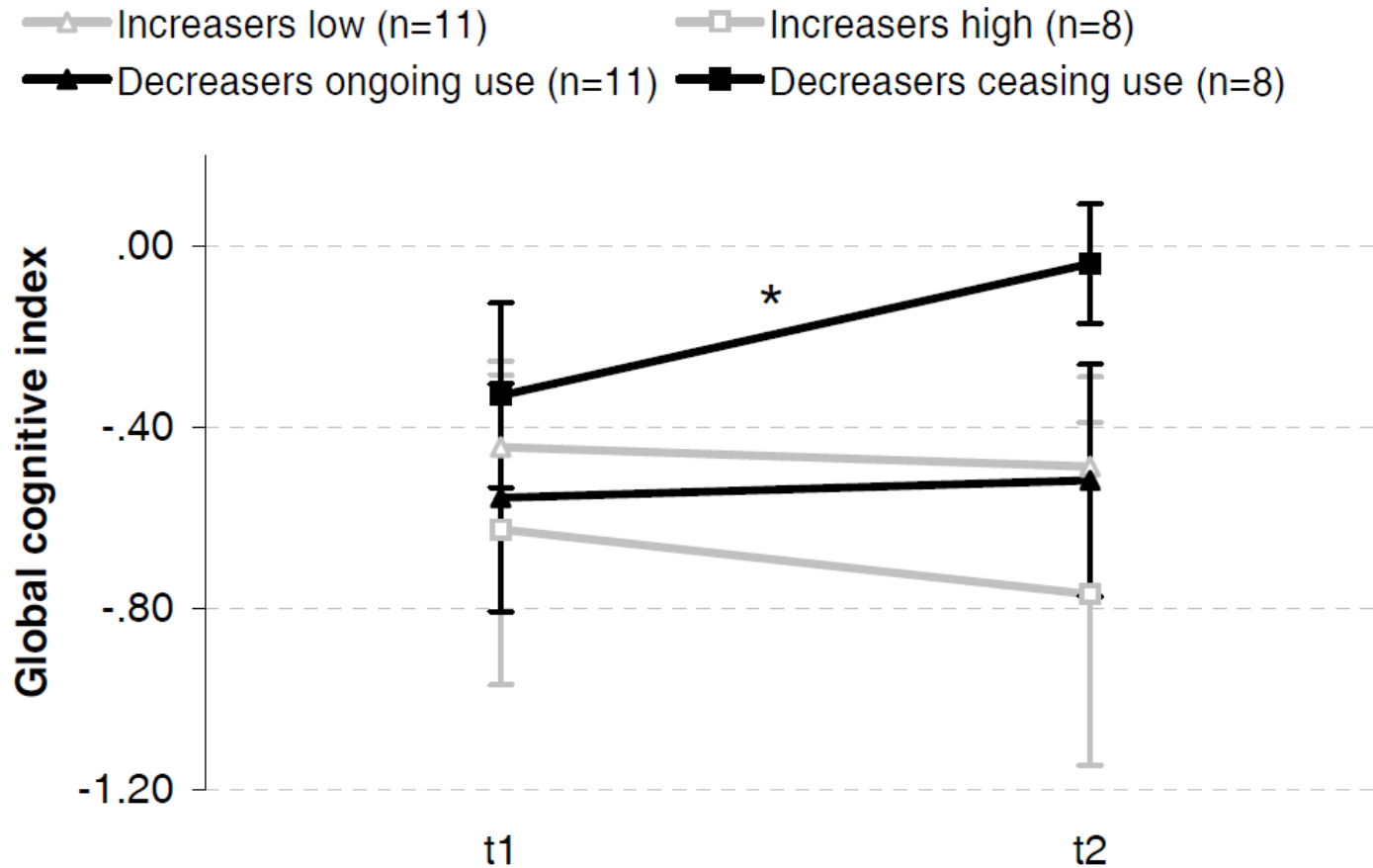
The criterion for group assignment was a combination of absolute and relative changes in cocaine concentration in hair samples between baseline (t1) and follow-up (t2):

- **Absolute criterion:** shift in cocaine concentration of at least ± 500 pg/mg
- **Relative criterion:** minimal increase of 20% or a minimal decrease of 10% in cocaine_{total} concentration (= cocaine + benzoylecgonine + norcocaine concentrations)

Longitudinal change of cognition

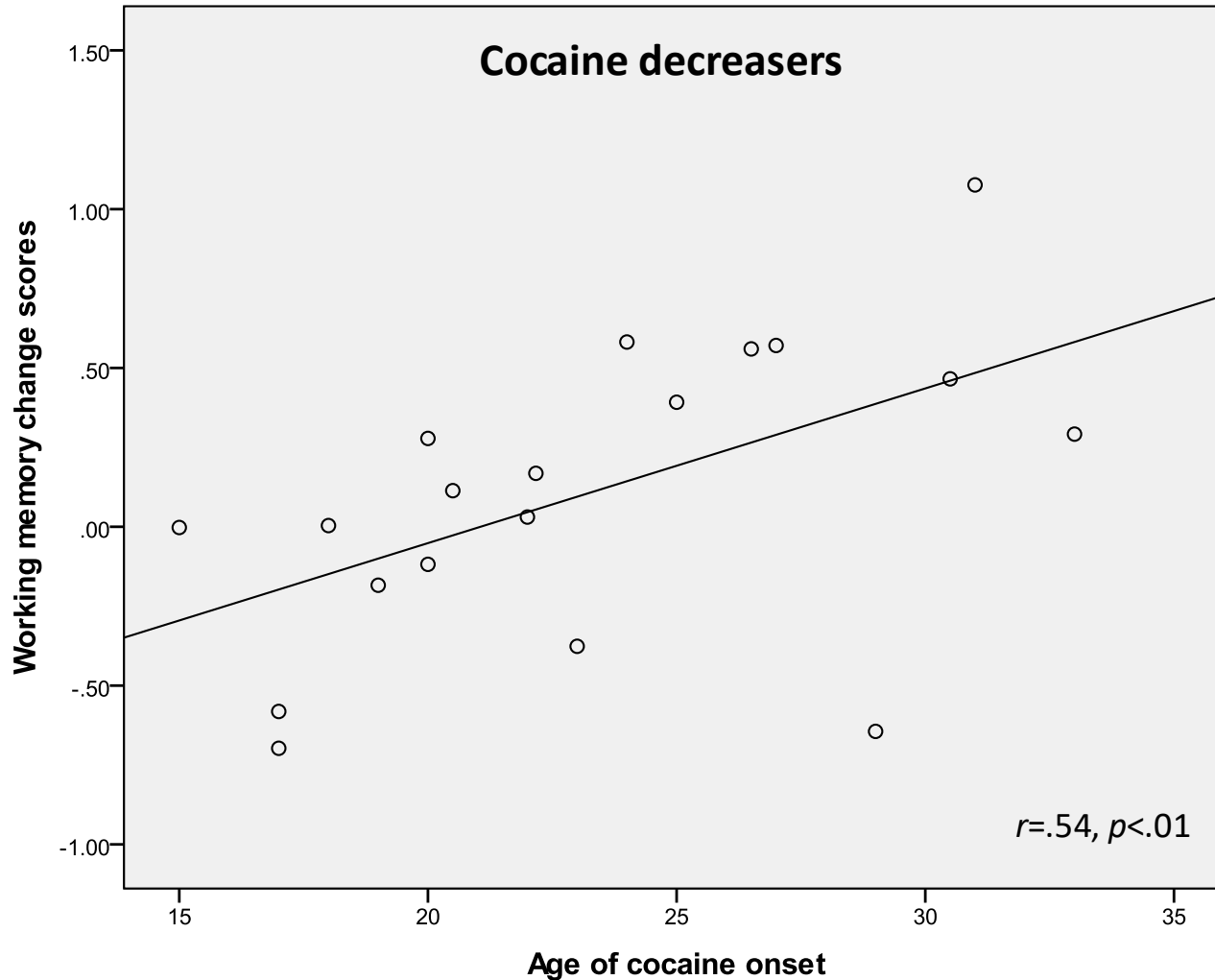


Longitudinal change of cognition



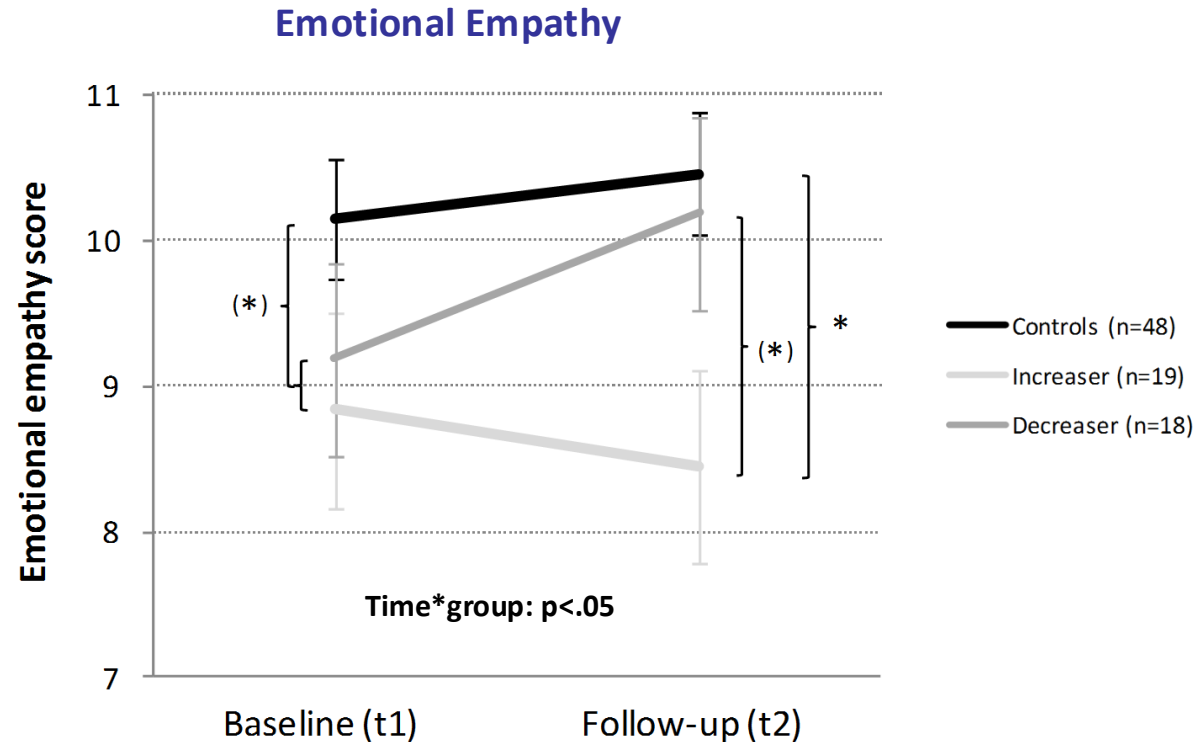
Vonmoos et al. 2014, NPP

Longitudinal change of cognition



Longitudinal change in empathy

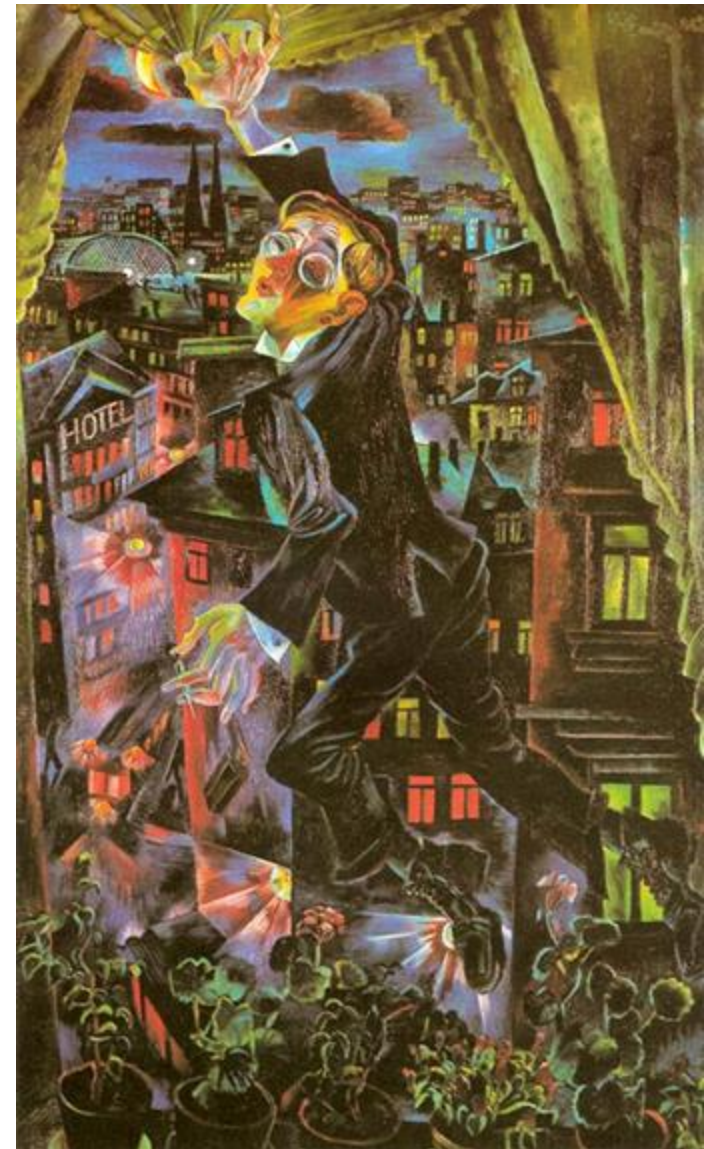
Vonmoos et al. 2019, Front Psychiatry



- Social and non-social cognitive deficits as well as associated cortical changes are at least in part drug-induced in cocaine users!

Summary

- Prevalence of cocaine use is high in young adults from Zurich.
- Recreational and dependent cocaine use is associated with cognitive impairments.
- Cognitive functions are correlated with subjective and objective cocaine intake parameters.
- Emotional empathy and social network size are reduced in cocaine users.
- Basal cognitive functions, and emotional empathy, covary with changing cocaine use. Thus, they are probably, at least in part, drug-induced. → **Neuroplasticity!**
- ADHD, age of onset, and adulderants are important contribution factors for impairment and recovery in cocaine users.



Conrad Felixmüller (1925), Der Tod des Dichters Walter Rheiner

Acknowledgements z-proso



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Zürich



Psychiatrische
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Zürich

Gedanken an Kokain, die den Alltag bestimmen?

Wir suchen Teilnehmende für unsere klinische Studie zu sich aufdrängenden **Erinnerungen** an und **Verlangen** nach Kokain

Genauere Infos
und Anmeldung



Direkter Kontakt:
crpp-sta@bli.uzh.ch

Ihre Daten werden bei Zustandekommen eines Kontakts registriert. Sollten Sie an einer Teilnahme nicht mehr interessiert sein, werden Ihre Daten unverzüglich gelöscht.

MEMOCYCLINE

Ziel der Studie

Wir möchten die Eigenschaften und Mechanismen von sogenannten **intrusiven** (= sich unkontrollierbar aufdrängenden) **Erinnerungen an Kokain(-konsum)** besser verstehen und herausfinden, ob sich diese durch zwei **medikamentös unterstützte Erinnerungstrainings** beeinflussen lassen. Im MRI-Scanner untersuchen wir zudem die **Hirnaktivierung** während dem Abruf von Kokain-bezogenen Erinnerungen, um herauszufinden, ob sich diese durch die Trainings verändert.

Aufwand

Die Studie besteht aus insgesamt **5 Terminen an der Psychiatrischen Universitätsklinik Zürich** (3 Untersuchungstermine, 2 Trainingstermine), dem parallelen Beantworten von Fragen über eine **Smartphone-App** und einem abschliessenden **Telefongespräch nach 3 Monaten**.

Teilnahmebedingungen

- Erleben von intrusiven Erinnerungen an Kokain(-konsum)
- 18-60 Jahre alt
- Ausreichende Deutschkenntnisse
- Keine Posttraumatische Belastungsstörung
- Kein übermässiger Konsum anderer illegaler Substanzen (ausser Alkohol, Cannabis und Nikotin)
- Weitere Kriterien findest du auf unserer Website (siehe QR-Code)

Entschädigung

Die Kompensation für die gesamte Studienteilnahme beträgt **400 CHF**.

Kontakt

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