NCANDA Workshop
Sunday, June 26, 2016

Executive functioning and risks for alcohol use disorder:
Baseline results from NCANDA

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Behavior Rating Inventory of Executive Function

- 80 self-report items: often, sometimes, never
- Age adjusted t-scores: higher is worse
- Validity: inconsistency, extreme responses
  - 4 subjects with invalid scores were excluded

Global Executive Composite [GEC]

Behavioral Regulation	*Metacognition*
Inhibitory Control	Working Memory
Shift: Behavior/Cognition	Tasks: Plan
Emotional Control	Tasks: Organize
Monitoring	Tasks: Complete

Behavior Rating Inventory of Executive Function

Face validity: Example items

Behavioral Regulation

Inhibitory Control: "I have trouble waiting my turn."

Shift: Behavior/Cognition: "I get upset by a change in plans."

Emotional Control: "I have angry outbursts."

Monitoring: "I don't know when my actions bother others."

Metacognition [Task Plan & Complete]
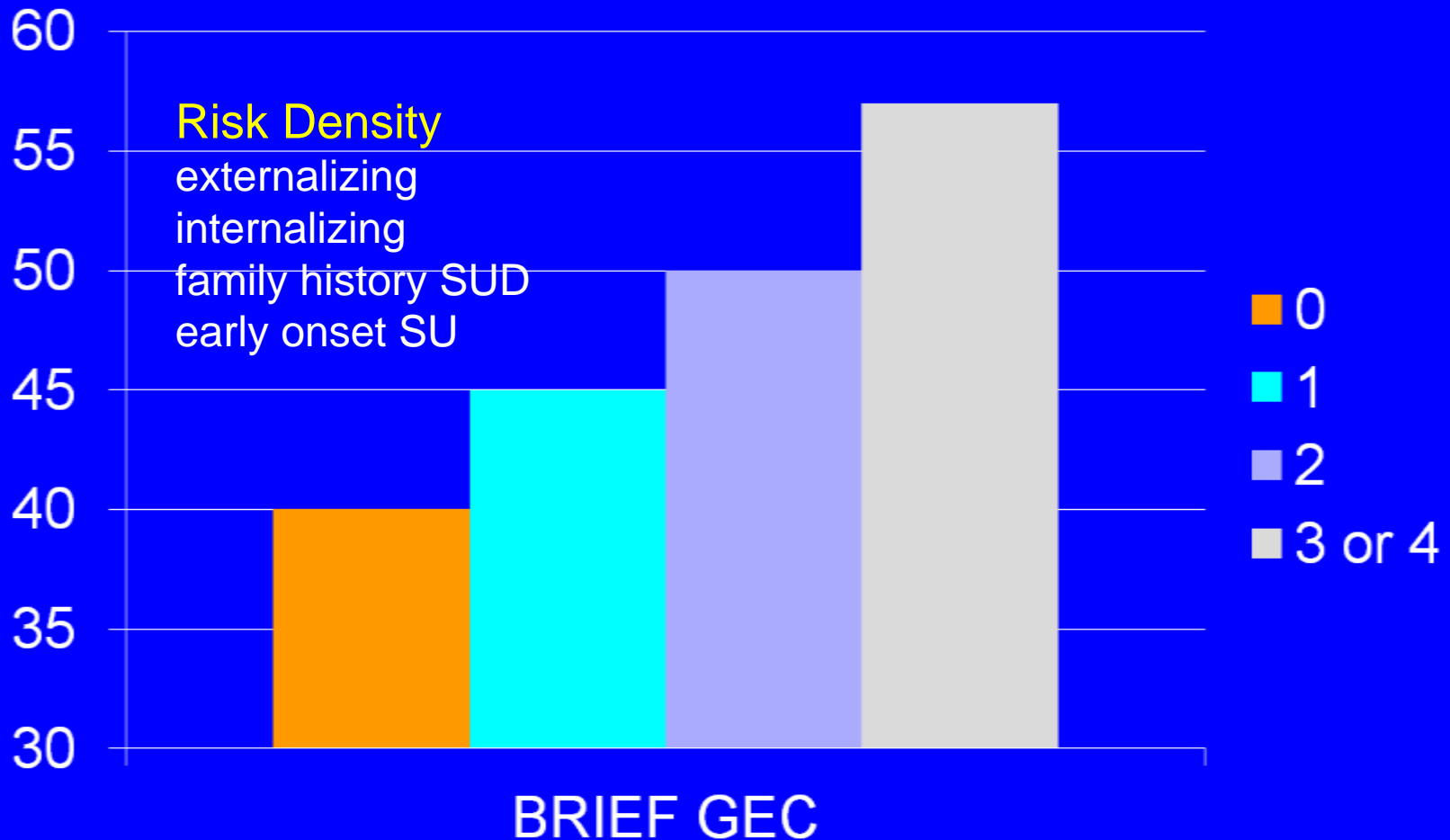
Working Memory: "I forget instructions easily."

Tasks: Plan   "I start projects without the right materials."

Tasks: Organize   "My desk/workspace is a mess."

Tasks: Complete   "I have problems completing my work."

BRIEF GEC correlations

Concurrent Validity	r
UPPS Premeditation (lack of)	.36***
UPPS Perseverance (lack of)	.30***
UPPS Urgency (positive)	.43***
UPPS Sensation Seeking	.10**
ASEBA Externalizing	.70***
ASEBA Internalizing	.58***

Stability	
GEC BL x GEC 1 yr FU	.71***

p: *<.05; **<.01; **<.001

Higher Risk Density & Worse Executive Functioning

Risk Density
externalizing
internalizing
family history SUD
early onset SU

Legend: 0, 1, 2, 3 or 4

X-axis: BRIEF GEC

Y-axis: 30, 35, 40, 45, 50, 55, 60

F=52.3, df 3,727, p<.001; covariates: age, sex, SES; s.d.= 10

Poorer Sleep Quality & Worse Executive Functioning

BRIEF GEC x PSQI total: r=.44***

Legend:
- good
- fairly good
- fairly bad
- very bad

X-axis: BRIEF GEC
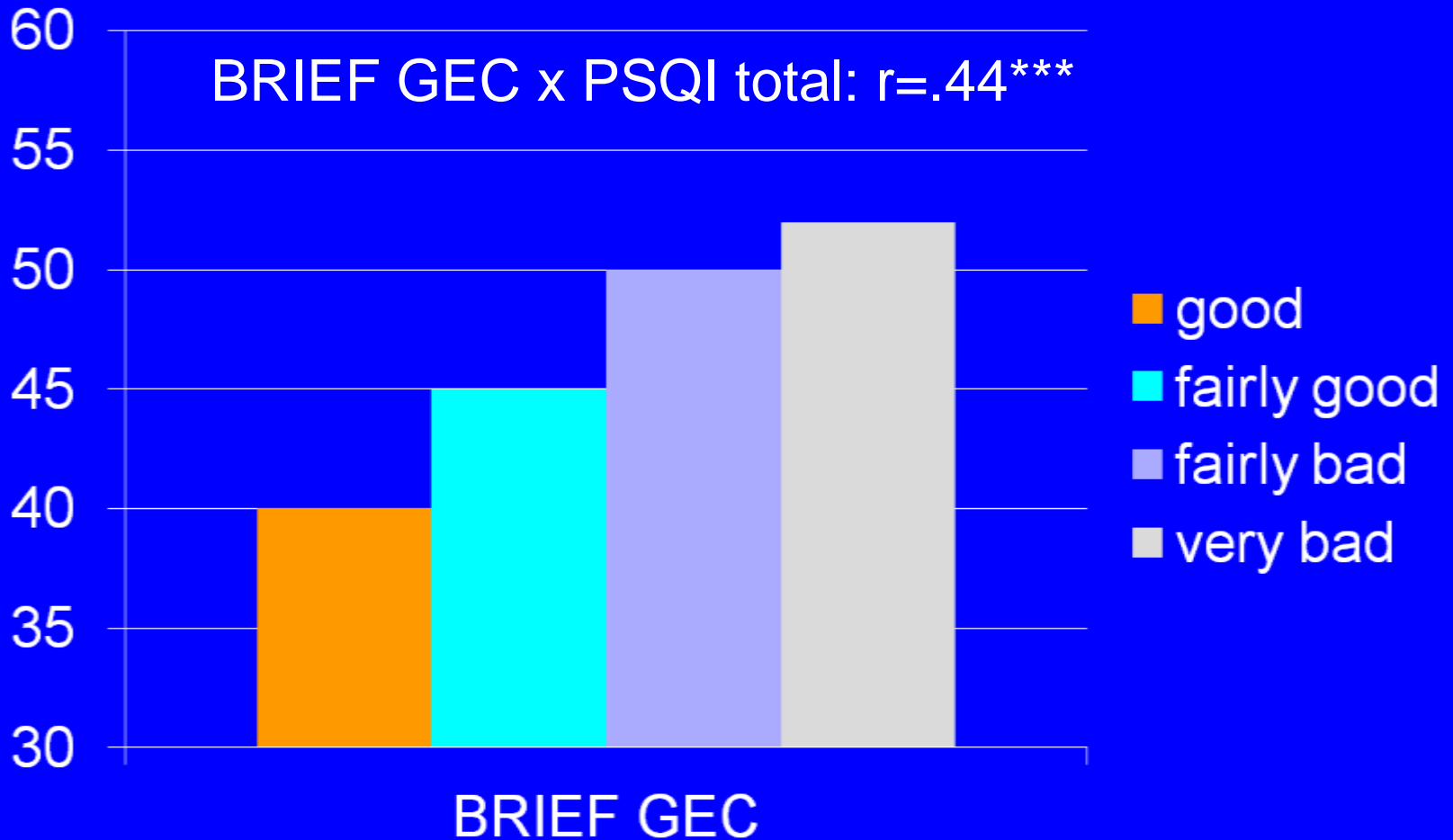
F=28.3, df 3,724, p<.001: covariates: sex, age, SES

Life Events Questionnaire

- 67 self-report items: yes or no
- Items classified by
  - Uncontrollable or controllable
  - Discrete or chronic
  - Positive or negative
- Composite Scales, e.g.
  - Negative Uncontrollable
  - Negative Controllable
  - Negative Composite

Life Events Questionnaire

Example items …during the past year…

Discrete Negative Uncontrollable: "My parents divorced…"

Discrete Negative Controllable: "…I ran away from home"

Chronic Negative Uncontrollable: "my parent had problems at work"

Chronic Negative Controllable: "…arguments with my parents…"

Discrete Ambiguous Uncontrollable: "Our family moved…

Discrete Positive Controllable: "I received a special award…"

BRIEF GEC x LEQ correlations

	r
Discrete Negative Uncontrollable	.19***
Chronic Negative Uncontrollable	.22***
Discrete Negative Controllable	.25***
Chronic Negative Controllable	.41***
Negative Composite	.39***
Discrete Positive Controllable	-.13***

p: *<.05; **<.01; **<.001; covariates: age, sex, SES

NCANDA Cognitive Tests

- 15 WebCNP tests
- 7 dimensions: accuracy, speed [z scores]

Attention: Continuous Performance Test

Working Memory: N-Back Test

Summary scores
accuracy; speed; accuracy - speed

BRIEF x cognitive testing correlations

BRIEF GEC	accuracy	speed
Abstraction	-.01	.02
Attention	-.08*	-.02
Emotion	.01	.06
Episodic memory	.01	.05
General ability	-.04	.04
Working memory	.02	-.01

BRIEF	cognitive	r
Inhibitory Control	Delay Discounting	.11**
	Episodic memory: speed	.13***
Task Completion	General ability: accuracy	-.10**

p: *<.05; **<.01; **<.001; Covariates: age, sex, SES

BRIEF x MR structural: gray indices

BRIEF GEC

	volume	thickness	surface area
Frontal	-.04	-.05	-.01
Temporal	-.01	-.03	.02
Parietal	-.02	-.03	.01
Occipital	-.05	-.03	-.02
Cingulate	-.05	-.04	-.02
Insula	-.04	-.07*	-.02
TOTAL	-.04	-.06	.00

p: *<.05; **<.01; **<.001; Covariates: age, SES

BRIEF x DTI indices: association fibers

| Fasciculi	BRIEF GEC			
	FA	MD	L1	LT
Superior longitudinal	-.07	.05	.01	.02
Superior frontal-occipital	-.08*	-.01	-.07	.01
Sagittal stratum	.02	-.01	.02	-.04
Uncinate	-.08*	.06	.00	.06
Limbic tracts				
Fornix	.01	.03	.04	.01
Striatia terminalis	.00	.04	.09*	-.02
Anterior mid cingulum	-.02	.10*	.11**	.01
Inferior cingulum	.00	-.01	.01	-.03

p: *<.05; **<.01; **<.001; Covariates: age, sex, SES

BRIEF GEC x past year binge [baseline]
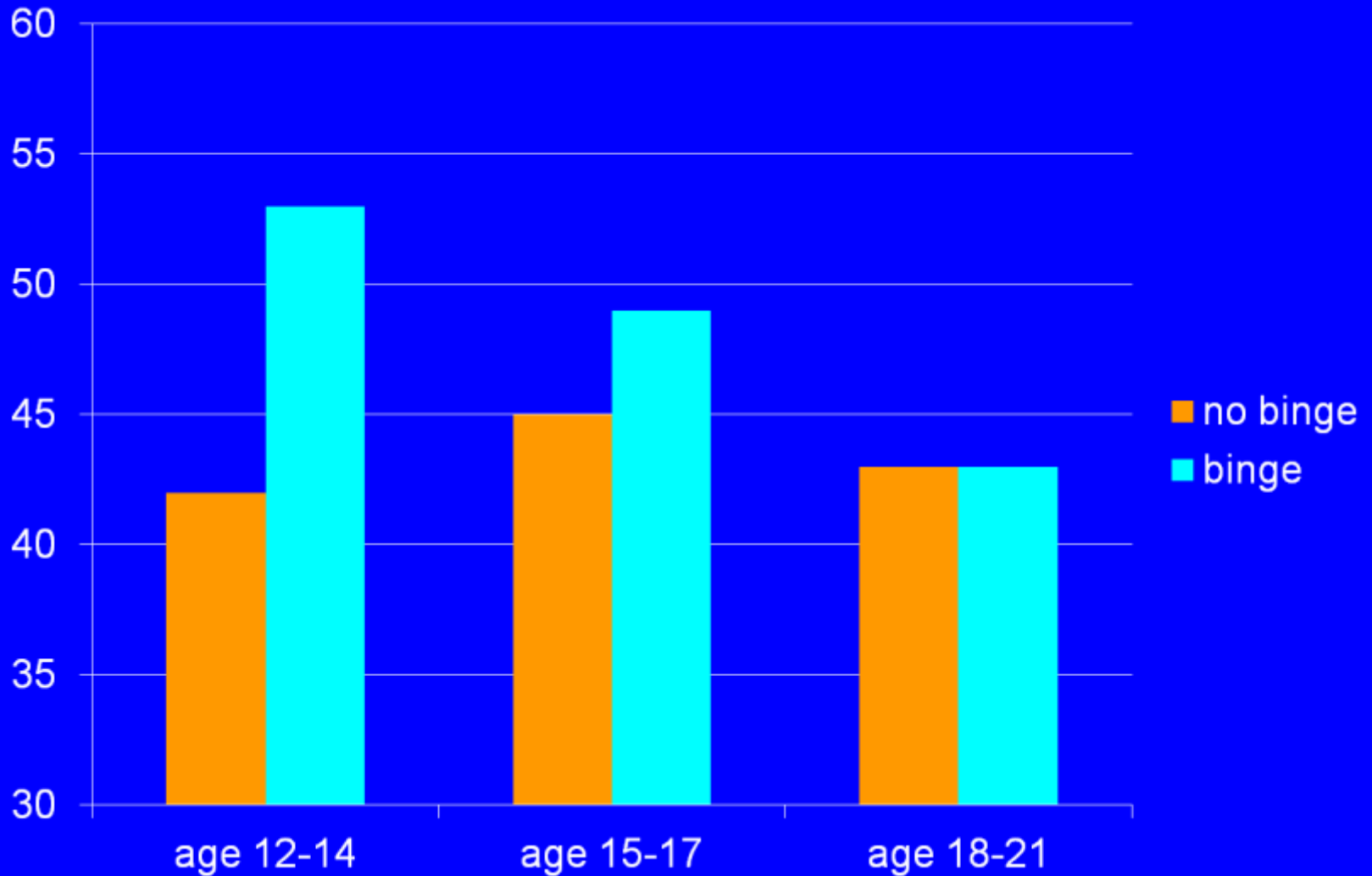
binge x age: F=3.1, df 2,810, p<.05

At ages 12 -14, worse BRIEF predicts initiation of alcohol use and binges at 1 year FU
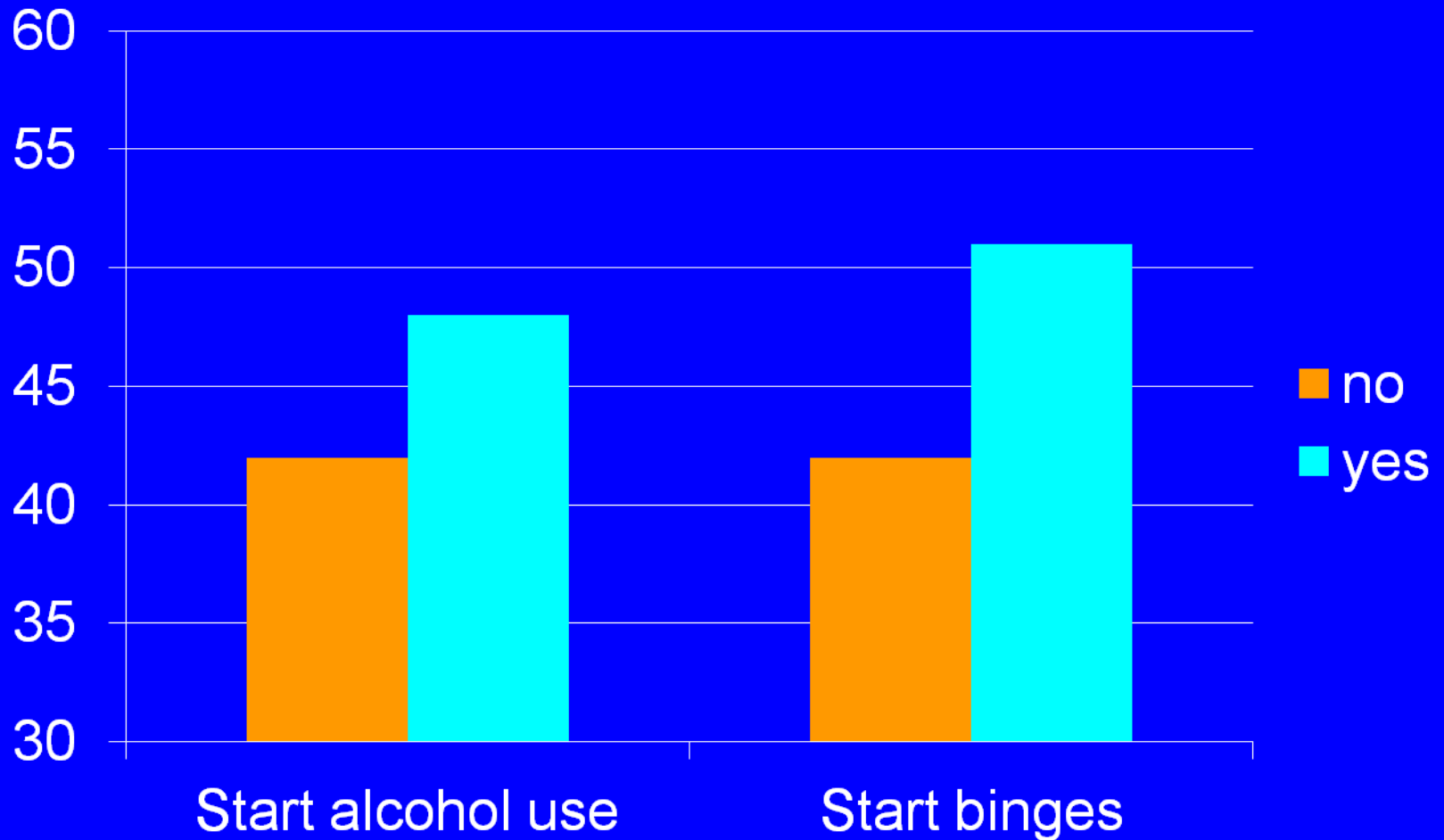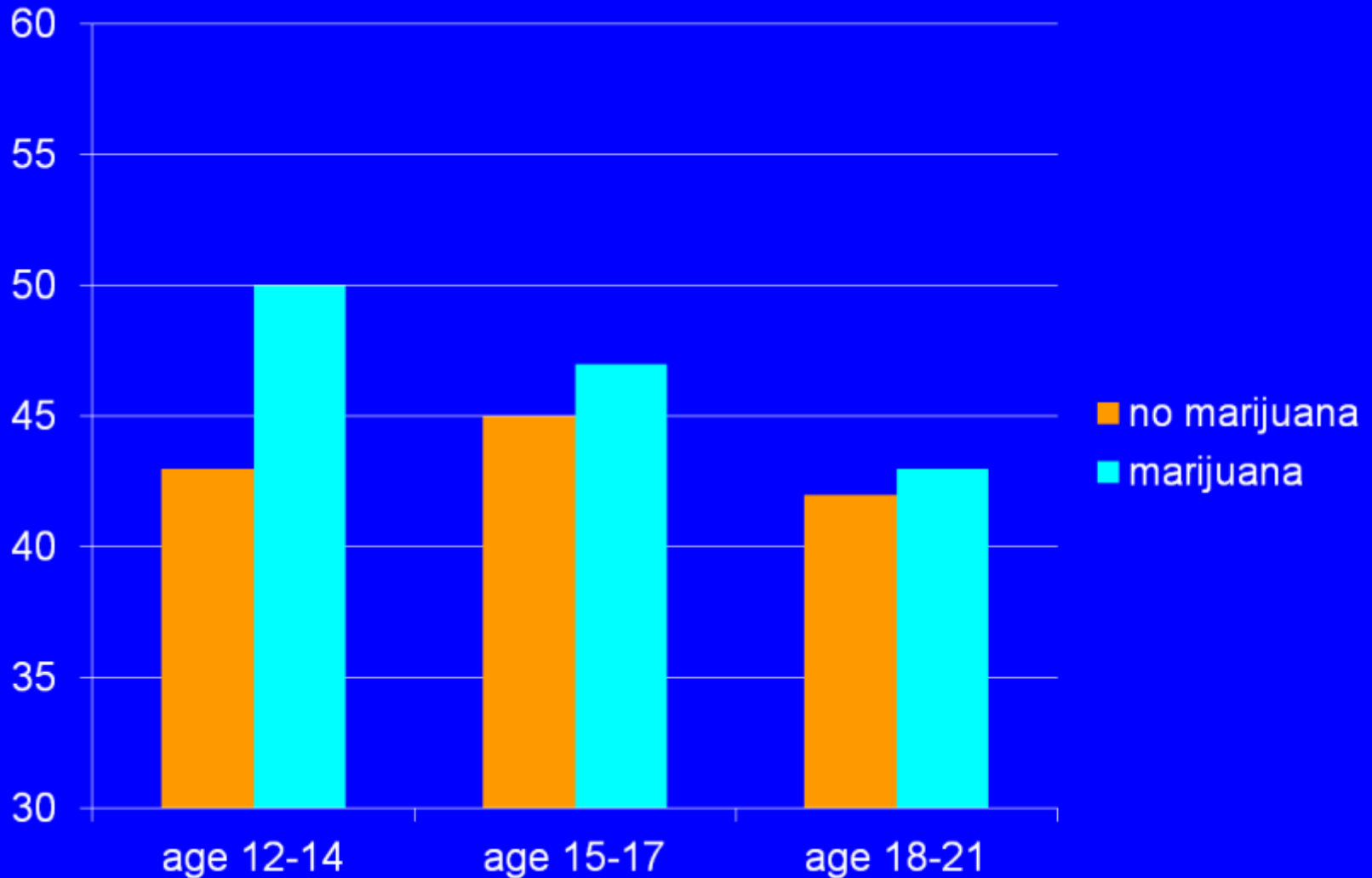

F=6.3; F=5.1, p≤.02: covariate: sex, age

BRIEF @ BL predicts # binge days 1 yr FU

	F	d.f.	p
Age 12-14.9	12.8	1,280	<.001
Age 15-17.9	1.5	1,280	ns
Age 18-21.9	2.9	1,164	ns

covariates: age, sex, # binge days @ BL

BRIEF GEC x lifetime marijuana use [baseline]

marijuana; sex & SES: F=8.6, df 2,717, p<.05; age: F=1.7

BRIEF @ BL x # marijuana days past year

	F	d.f.	p
Age 12-14.9	1.0	1,295	ns
Age 15-17.9	5.0	1,306	<.05
Age 18-21.9	8.8	1,199	<.01

covariates: age, sex

NCANDA BRIEF: Summary

- **BRIEF validity measures EF construct**
- **EF problems in natural environment distinct from EF skills assessed by cognitive testing**
- **Correlated with other risk variables**
  - **Risk Density, Sleep Quality, Adverse Life Events**
- **BRIEF not sig. correlated with cortical gray volume, thickness, surface area; DTI indices**
- **Predicted initiation of alcohol use and binges in young adolescent period; marijuana use**
- **BRIEF compliments other measured constructs important for understanding adolescent substance use risks and outcomes**