



Sensitivity to reward and punishment and young drivers' self-reported risky behaviors and driving records

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Introduction: Importance of the problem



Young drivers at higher risk

- Crashes = 1st cause of death for 15-29 years old

Males vs. females

- ↑ involvement in risky driving behaviors (e.g., driving records)
- ↑ involvement in severe injury and fatal crashes

Introduction: Prevention and remediation programs

- Reinforcement and punishment
- Programs
 - Main focus on punishment (e.g., demerit points, fines)
 - What about reinforcement?
 - Powerful effect on behavior, but rarely used to modify risky driving behaviors

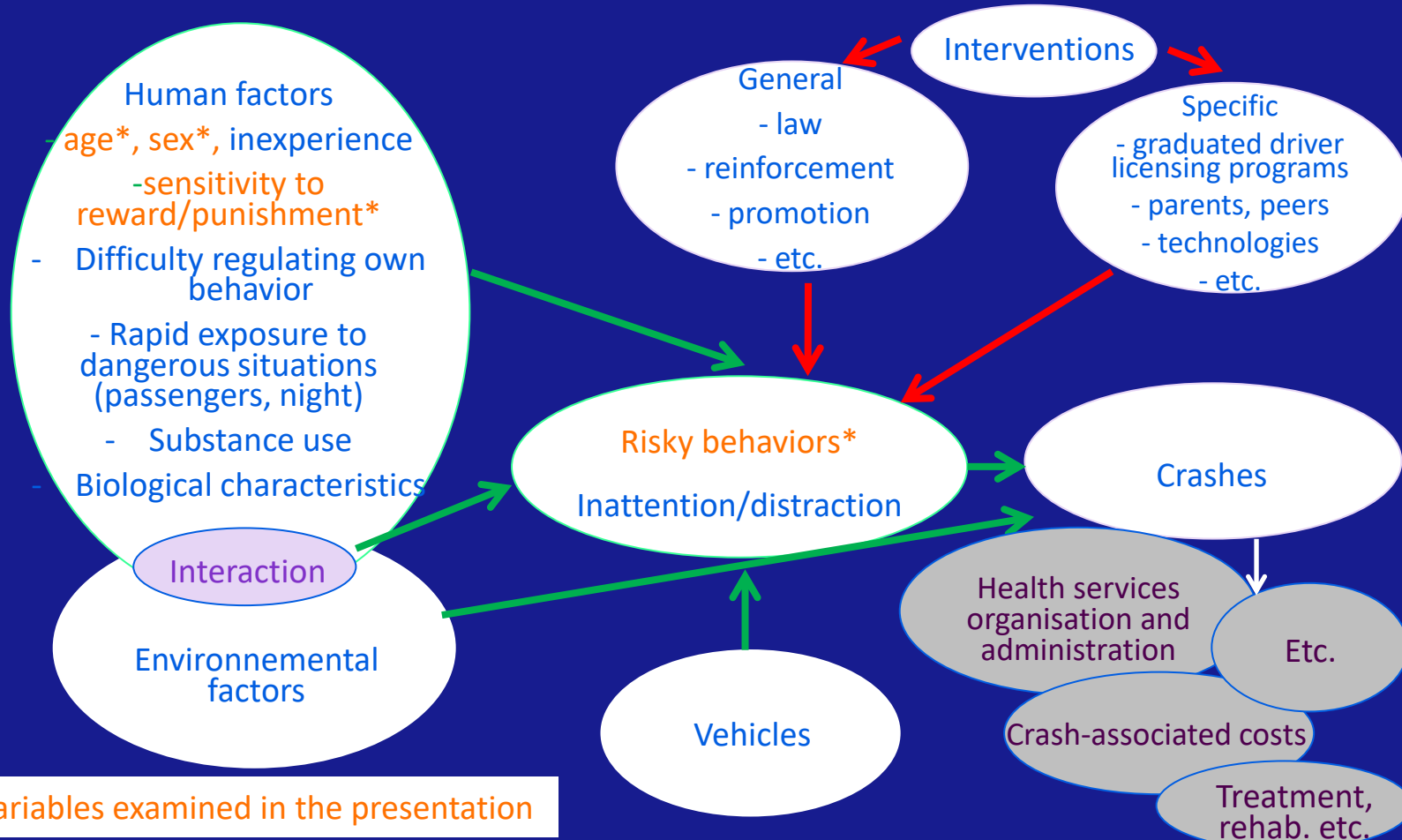
Introduction: Studies on sensitivity to reward and punishment

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- ↑ reward sensitivity
 - ↑ self-reported risky driving behaviors
 - ↑ actual risky driving behaviors (observed in the lab)
 - in males
- ↓ Sensitivity to punishment
 - ↑ self-reported risky driving behaviors
 - in males
- Limitations
 - Most studies used self-reported behaviors (questionnaires)
 - May artificially inflate the importance of relationships between constructs
 - What about the relationship with actual behavior documented in driving records?

Introduction: Interdisciplinary approach for crash risk reduction



*Variables examined in the presentation

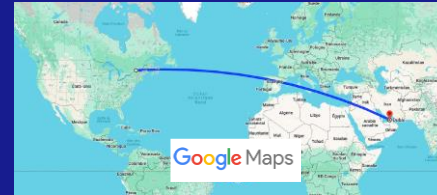
Introduction: Objectives and hypothesis of the study

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- In young drivers, to examine relationships between sensitivity to reward and punishment
 - Self-reported driving behaviors (replication of other studies)
 - Actual behavior documented in driving records
- Overarching hypothesis
 - ↑ sensitivity to reward
 - ↑ risky driving behaviors (self-reported and documented)

Graduated Licensing Program: Quebec Canada



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	Types of drivers' license					
	Learner	Provisional		Regular		
Minimum age	16	17	19	22	23	25+
Components						
Driving school (mandatory)	✓	----	----	----	----	----
Tests and exams (mandatory)	✓	----	----	----	----	----
Supervised driving period	✓	----	----	----	----	----
Gradual licensing “priviledges”						
Maximum alcohol level	0.00%	0.00%	0.00%	0.08%	0.08%	0.08%
Driving with only young passengers at night (not allowed)	X	X (up to 6 months)	----	----	----	----
Maximal amount of demerit points (for license revocation or suspension)	4	4	8	8	12	15

Table adapted from Ouimet (2012); see also for more details <https://saag.gouv.qc.ca/en/drivers-licences/demerit-points>

Methods: Participants

Main inclusion criteria

- 18-24 years old
- Provisionnal or regular driver's license
- Driving at least 1 day/ week in past months

Main exclusion criterion

- Health problems

Methods: Independent variables



■ Sensitivity to Punishment and Sensitivity to Reward Questionnaire

Lardi et al. (2008); Torrubia et al. (2001)

Sensitivity
to
Punishment

- 18 items, responses 0-1 (no/yes); scores from 0-18
- Example: Are you often afraid of new or unexpected situations?

Sensitivity
to reward

- 17 items, responses 0-1 (no/yes); scores from 0-17
- Example: Do you sometimes do things for quick gains?

Methods: Dependent variables

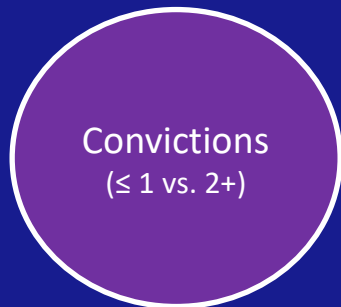


- Driving Behaviour Questionnaire Lajunen et al. (2004)



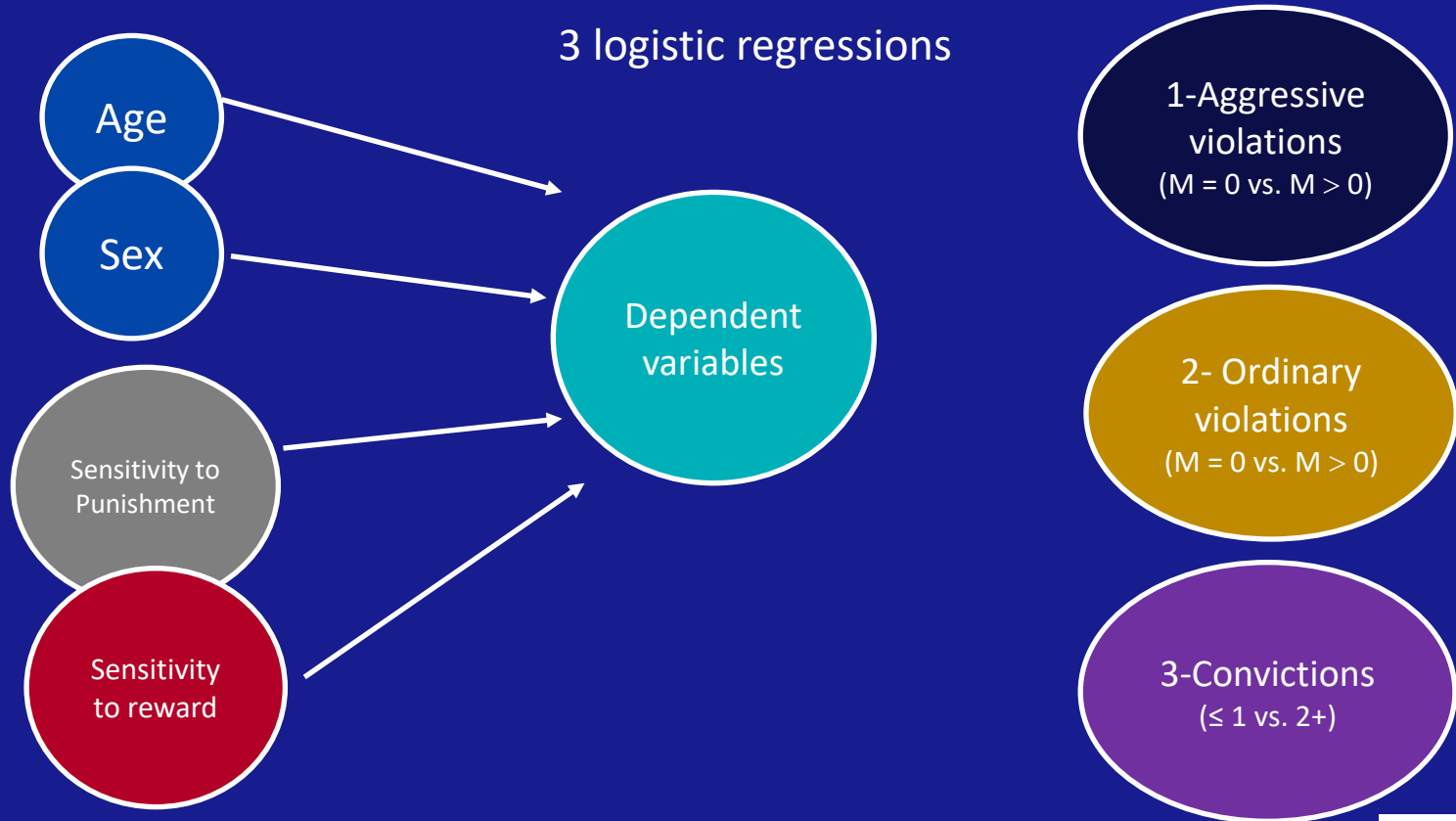
- 3 items, responses 0-5
- Example: Sound your horn to indicate your annoyance to another road user

- 8 items, responses 0-5
- Example: Disregard the speed limit on a residential road



- Convictions (traffic safety code, criminal code, loss of license, vehicle impoundment)
- Obtained with participants' permission up to 5 years after participation in study

Methods: Data analyses

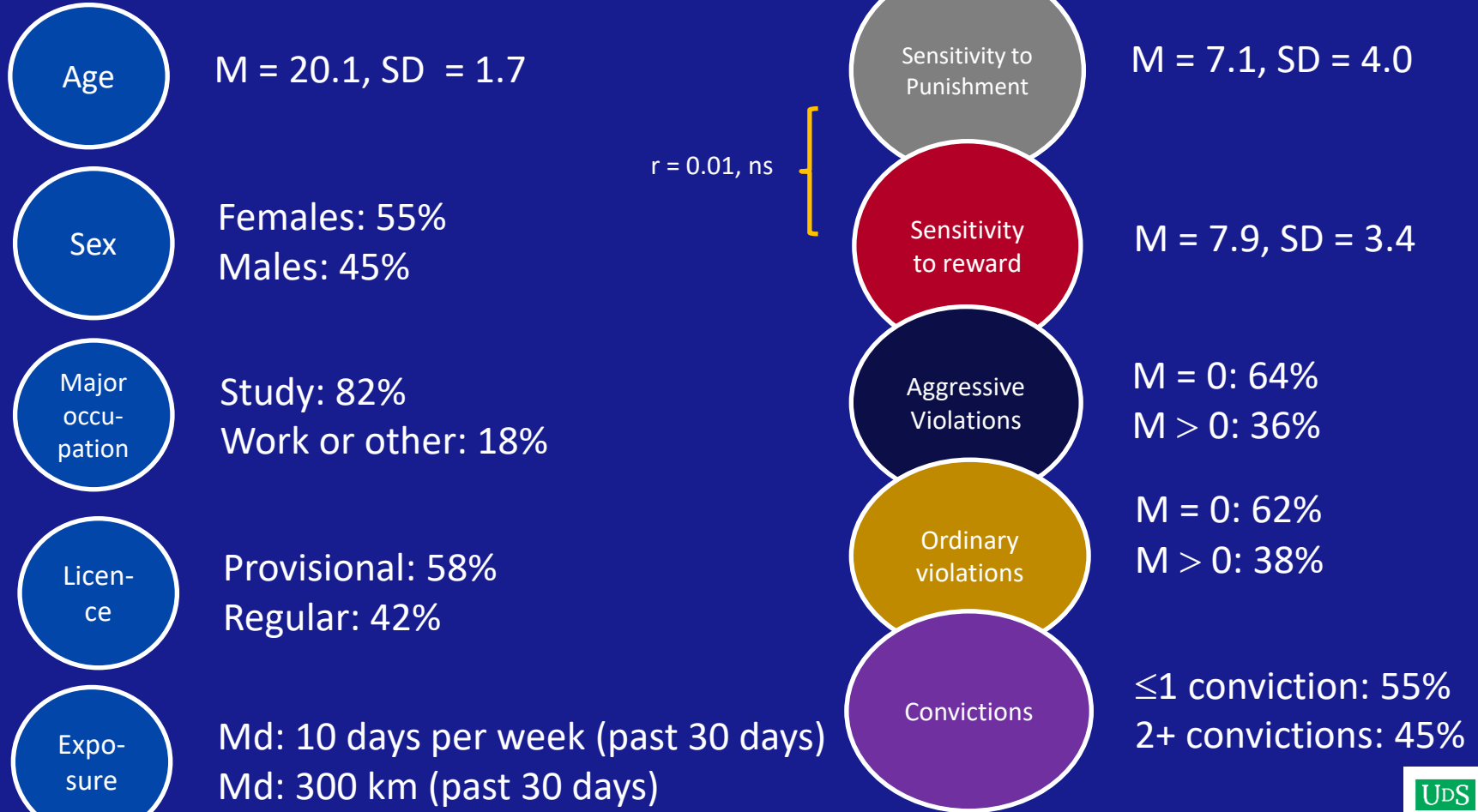


Results: Descriptive analysis

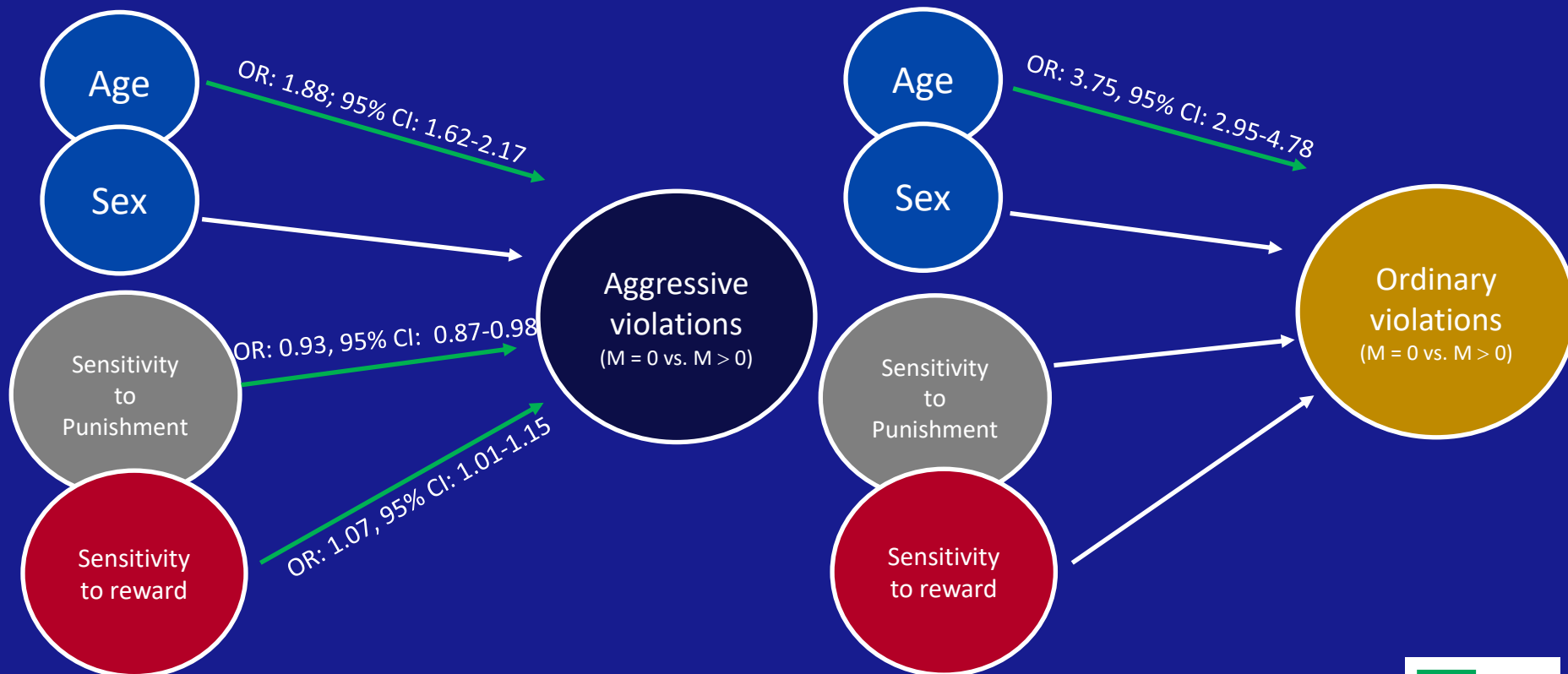
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N = 437 participants

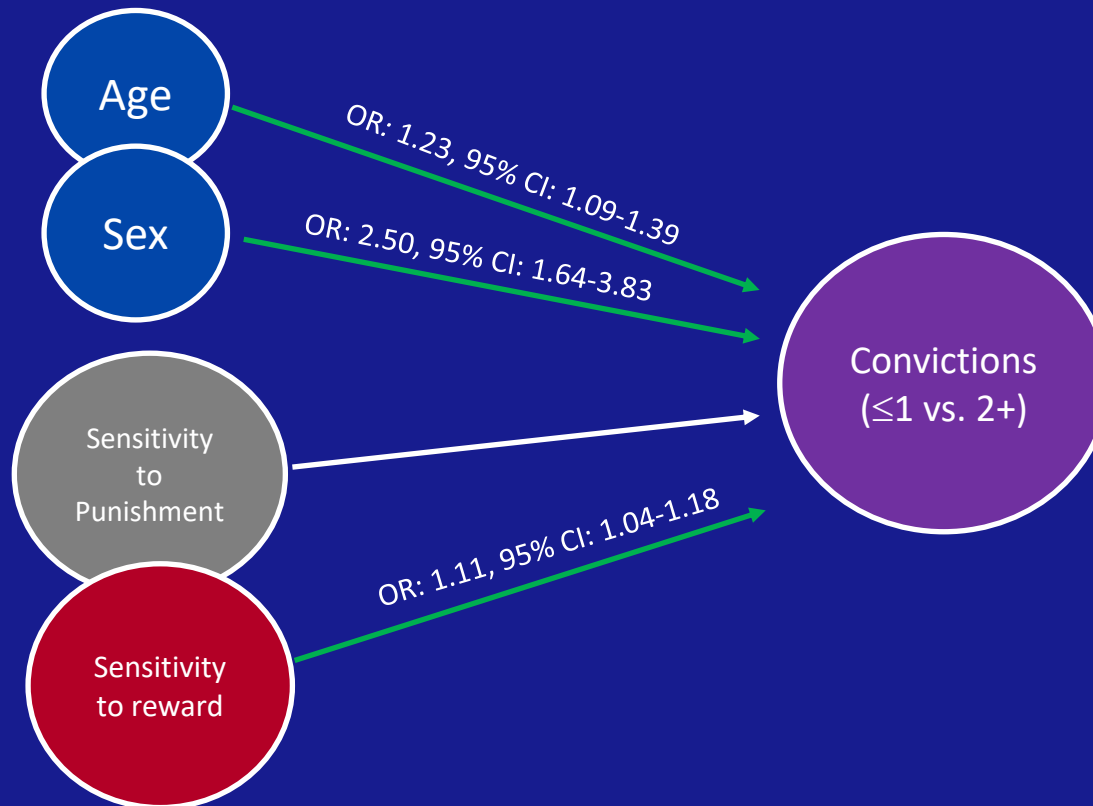


Results: Self-reported behaviors



CI = confidence interval; OR = odds ratio

Results: Driving records



CI = confidence interval; OR = odds ratio

Discussion



Variables	Self-reported aggressive violations	Self-reported ordinary violations	Convictions in driving records
Age	↑	↑	↑
Sex (male)			↑
Sensitivity to reward	↑		↑
Sensitivity to punishment	↓		

Include both self-reported and actual behaviors

Different factors and underlying mechanisms

e.g. Kubanek, et al. 2015

Discussion

- Future steps
 - Examine results in a prospective manner
 - Include other factors associated with risky behaviors
 - Example of other research questions



Discussion

- How can sensitivity to reward be included in traffic safety?
 - Focus on both types of messages?
 - Loss associated with manifestation of risky behavior
 - Gain associated with manifestation of safe behavior
 - Immediate vs. delayed rewards?
 - Example: *Pay-As-You-Drive* vehicle insurance
 - Others?

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THANK YOU

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