

The use of video in teen driving: age vs. experience

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Teen crashes

- Driving is the single most dangerous thing we let our children do
- Number 1 cause of death *and* injury among our 14-19 year-olds
 - Young drivers *and* passengers
 - Occupants of other vehicles
 - Non-motorists – pedestrians, bicyclists
- These deaths are premature and preventable

Crash causes

1. Inexperience in vehicle control skills
2. Poor ability to anticipate & identify hazards
3. Sensitivity to peer influence and willingness to take risks
4. Impulsive
5. Poor understanding of driving abilities relative to demands

Texting and cell phone conversations compound



Compelling teen driving research

- Crash risk increases about 10-fold when teens begin driving unsupervised and decreases at a moderate rate over first several *years*
- More young passengers → more crashes
- Most severe crashes occur before midnight
- Enhanced Graduated Driver Licensing (GDL) showing positive results in other states
 - More supervised driving
 - Passenger restrictions
 - Nighttime driving limitations

Event-triggered video as an intervention tool

- The intervention is more important than the technology itself
- Purpose is to extend parent mentoring, not monitoring
 - Goal is to enhance learning for long term
- Video provides the driver and parent the context of safety-relevant events
- Looking for teachable moments
 - The good, the bad, and the “you almost died”
- User acceptance is critical for success

Event-triggered video recorders



- Two cameras
- 3-axis accelerometer
- Video/audio buffer
- GPS location and speed
- Triggers and saves video clips when g-force exceeds threshold ($\sim .5$ g)
- Records 8 sec before/4 sec after trigger
- Cellular download

Previous ETVR intervention studies

- Two previous evaluations
 - 25 rural teen drivers
 - 36 suburban teen drivers
- Pre-post study design
- Event rates decrease significantly with feedback
- About 1/3 of teens “high event” drivers
- Limitation: no control group to account for maturation

Current evaluation: age and experience

- Three different groups of participants
 - School license holders (14.5 – 15.5 years old)
 - Inexperienced intermediate license (16 years old) – never held a school license
 - Experienced intermediate license (16 years old) – had a school license for at least 4 months
- Half the participants in each group assigned to control condition
- Total study: 90 participants

Timeline

- ETVR installed prior to independent driving under applicable license
- First 4 weeks were no-feedback baseline for all (pre-intervention)
- 16 weeks of feedback
 - Flashing light on ETVR (immediate feedback)
 - Weekly report and CD of video (delayed feedback)
- Four weeks of baseline (post-intervention)

March 2012 analysis

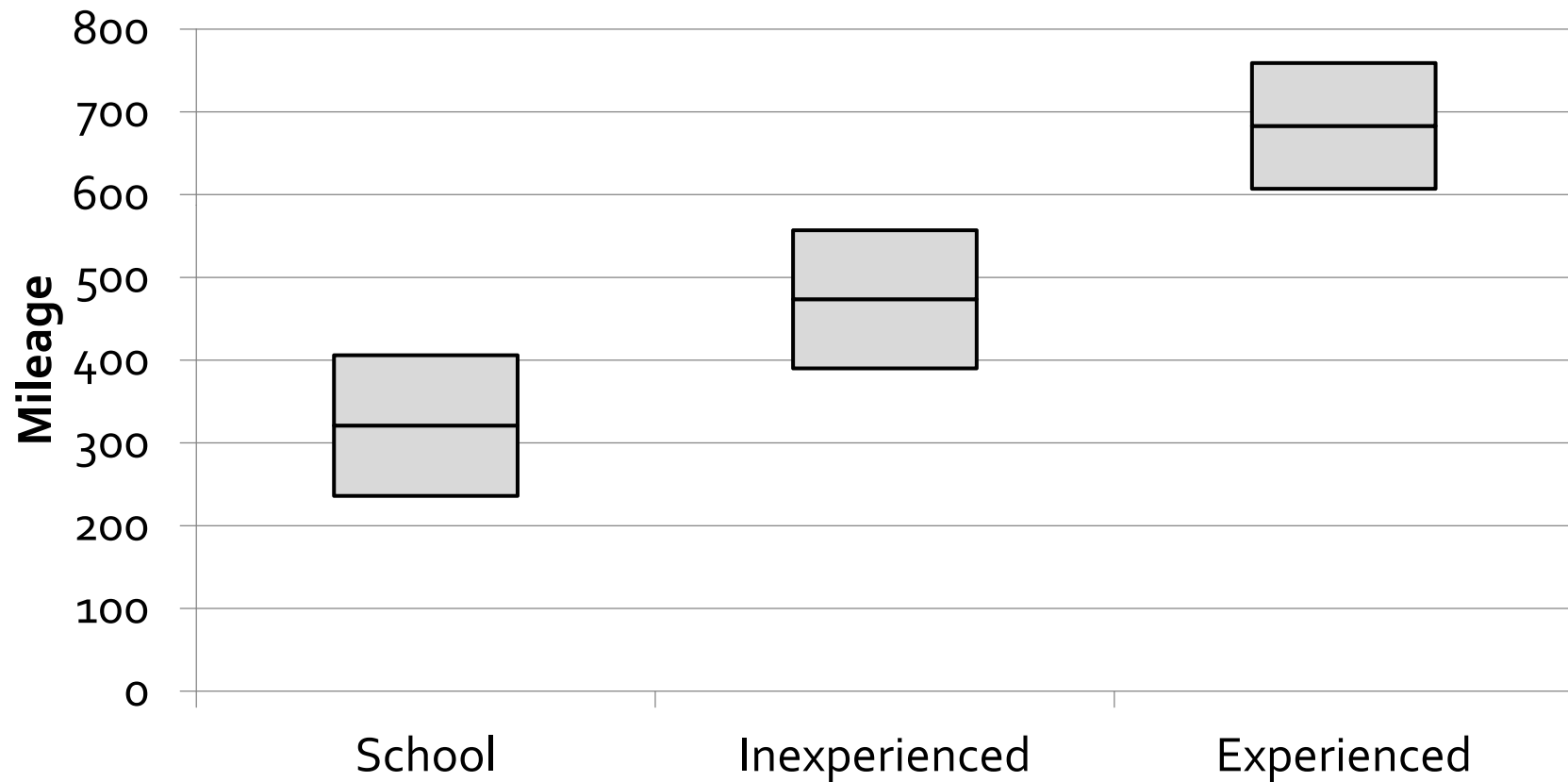
- Data completed for 79/90 participants
- 240,257 miles
- Primary dependent measure is number of safety-relevant events per 1000 miles
 - Event frequency
- Negative binomial regression
 - Log of mileage as offset variable
 - Repeated measures

Subjects as of March 10, 2012

	Completed (n=79)		In Process (n=11)		Total
	Intervention	Control	Intervention	Control	
School Group (School License)	12	11	4	5	32
Inexperienced Intermediate Group (Intermediate License without prior School License)	13	13	1	1	28
Experienced Intermediate Group (School License before Intermediate License)	15	15	0	0	30
Total	40	39	5	6	90

Data collection complete Summer 2012

Miles per 4-week segment NEW



Main effect of License type: $F(2,73) = 19.13$, $p < 0.0001$; all three groups are different

Effectiveness of intervention

March 2011

License group	Intervention condition	Event rate	Lower 95% CL	Upper 95% CL	X ² value for diff	P > X ²
School	Control	41.5	23.4	73.5	17.5	<.0001
School	Intervention	3.0	1.0	8.9		
Inexperienced	Control	26.2	12.9	53.0	6.33	0.01
Inexperienced	Intervention	9.0	5.8	14.0		
Experienced	Control	18.1	10.4	31.6	17.23	<.0001
Experienced	Intervention	5.0	3.9	6.4		

Effectiveness of intervention

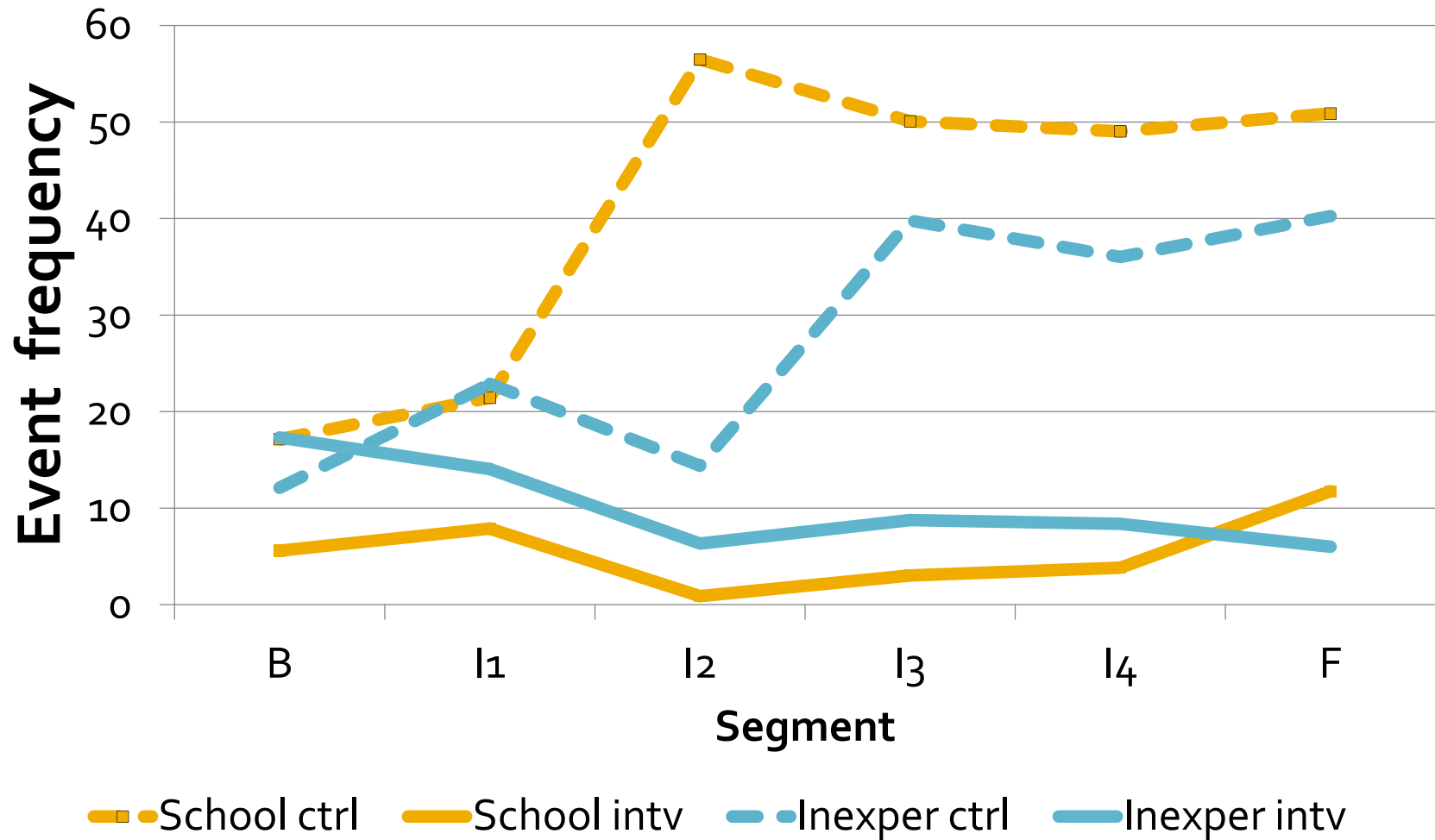
March 2012

License group	Intervention condition	Event rate	Lower 95% CL	Upper 95% CL	X ² value for diff	P > X ²
School	Control	40.8	23.8	70.1	4.85	0.0275
School	Intervention	12.9	5.4	30.8		
Inexperienced	Control	40.0	18.7	85.8	5.93	0.0149
Inexperienced	Intervention	12.3	6.9	21.7		
Experienced	Control	20.6	12.8	33.1	12.15	0.0005
Experienced	Intervention	6.0	3.6	10.0		

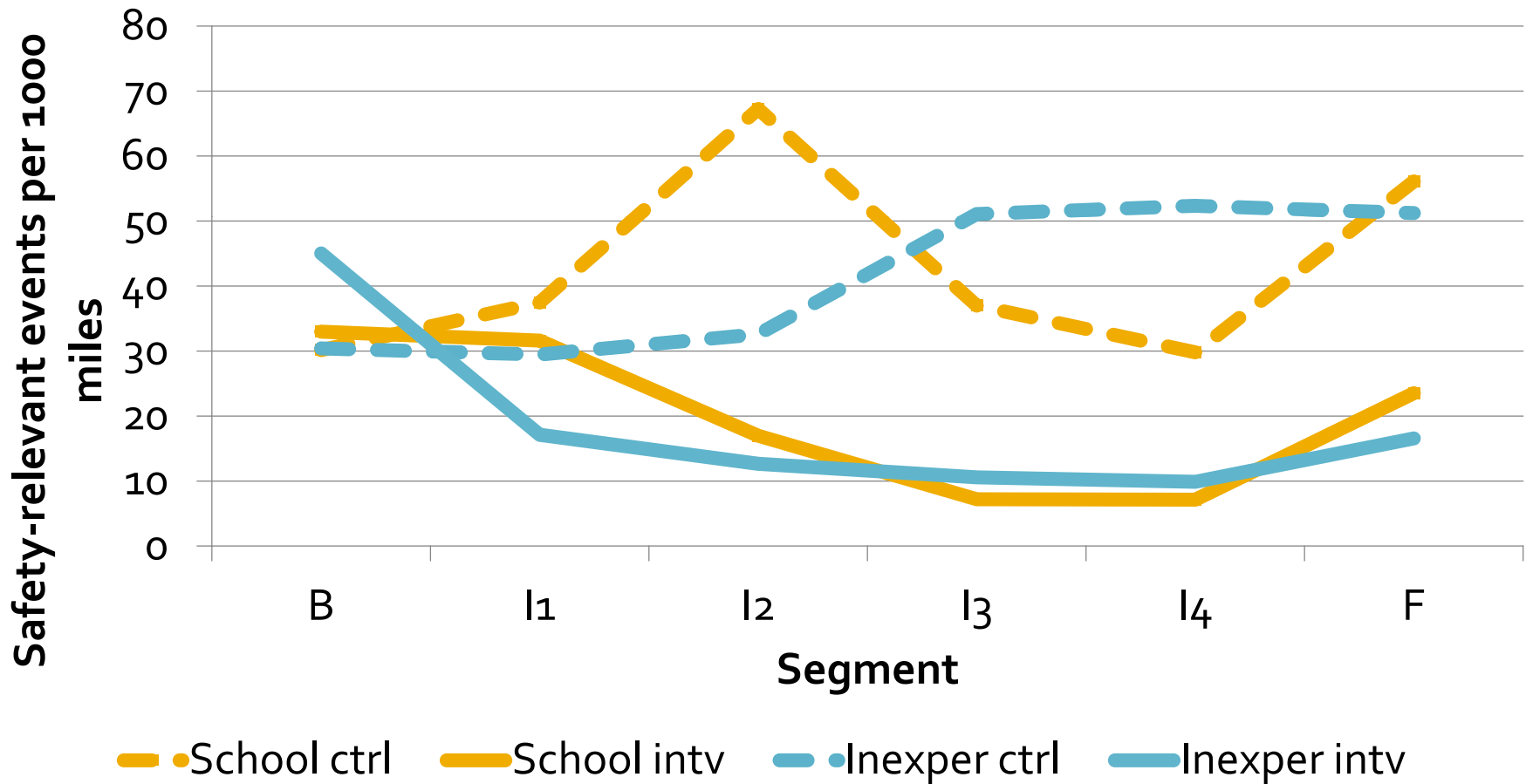
After the intervention March 2012

- School license group saw an increase of about 11 events/1000 miles after intervention ended ($X^2 = 5.13$, $p = 0.0235$)
- No increase after the intervention ended for both inexperienced and experienced 16-year-olds in the feedback condition.

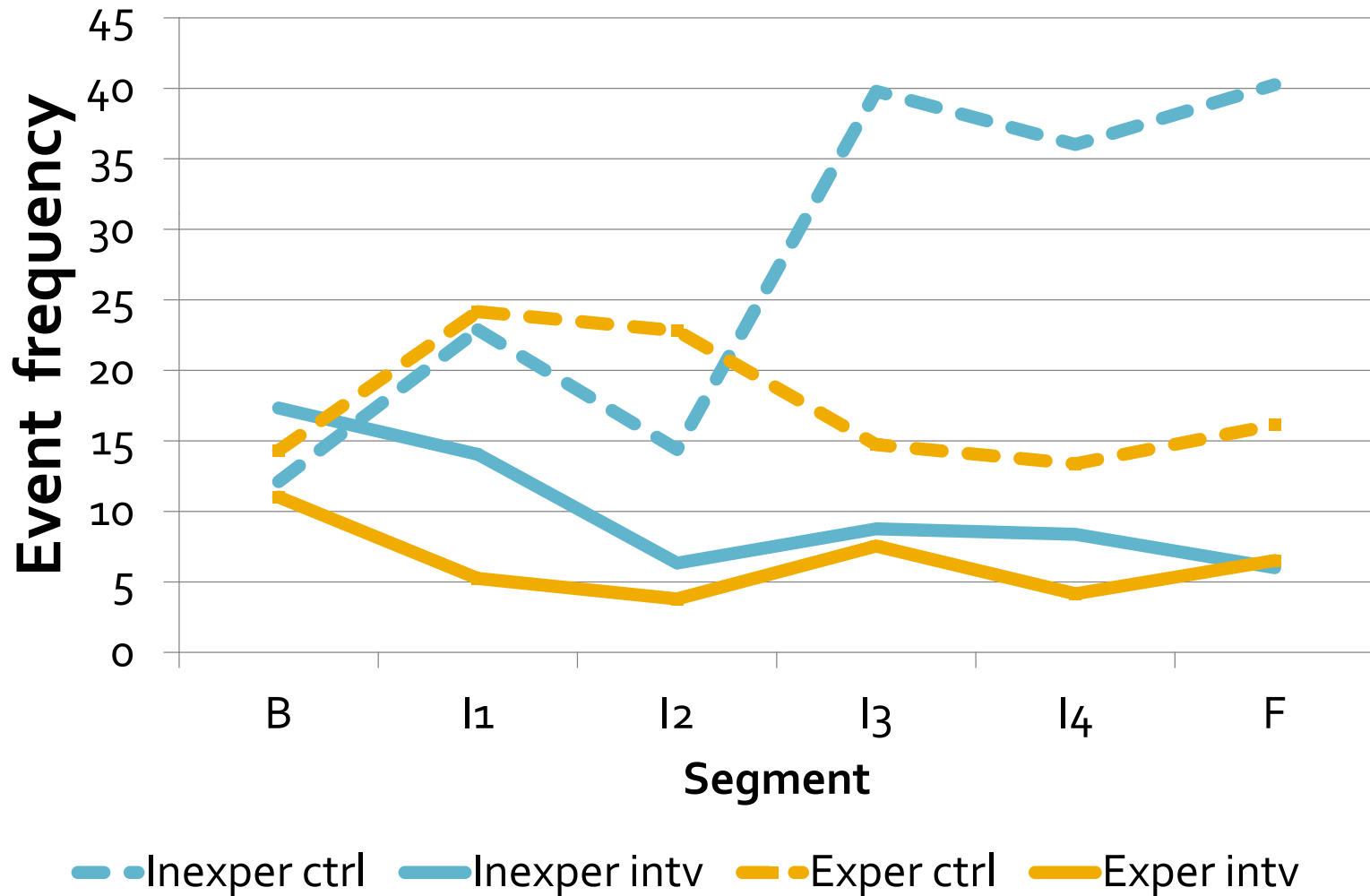
Effect of age March 2011



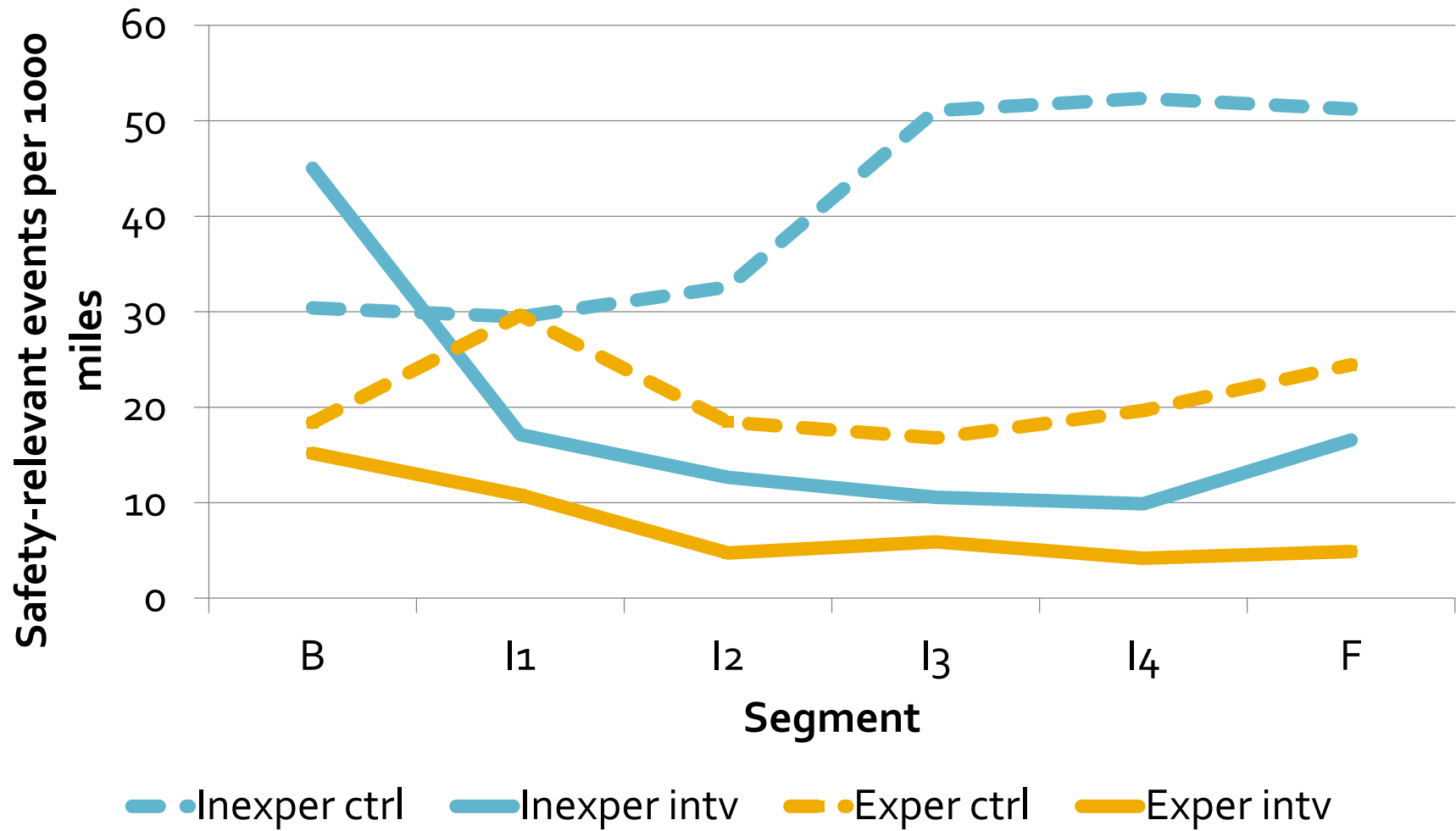
No effect of age NEW



Effect of experience March 2011

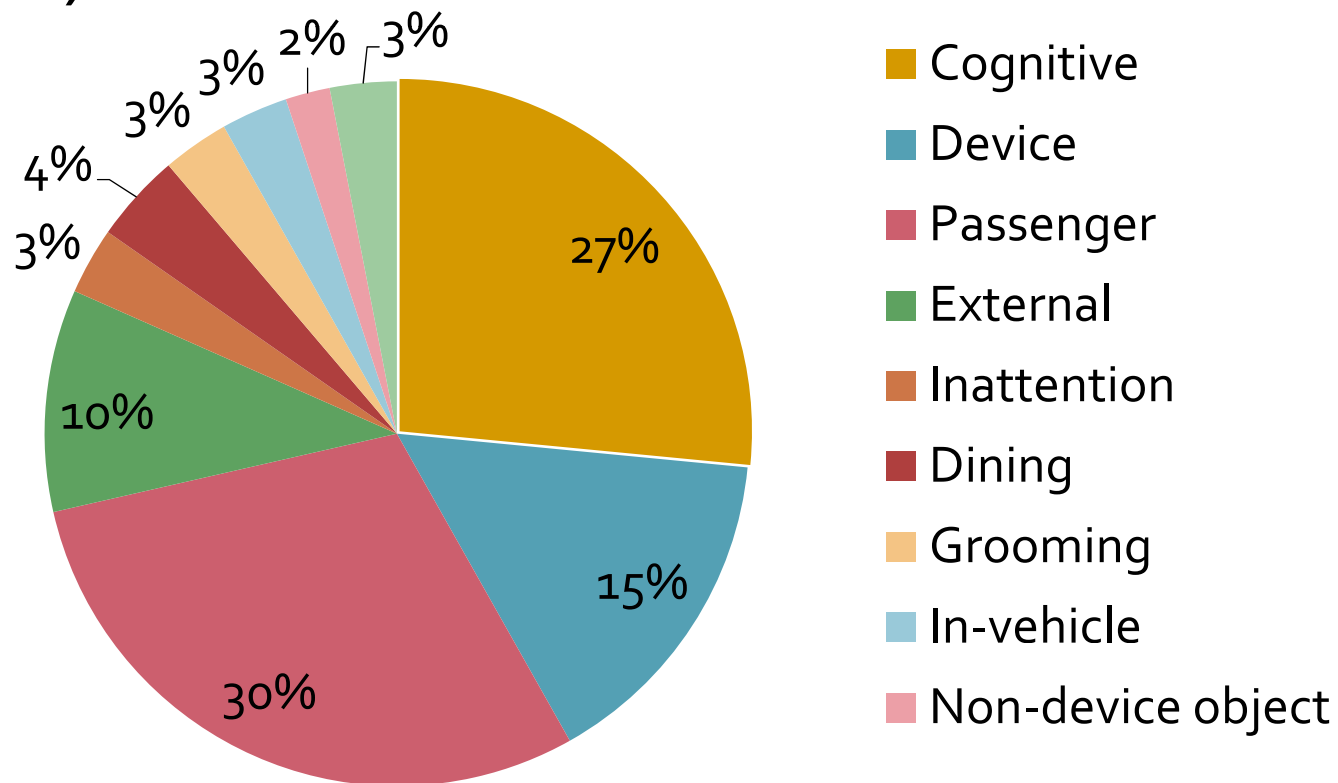


Effect of experience March 2012



Distraction events

- Distraction was present for 1118 events (23%)



Summary

- Results for 78 drivers suggest:
 - Feedback significantly decreases event frequency relative to control for all driver groups
 - No evidence for an effect of age
 - School permit drivers saw a rebound in event rates after intervention ended
 - Effect of experience
 - Inexperienced drivers tend to have more events in the initial baseline period
 - In the control condition, event rates are higher for inexperienced drivers after about 3 months of driving
 - In the feedback condition, inexperienced drivers tend to have more events