

Persistent Cannabis Users Show Neuropsychological Decline from Childhood to Midlife

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Why Cannabis?

- Timely issue
 - Debate regarding the medicinal use and legalization of cannabis in the US and abroad

Why Cannabis?

Mixed Messages

Therapeutic



Harmful



People think cannabis use results in...

Memory Problems

“If I am ever asked to pop to the shop to buy more than 2 items, I need them [to be] written down.”

- Carl from the UK, age 31
(used cannabis from age 16 to 27)

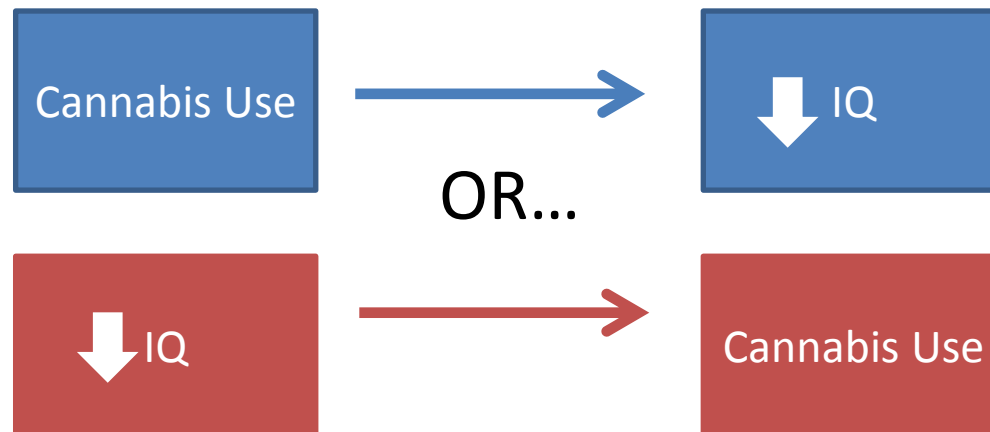
Increased Creativity

“...marijuana use can stimulate creativity and actually enhance intelligence. Many scientific breakthroughs during my career occurred while under the influence.”

- Bobbie from the US
(used cannabis in his 20's and 30's)

Rationale

- Case-control studies suggest that long-term, heavy cannabis use may cause enduring neuropsychological impairment
- Limitations:
 - Chicken or the egg?



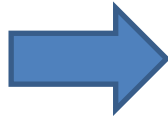
Current Study

“Before and After” IQ Testing

IQ Testing



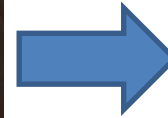
Ages 7-13



Cannabis Assessments



Age 18-38



IQ Testing



Age 38

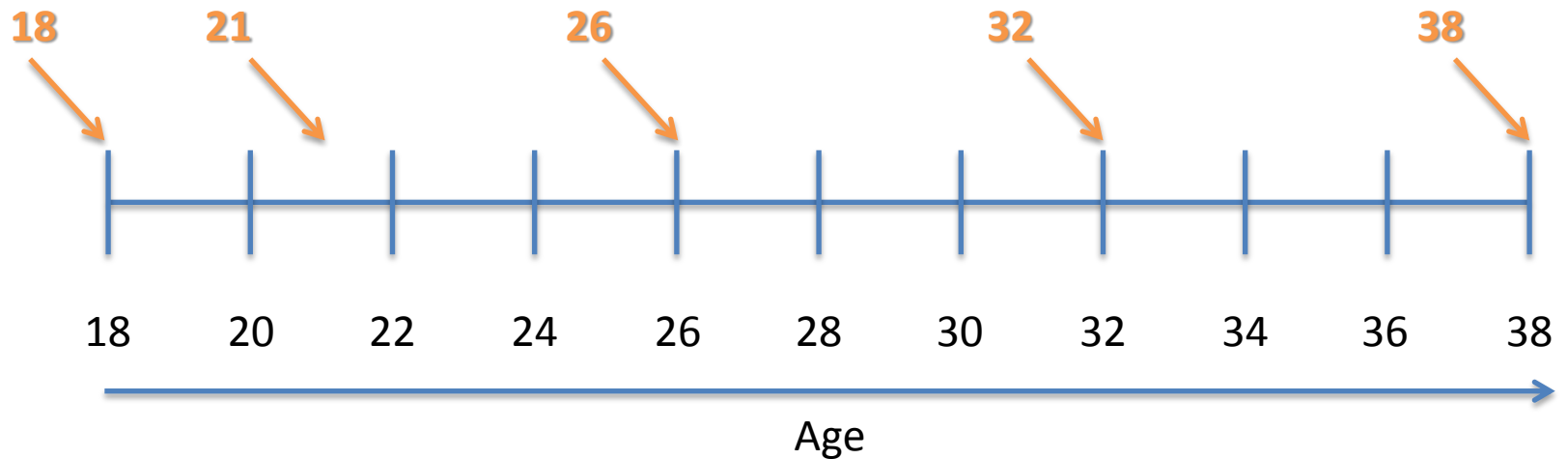
Dunedin Longitudinal Study

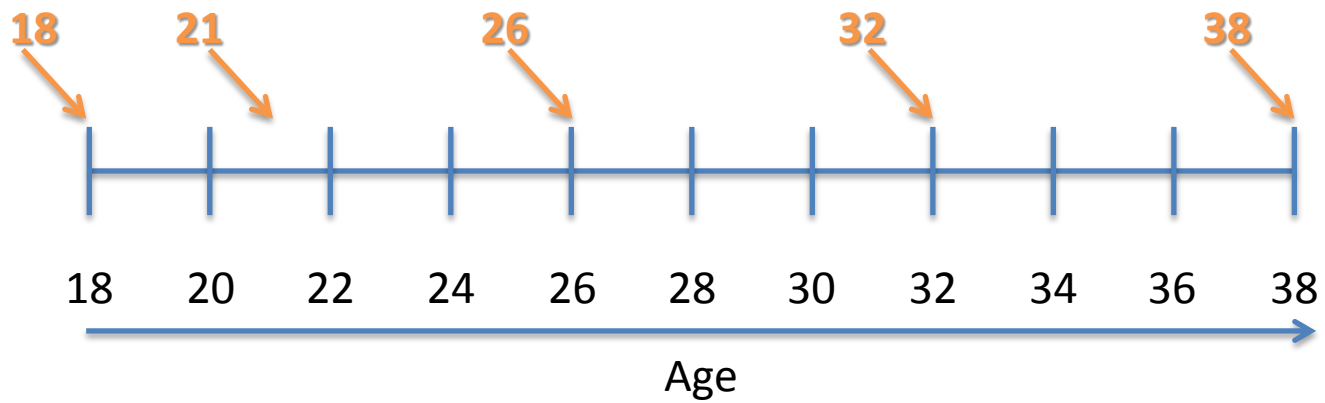
Age	Year	Number	Percent
Birth	1972-73		
3	1975-76	1,037	100%
5	1977-78	991	96%
7	1979-80	954	92%
9	1980-82	955	92%
11	1983-84	925	90%
13	1985-86	850	82%
15	1987-88	976	95%
18	1990-91	993	97%
21	1993-94	992	97%
26	1998-99	980	96%
32	2004-05	972	96%
38	2010-12	957	95%



Assessment of Cannabis Use

- Cannabis dependence was assessed 5 times between ages 18 and 38





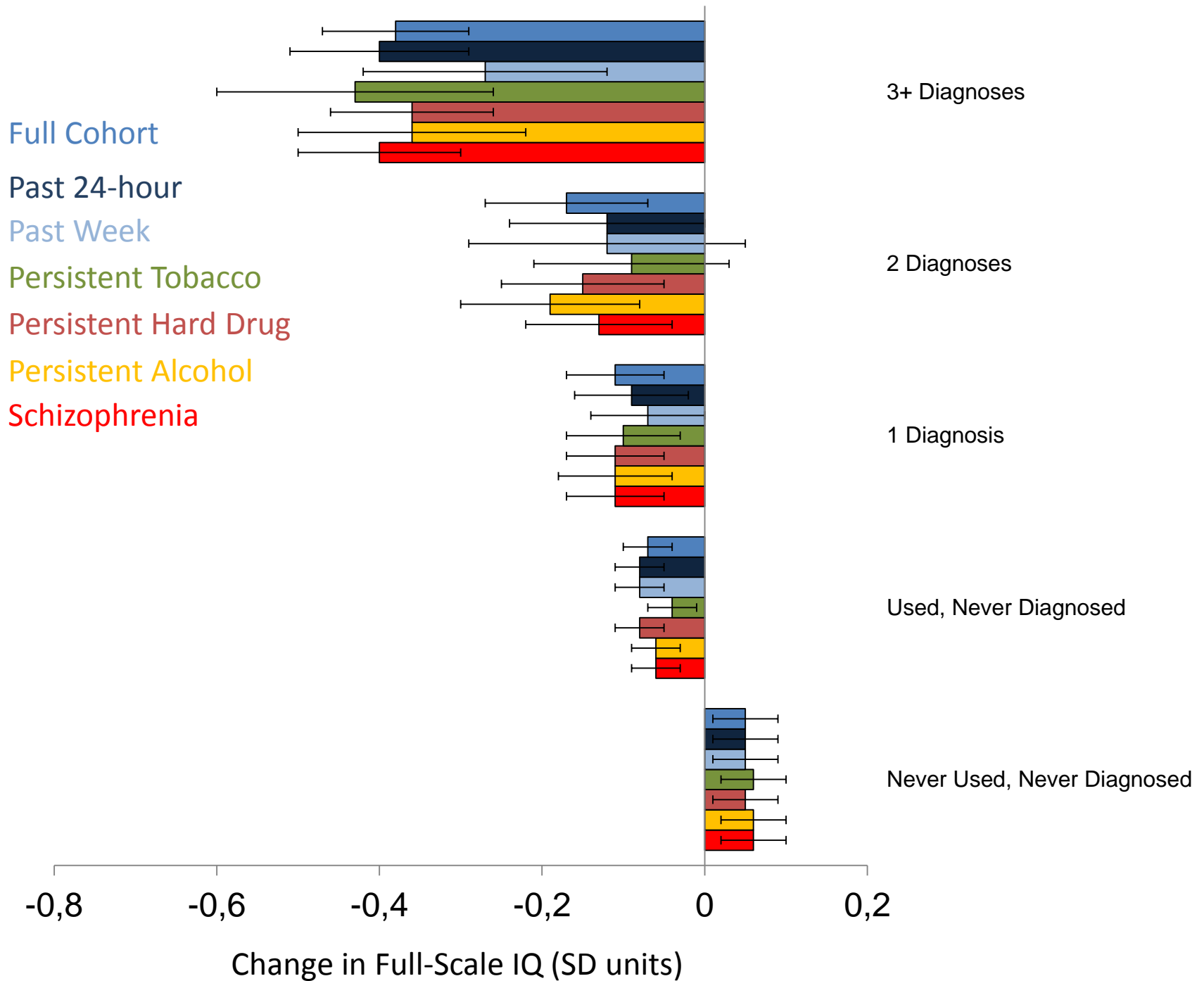
Persistence of Cannabis Dependence	N (%)	% Male
Never Used, Never Diagnosed	242 (28)	38.84
Used, Never Diagnosed	479 (55)	49.48
1 Diagnosis	80 (9)	70.00
2 Diagnoses	35 (4)	62.86
3+ Diagnoses	38 (4)	81.58

Do persistent cannabis users show IQ decline?

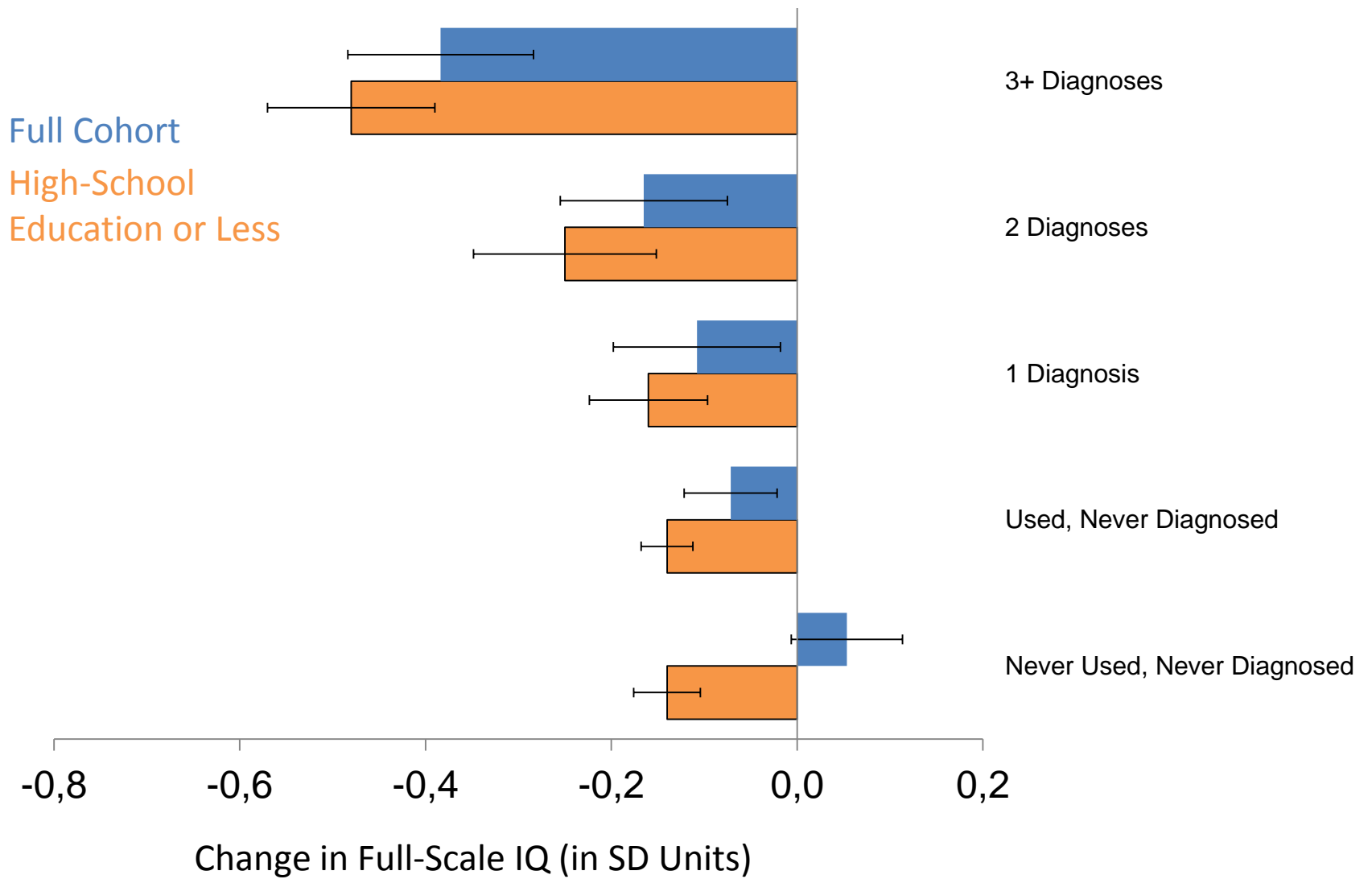
IQ Before and After Cannabis Use

Persistence of Cannabis Dependence	N	% Male	Age 7-13 Full-Scale IQ	Age 38 Full-Scale IQ	Δ in IQ
Never Used, Never Diagnosed	242	38.84	99.84	100.64	+0.80
Used, Never Diagnosed	479	49.48	102.32	101.25	-1.07
1 Diagnosis	80	70.00	96.40	94.78	-1.62
2 Diagnoses	35	62.86	102.14	99.67	-2.47
3+ Diagnoses	38	81.58	99.68	93.93	-5.75

Can this effect be explained by alcohol
or other drug use?



Can this effect be explained by reduced years of education among persistent cannabis users?



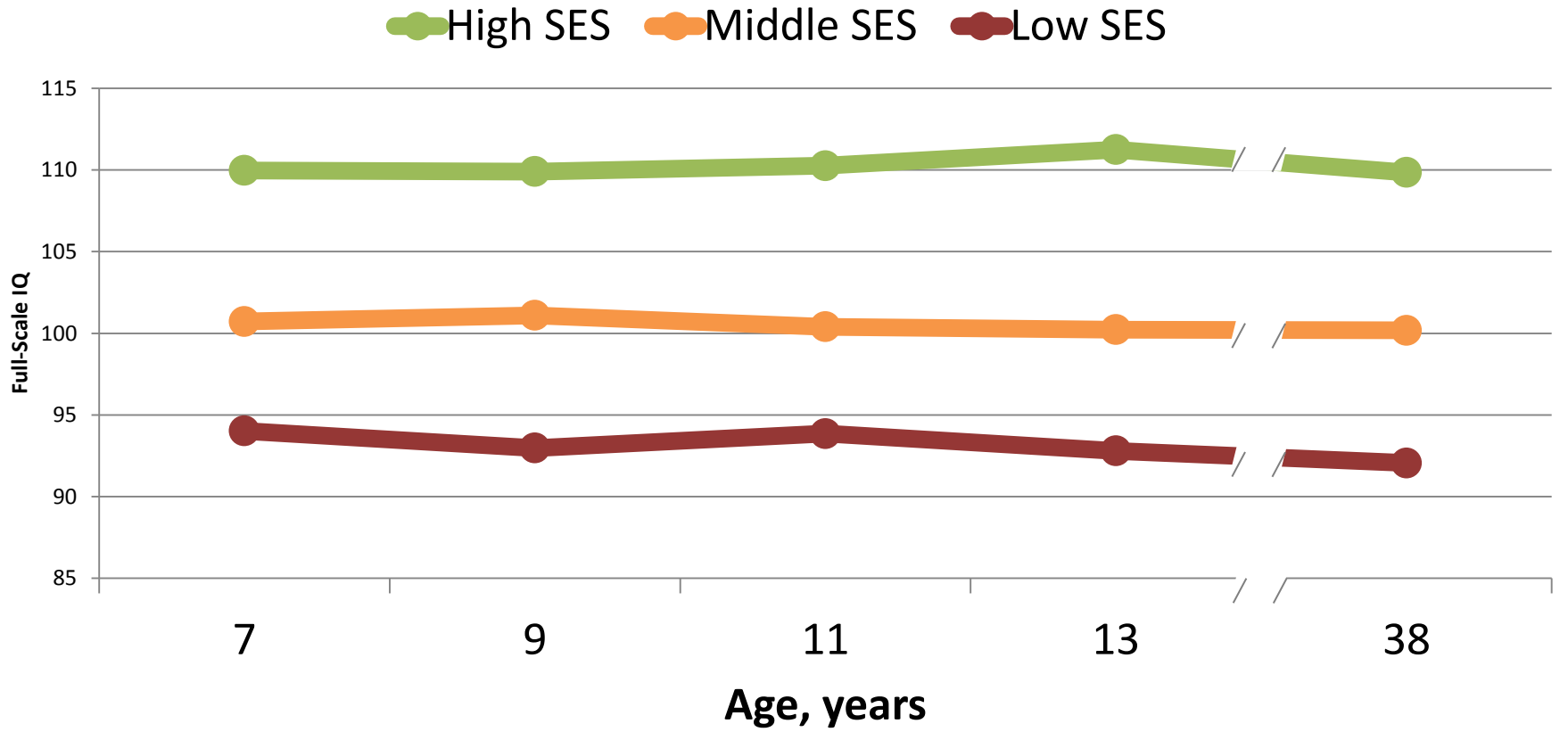
Can this effect be explained by low SES?

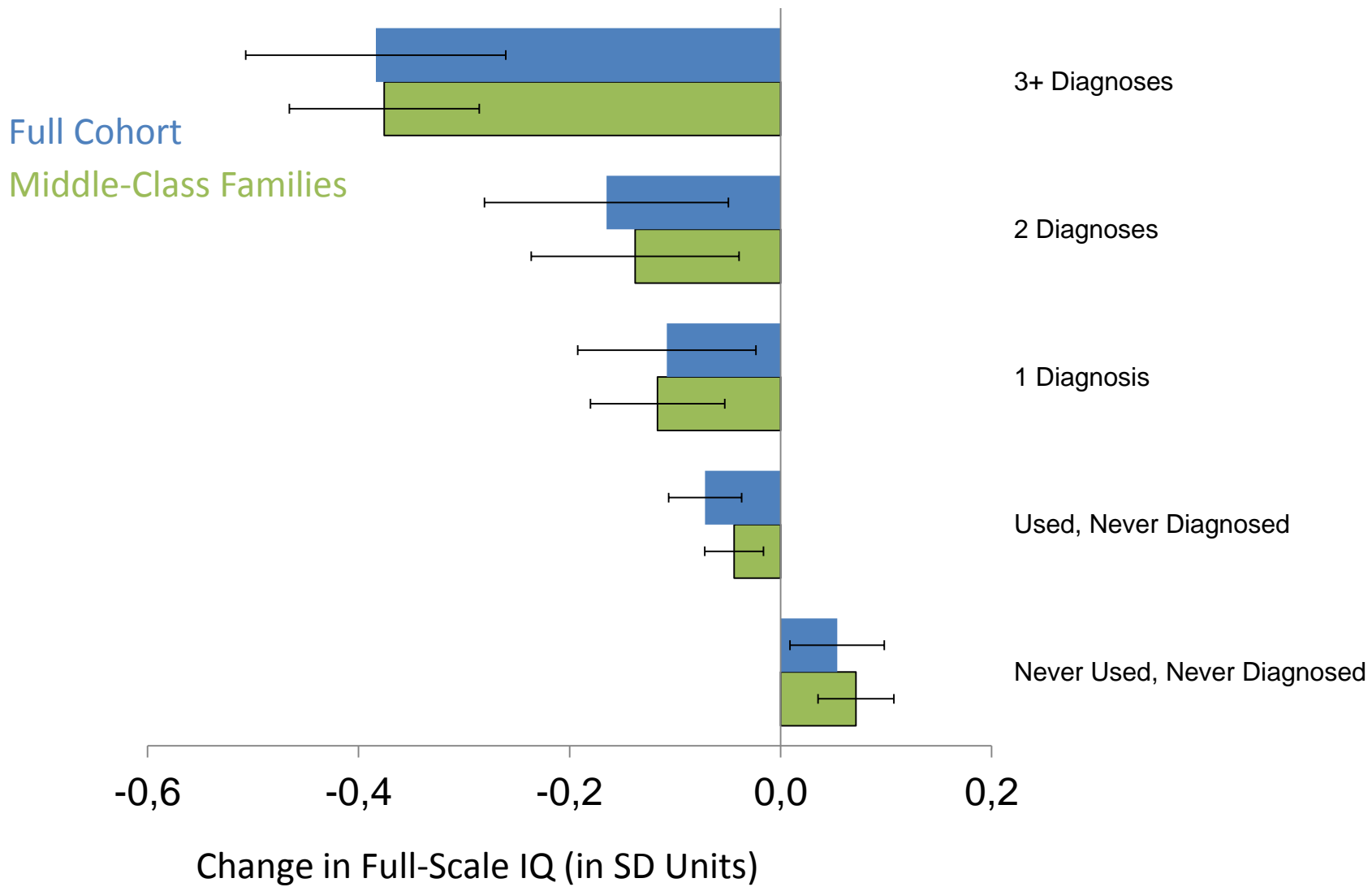
Correlations between cannabis use and IQ change in the Dunedin cohort are consistent with confounding from socioeconomic status

Ole Rogeberg¹

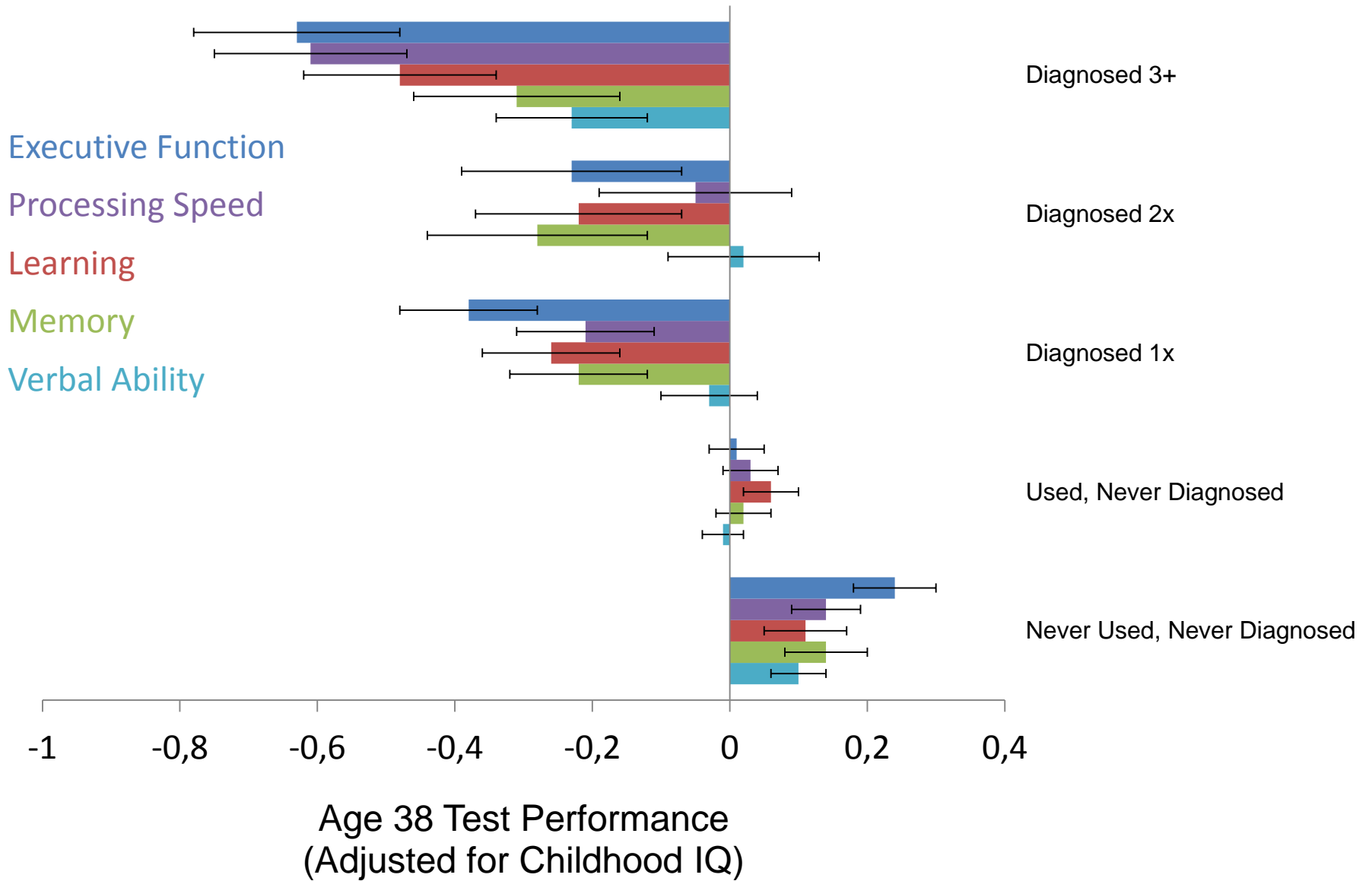
The Ragnar Frisch Centre for Economic Research, N-0349 Oslo, Norway

Edited by Leslie Lars Iversen, University of Oxford, Oxford, United Kingdom, and approved December 7, 2012 (received for review September 8, 2012)





What about other mental functions?



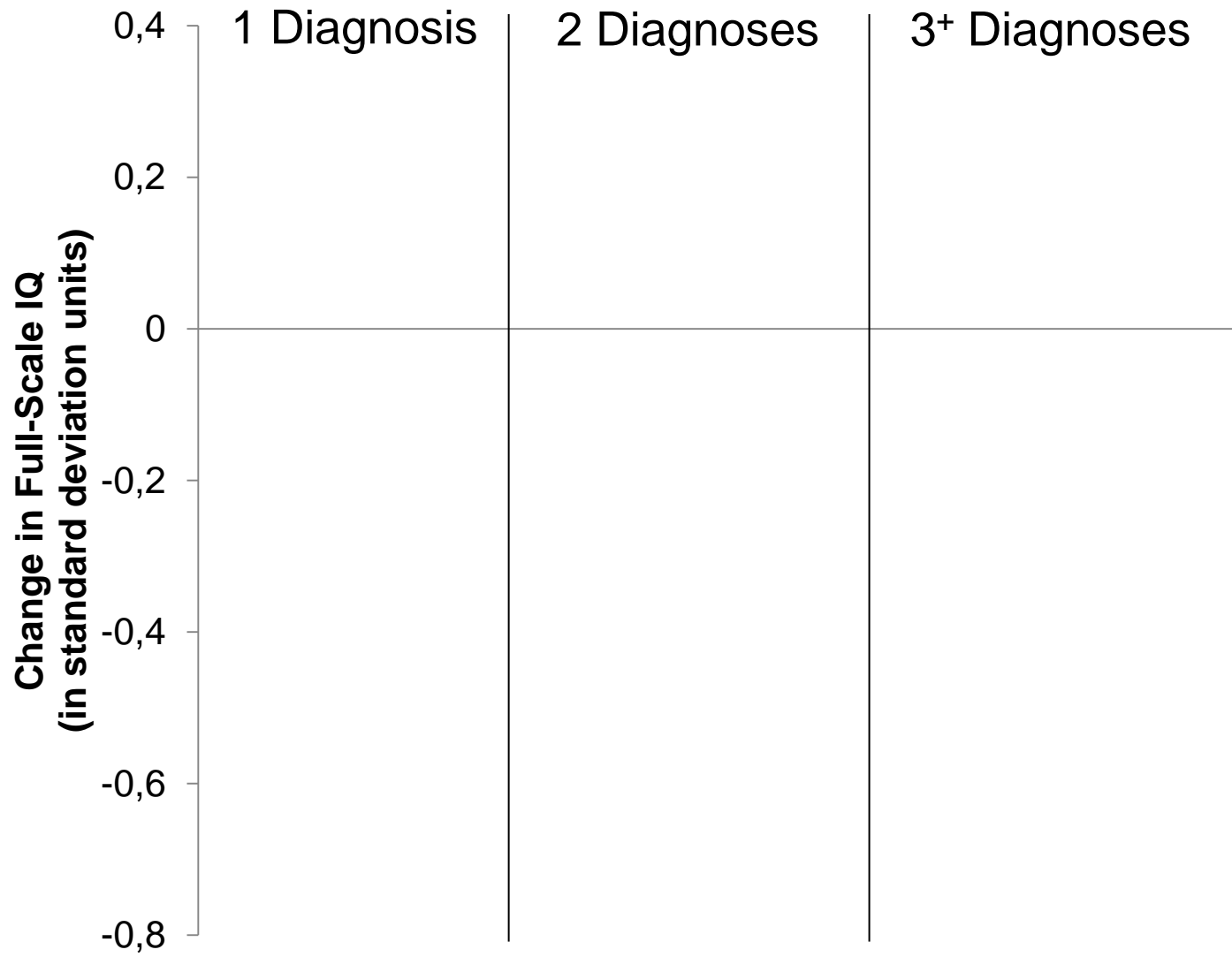
Do friends and relatives notice cognitive problems?

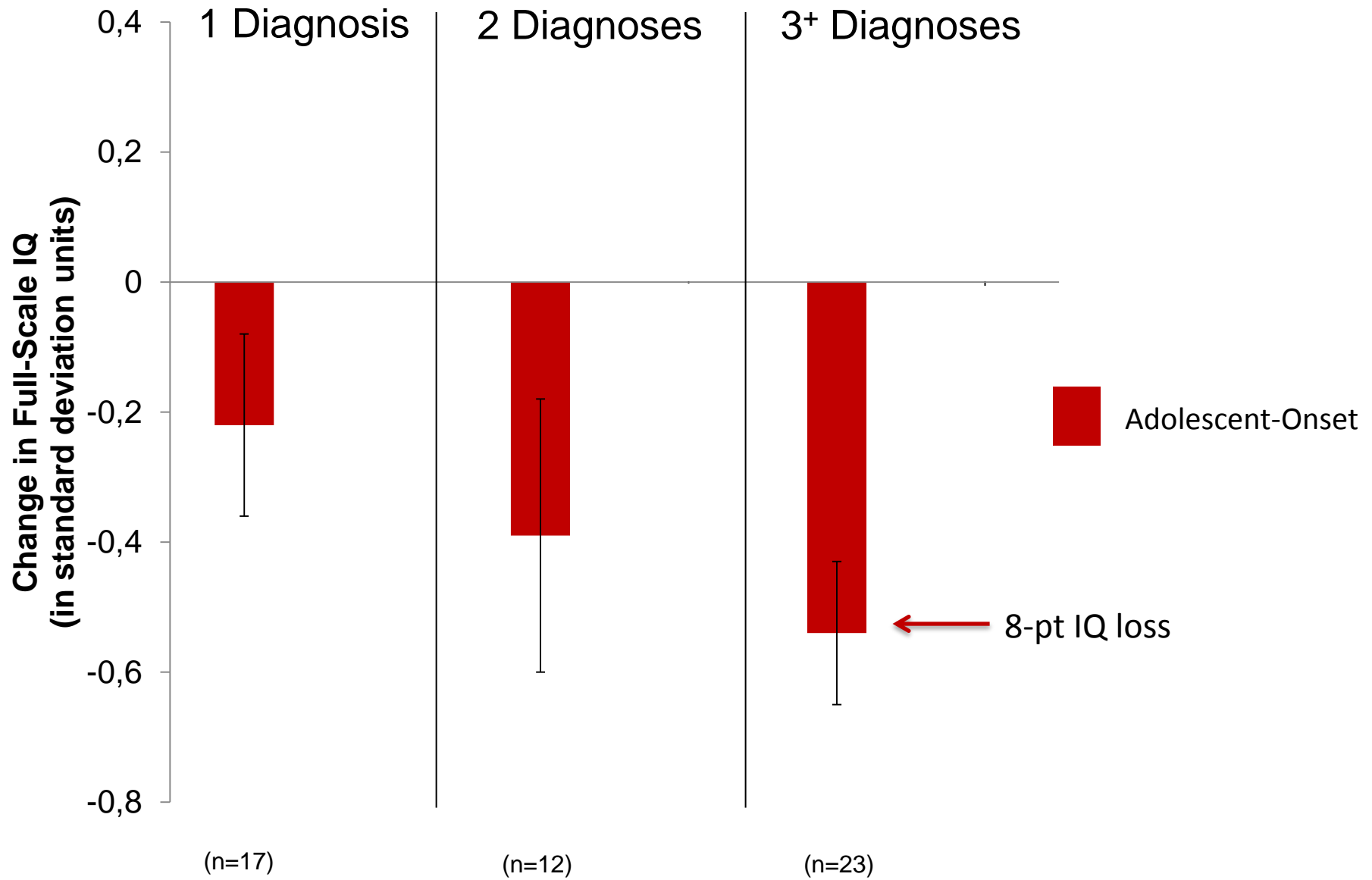
Informant-Reported Cognitive Problems In Everyday Life						
Informant Reports	Never Used, Never	Used, Never	1	2	3+ agnoses	Linear Trend T-test
	"Is easily distracted, gets sidetracked easily"					
Attention Problems	-0.21	-0.07	0.31	0.64	0.96	7.74*
	"Forgets to do errands, return calls, pay bills"					
Memory Problems	-0.27	-0.03	0.38	0.78	0.75	7.65*

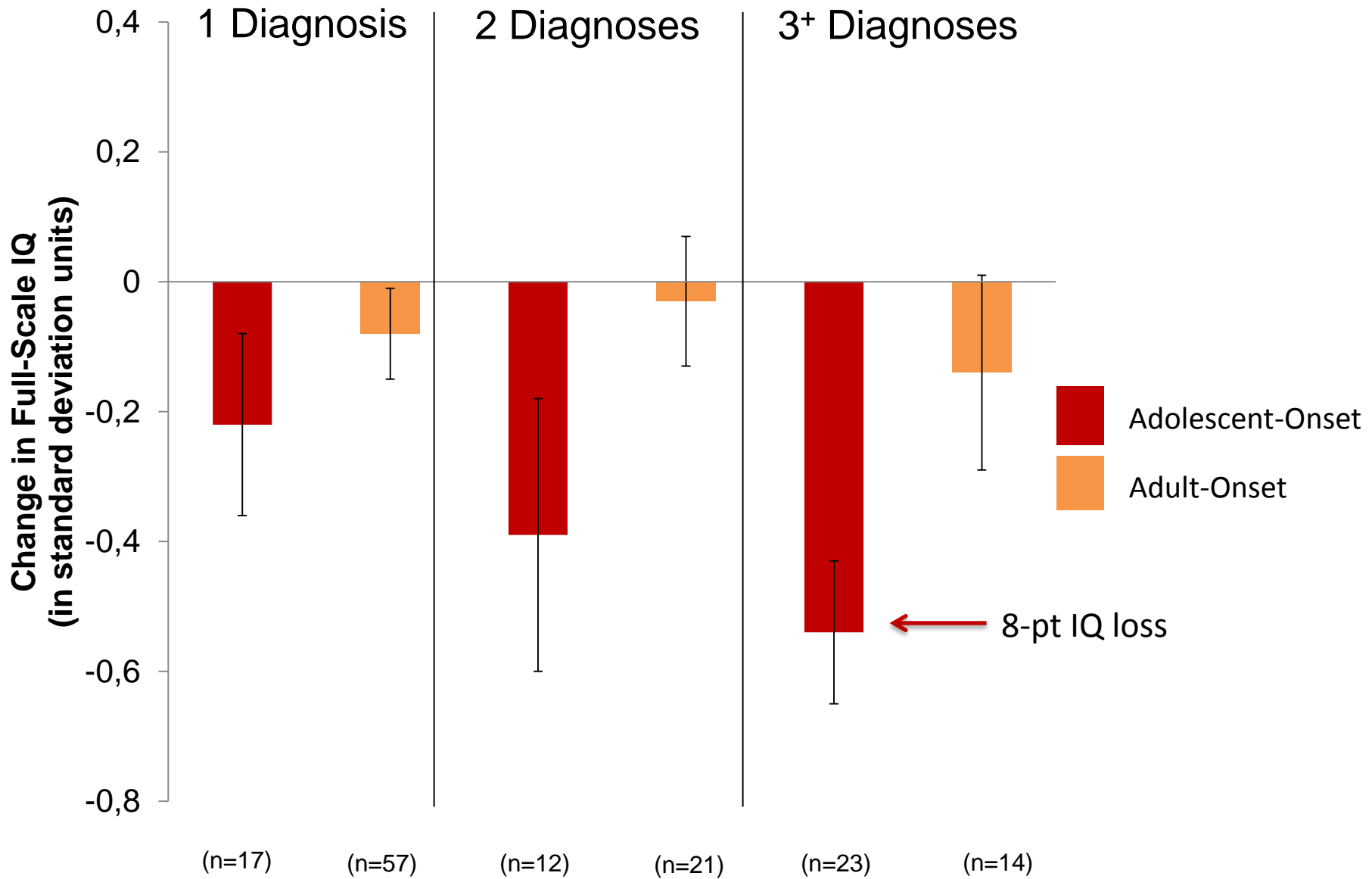
Are adolescents particularly vulnerable?



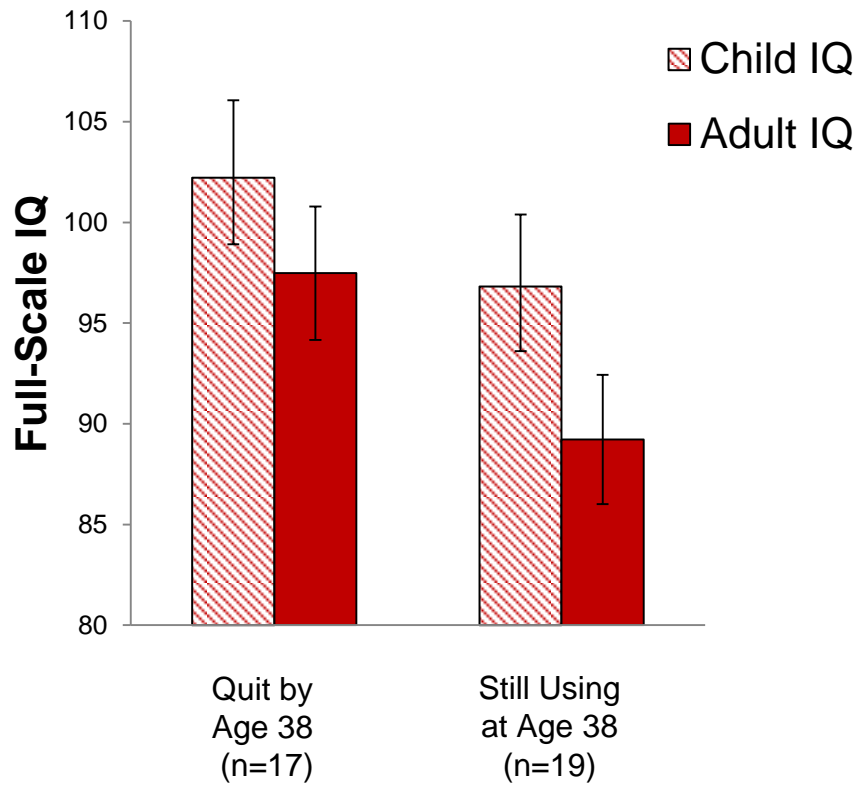
Adapted from Schneider, M. (2008). *Addiction Biology*, 13, 253-263







Does quitting restore functioning?



Adolescent-Onset

Summary

- Do persistent cannabis users show IQ decline?
 - Yes, but this effect is limited to adolescent-onset cannabis users
- Can this effect be explained by alcohol and other drug use, reduced years of education, or low SES among persistent cannabis users?
 - No
- Does IQ decline translate to cognitive problems in everyday life?
 - Yes

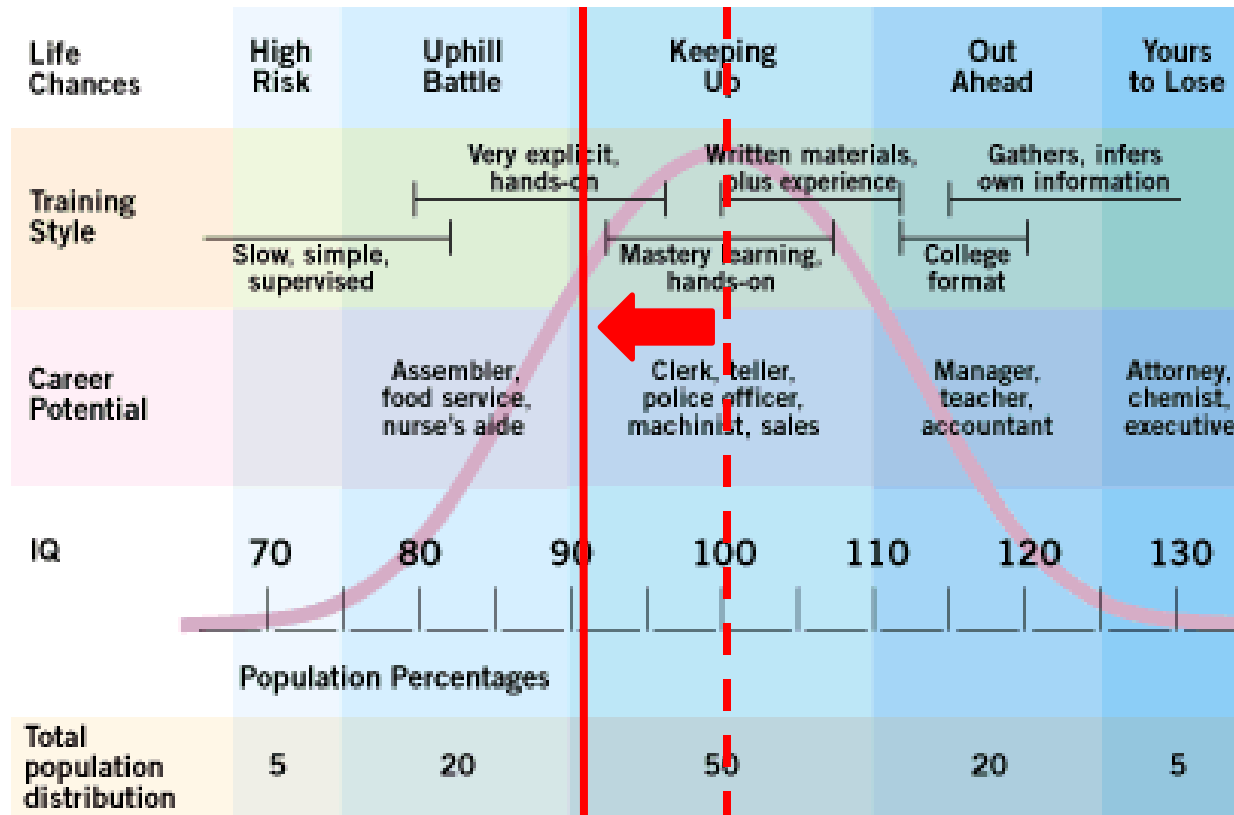
Brain Implications

- Adolescent brains are especially vulnerable to cannabis
 - Cannabis use disrupts critical brain development that occurs during adolescence (e.g., synaptic pruning, myelination)

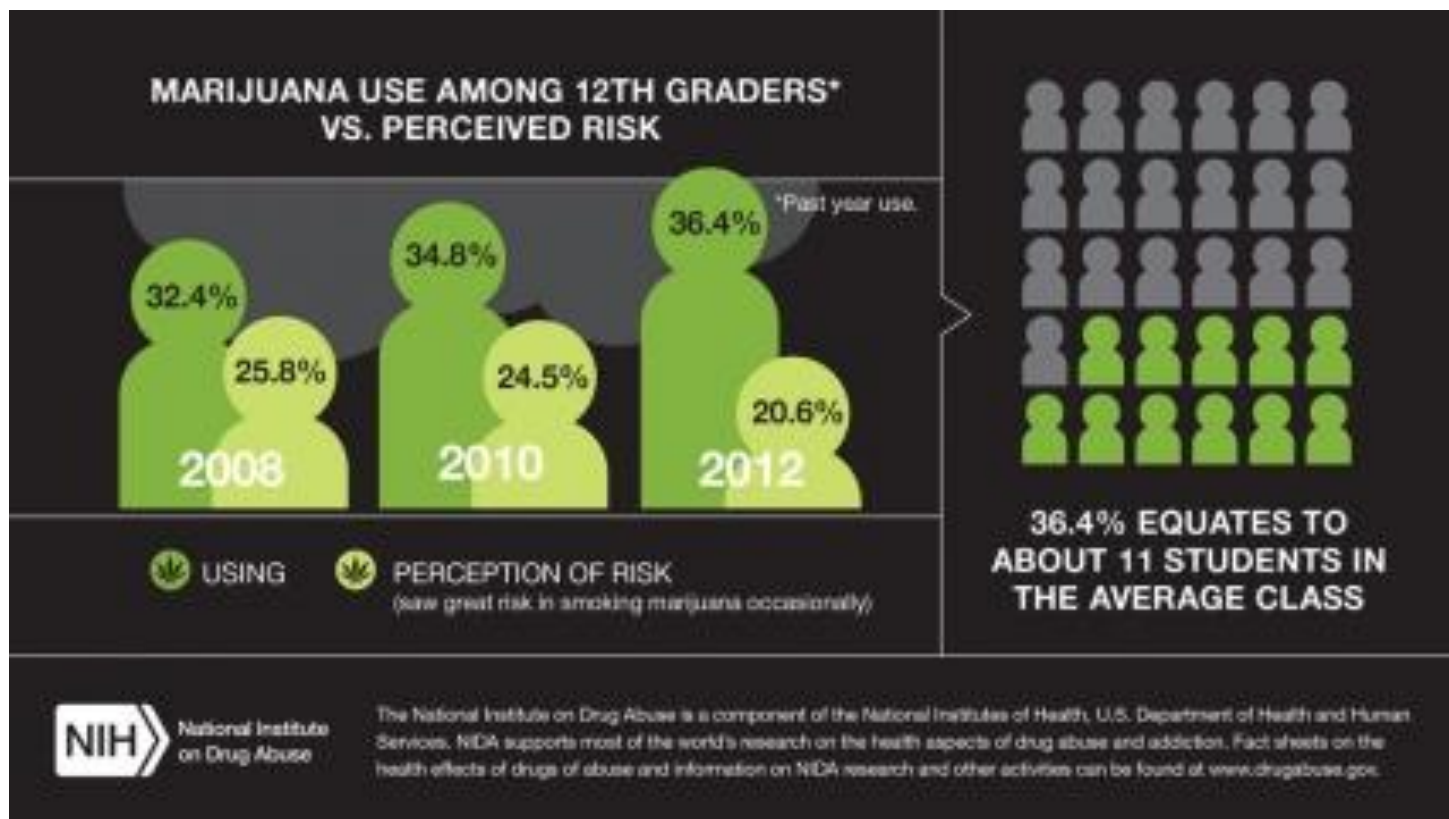


Should we be concerned about an 8-pt
IQ loss among teens?

An 8-pt IQ Loss Drops A Person with Average IQ from the 50th to the 29th percentile



Perceived Risk ↓, Teen Use ↑



Policy Implications

- Get the message out: adolescent cannabis use is associated with poorer neuropsychological function
- Delay the onset of cannabis use
- Encourage cessation of cannabis use particularly for those who began using cannabis in adolescence

Acknowledgements

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