Crash Rates Among Young Drivers Diagnosed with Psychopathology

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Background - Young Drivers

- Young drivers are a high-risk driving group
  - Crashes accounted for ~1/4 of young adult deaths in 2016[1]
  - Young drivers are over-represented in crash statistics ~9% in 2016[2]
- More vulnerable due to: inexperience, riskier behaviors [3,4]

[1] National Vital Statistics Reports 2018; [2] CDC 2018; [3] McCartt et al., 2013; [4] Curry, 2011

Background - Psychopathology & Driving

- Internalizing vs externalizing
- ADHD and driving
  - ADHD is associated with crash, traffic violations, etc.[1]
  - Inconsistent reporting [2]

[1] Aduen et al., 2015; [2] Jerome et al., 2006; [3] DSM-5 2013

Background - Psychopathology & Driving

- Symptoms of depression and anxiety may include [3]:
  - Psychomotor agitation
  - Fatigue, drowsiness
  - Difficulty concentrating
- Depression/Anxiety and driving
  - Simulator: poorer performance [1,2]
  - Older driving sample [2]
  - Survey: self-reported injury only [3]

[1] Brunnauer et al., 2008; [2] Bulmash et al., 2006; [3] Aduen et al., 2015

Research Gaps

- Little is known about internalizing disorders & young drivers
- Many studies have relied on convenience samples

Research Questions

What is the association between diagnosed psychopathology and safety critical events among young drivers?

Compared to those with no psychopathology, do young drivers with psychopathology have higher crash rates?

Do these associations vary by type of psychopathology?

Strategic Highway Research Program Naturalistic Driving Study (SHRP 2)

- Nationally-representative sample of 3600 licensed drivers
  - Drivers were sampled across 6 U.S. States
- DAS recorded vehicle kinematics, GPS, and video for 1-2 years per driver captured mileage and event data continuously
  - **Elevated g-force events (>0.65g) flagged safety critical events**

Psychopathology Groups

No Dx (n = 453)	• No diagnosed psychopathology indicated
ADHD (n = 37)	• ADD/ADHD/Tourette's • Low prevalence of Tourette's
Depression/Anxiety (n = 56)	• Depression (n = 18) • Anxiety or panic attacks (n = 20) • Both (n = 18)
ADHD & Depression/Anxiety (n = 18)	• ADD/ADHD/Tourette's & Depression (n = 5) • ADD/ADHD/Tourette's & Anxiety or panic attacks (n = 3) • All dx (n = 10)

Sample

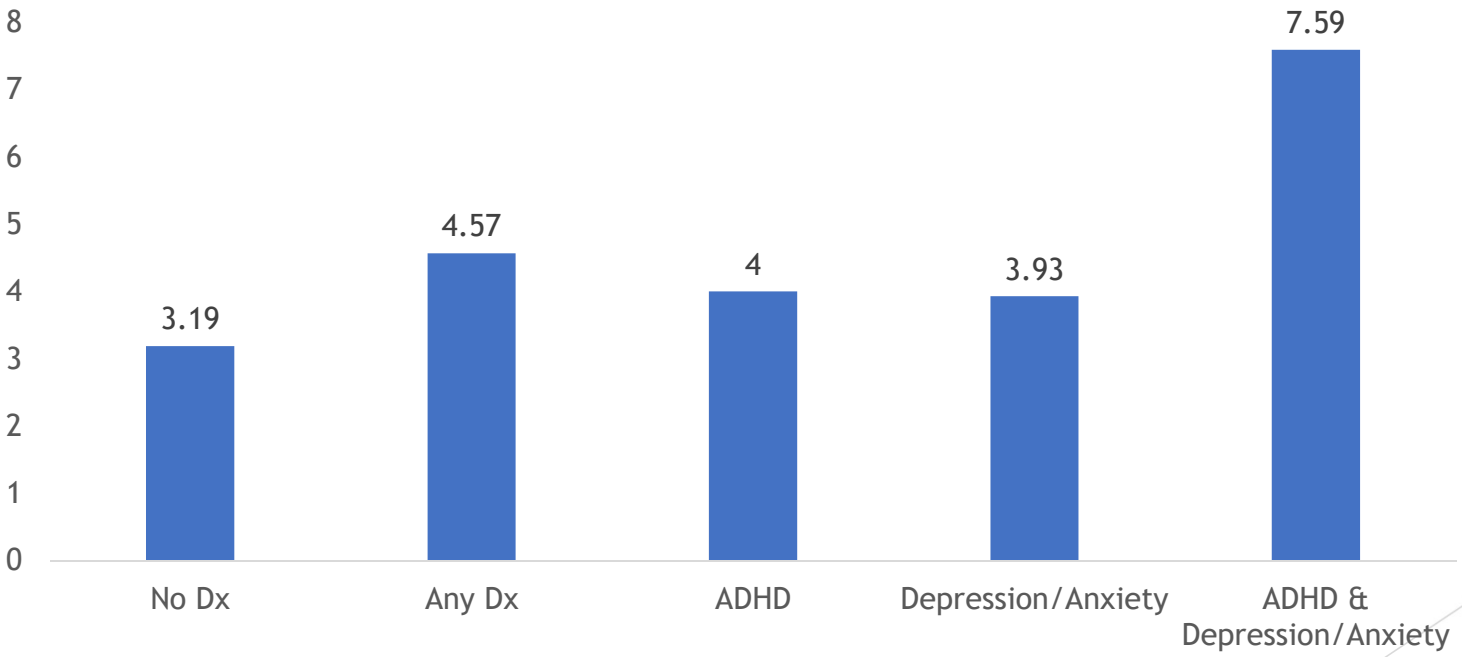
Psychopathology category	N (%)	Total Mileage	Total CNC	Total Crash
No Diagnosis	453 (80.32)	1556181	621	132
ADHD	37 (6.56)	436901	155	16
Depression/Anxiety	56 (9.93)	494902	201	27
ADHD & Depression/Anxiety	18 (3.19)	156969	90	17
Total	564	5273847	1674	272

- Our sample included 564 participants (86.23% retention)
  - Included any participants in groups
  - N excluded = 15 (bipolar, psychotic, personality disorders & “other”)

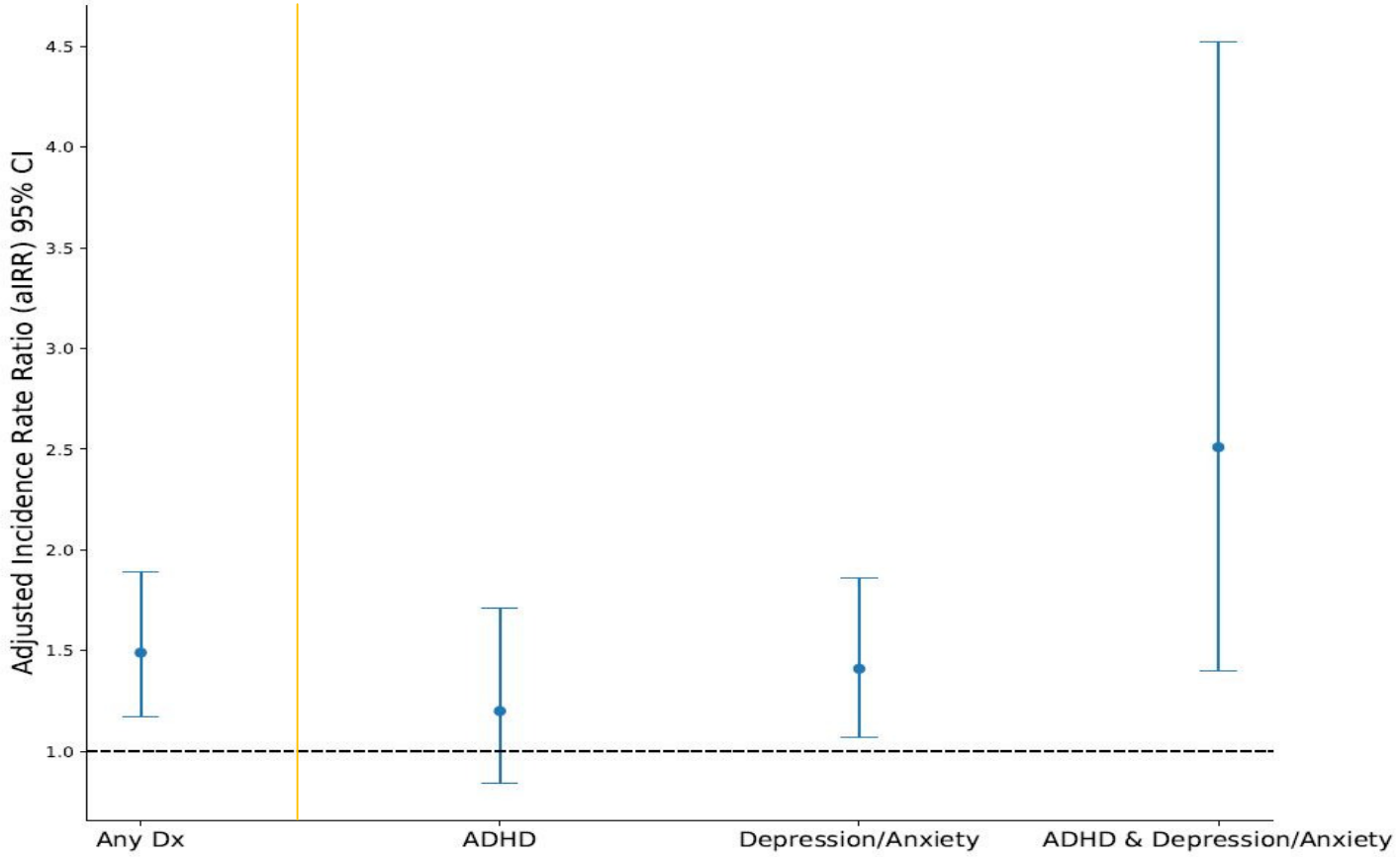
Analysis

- **Predictor:** Psychopathology category
- **Primary Outcomes**
  - Safety Critical Events: Crash/Near-crash
  - Crash: Crash events severity 1-3
- **Controlled Covariates**: age group, highest level of education & sex
- Negative binomial regressions yielded incidence rate ratios (IRRs)
  - Association of psychopathology grouping to primary outcomes

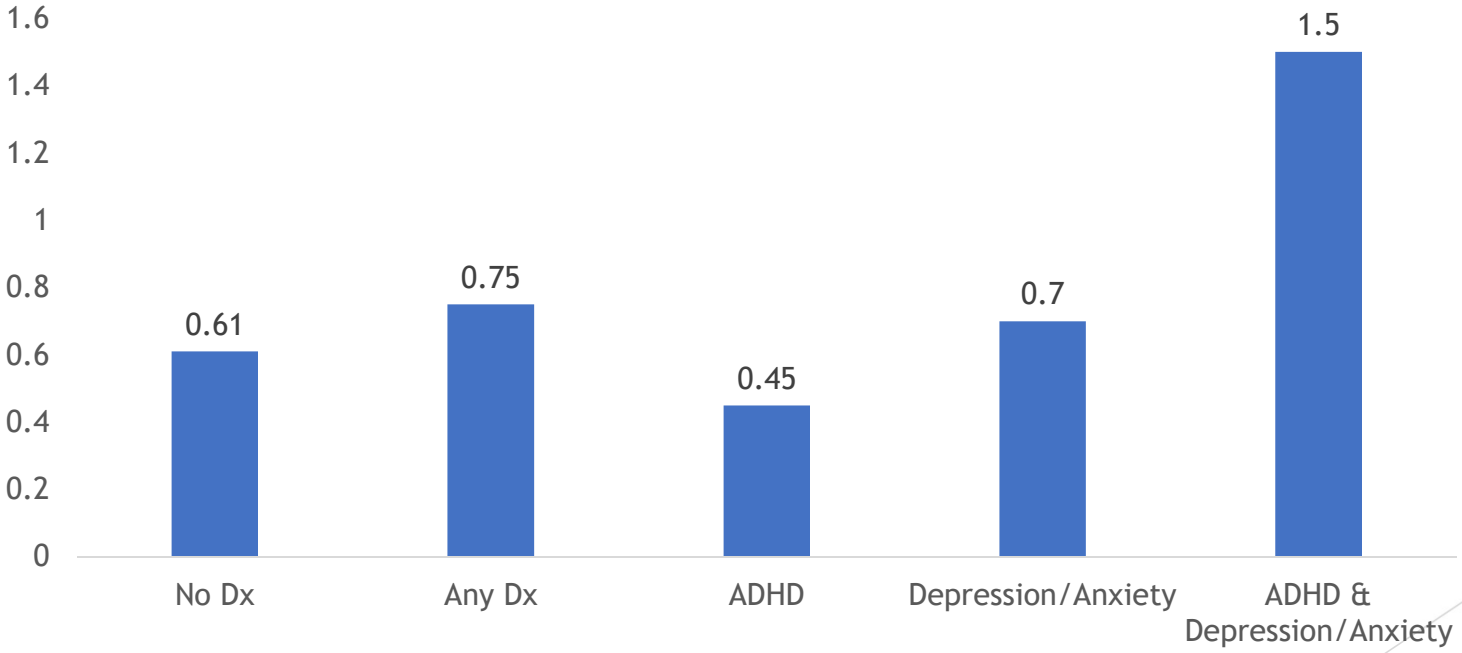
Safety Critical Event Rates per 10,000 mi by Psychopathology Category



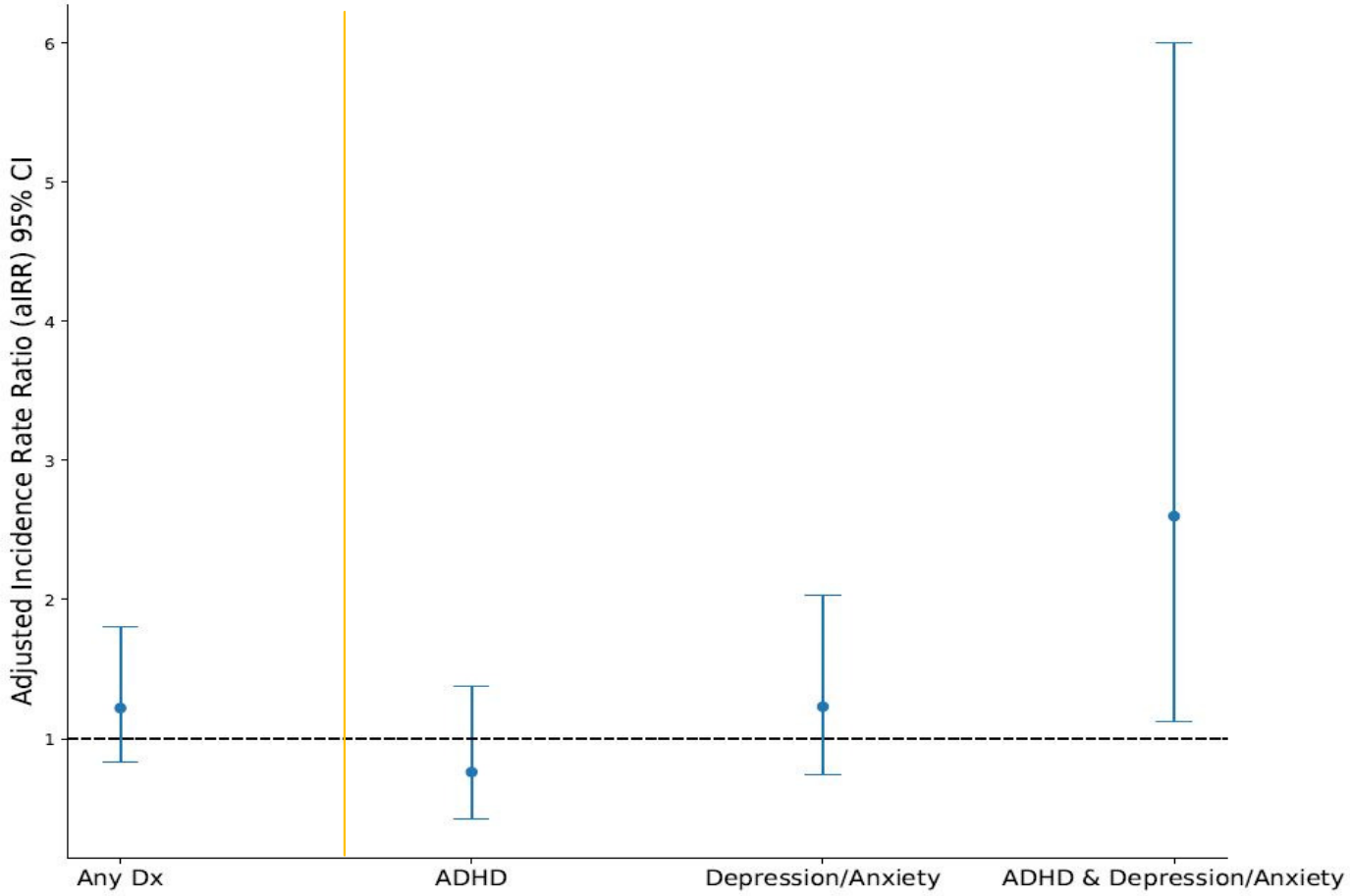
AIRRs for Safety Critical Events by Psychopathology Category



Crash Rates per 10,000 mi by Psychopathology Category



AIRRs for Crash Events by Psychopathology Category

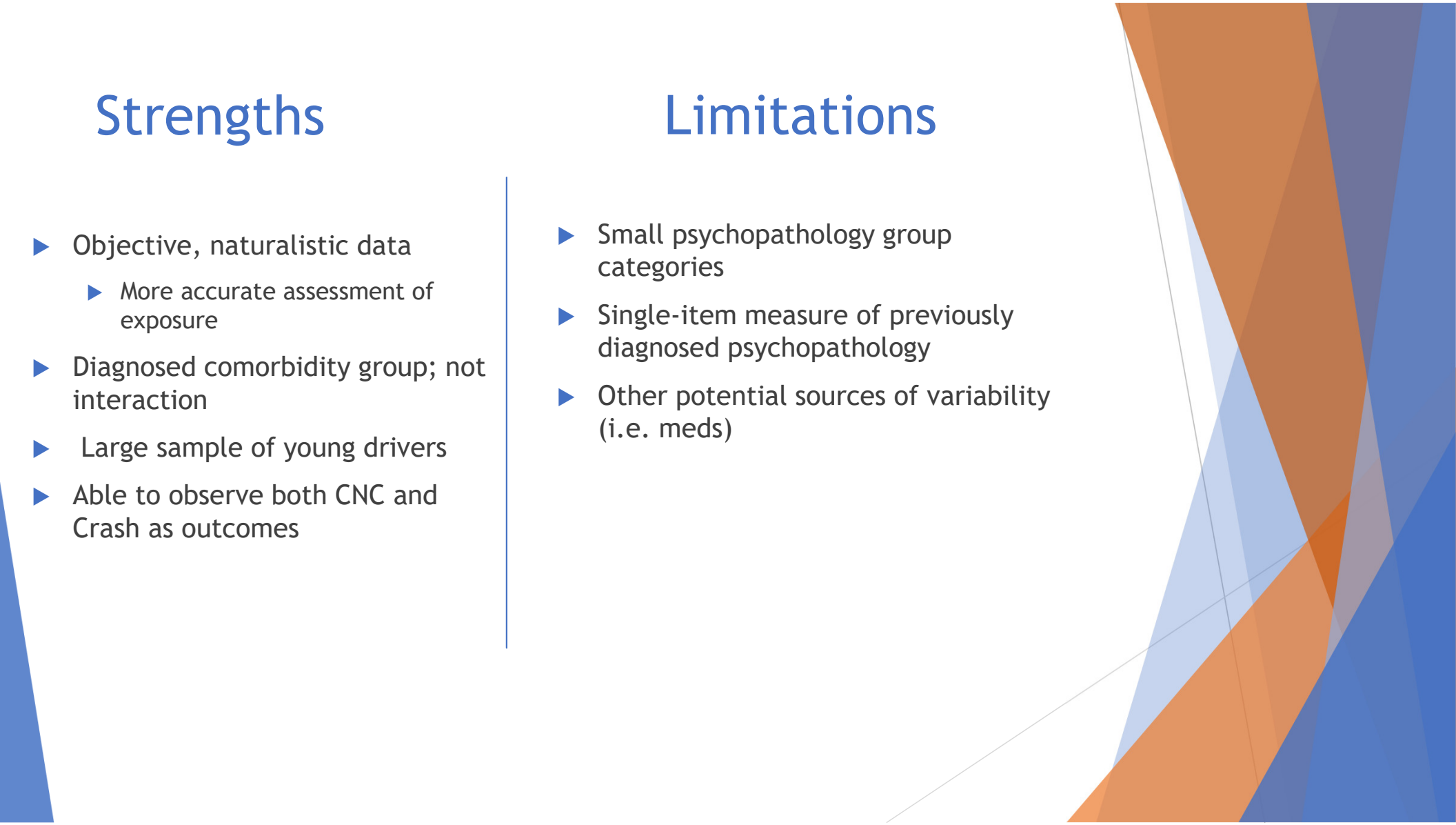


Strengths

- Objective, naturalistic data
  - More accurate assessment of exposure
- Diagnosed comorbidity group; not interaction
- Large sample of young drivers
- Able to observe both CNC and Crash as outcomes

Limitations

- Small psychopathology group categories
- Single-item measure of previously diagnosed psychopathology
- Other potential sources of variability (i.e. meds)



Conclusions & Implications

- ADHD & Depression/anxiety are associated with increased risky driving & crash rates
- Depression/Anxiety is associated with increased risky driving rates
  - Novel risk factor for safety critical events in young drivers
- ADHD alone was not associated with increased crash or risky driving rate

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Collaborators

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