Examining the effect of video-based feedback on older drivers' confidence and behind-the-wheel performance

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CARSP
May 28, 2019

Acknowledgements

LABARGE Optimal Aging INITIATIVE

Candrive
Driving research for older adults.
Au volant de la recherche sur les aînés.

YOUNG DRIVERS®

School of Rehabilitation Science
REACHING FURTHER

Special thanks to:
Michelle Porter, Isabelle Gélinas & Yu-Ting Chen

Mary's Story

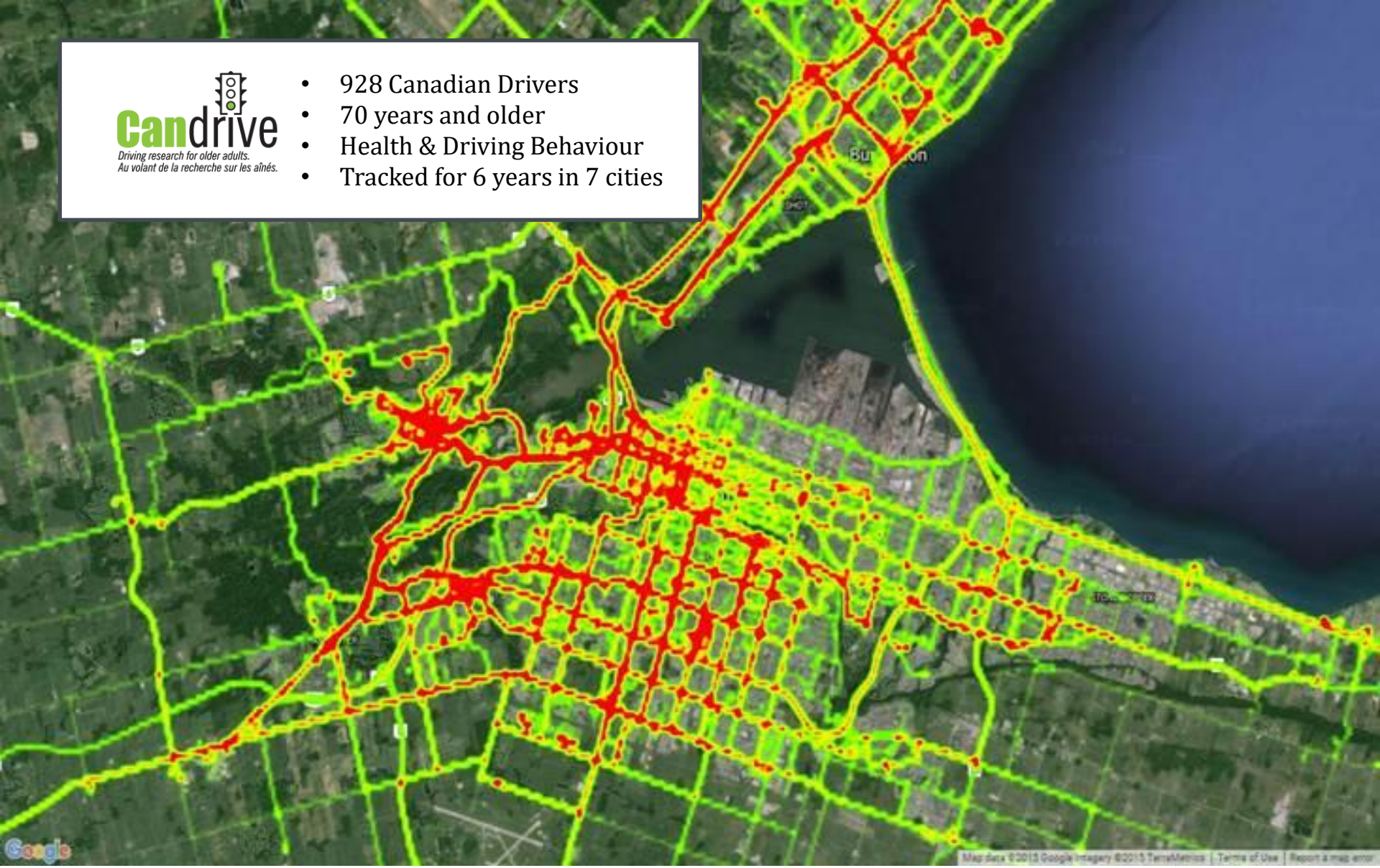
Continued Community Mobility

Maintaining Driving Ability

Mobility Planning

Driving Retirement

Discuss Mobility with Family/ HCP


Candrive
Driving research for older adults.
Au volant de la recherche sur les aînés.
• 928 Canadian Drivers
• 70 years and older
• Health & Driving Behaviour
• Tracked for 6 years in 7 cities

Participants wanted feedback on their driving!

Candrive
Driving research for older adults.
Au volant de la recherche sur les aînés.

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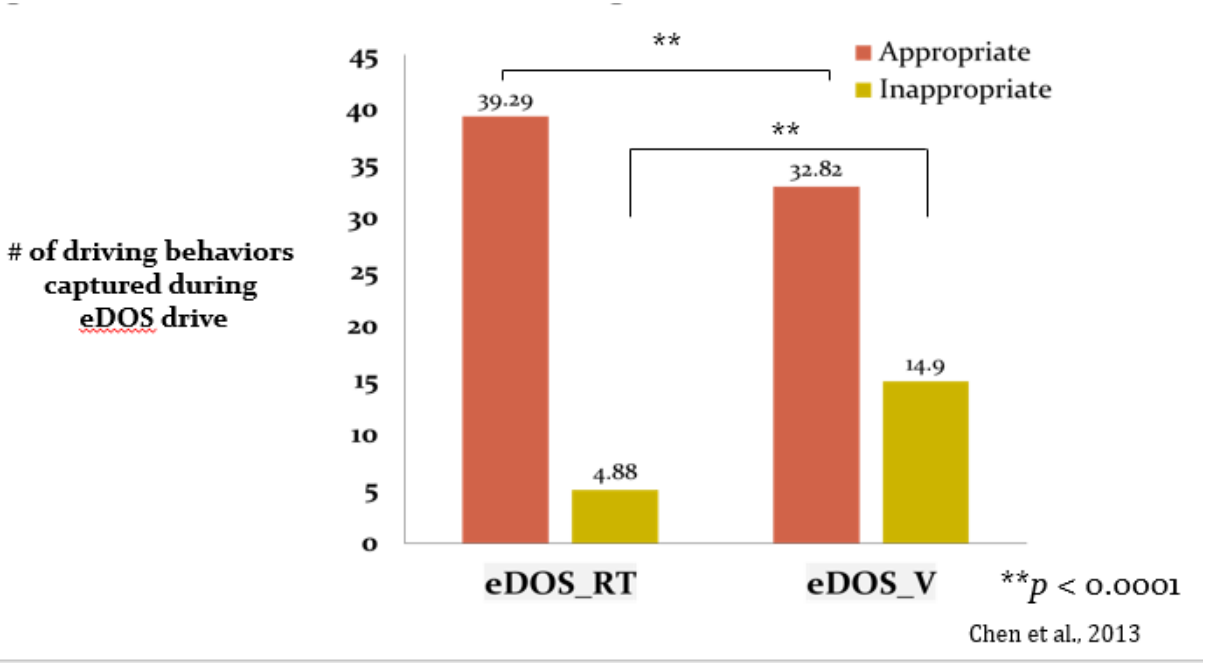
Introduction

- 94.7% of Canadian drivers over age 45 reported holding a valid license; 84.5% of these use their vehicle at least four times a week. (Vrkljan et al., 2018)
- Canadians, age 65+, want to drive, need to drive, and live in communities where driving is valued and necessary for mobility and social engagement. (Turcotte, 2012)
- Poor driving behaviours (i.e., bad habits) have been implicated in crashes involving older drivers. (Cicchino & McCartt, 2015)

eDOS Study: Scored behaviours in Real-Time (RT) vs. Video (V)



Most 'inappropriate' behaviors captured by eDOS were due to bad habits [correctable!]

→lane change, merging, intersections, speeding!

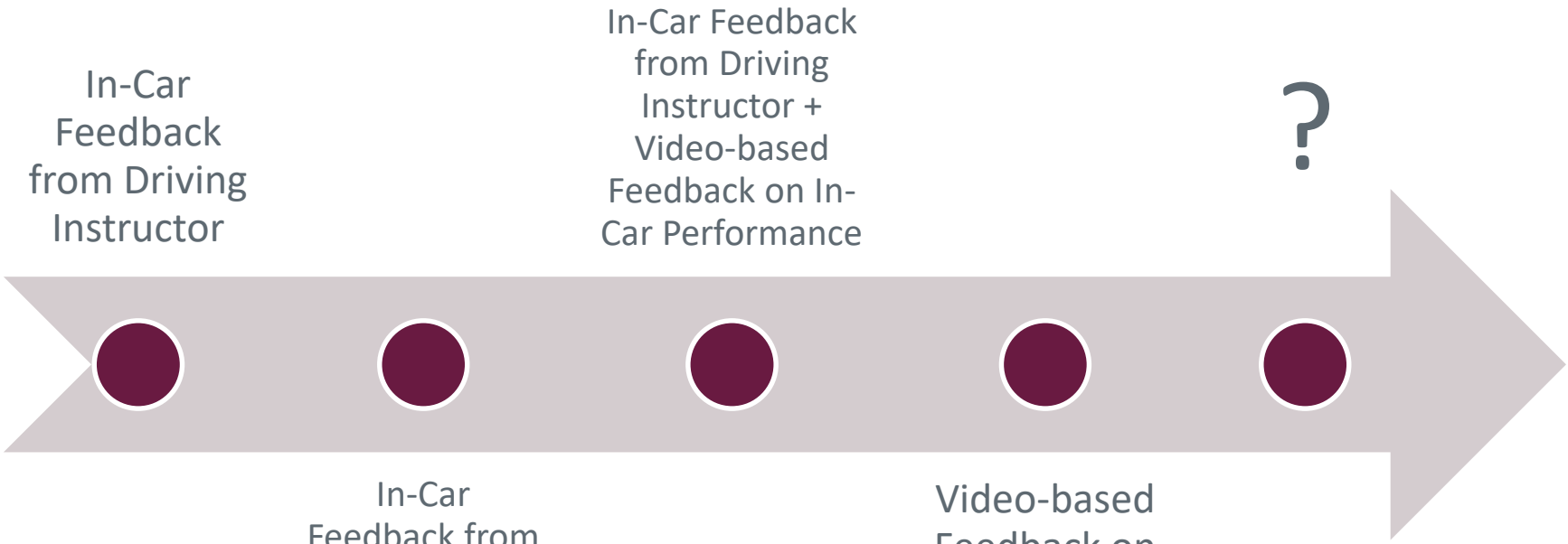
Chen et al., 2013

Introduction (cont.)

- Individualized in-vehicle instruction provided by a driving instructor, coupled with group-based classroom education on road safety, has been shown to improve the driving performance of older drivers. (Korner-Bitensky, Kua, von Zweck & Van Benthem, 2008)

- Video-based feedback allowing the older driver to view clips of their actual performance may be an effective alternative to in-vehicle training. (Anstey et al., 2018; Porter, 2013; Sawula et al., 2018)

Progression of Feedback Training



Bédard et al., 2008; Marattoli et al., 2007

Sawula et al., 2018

Anstey et al., 2018

Porter 2013

Research Questions

1. Is there a difference in the **on-road performance** of older drivers who receive video-based feedback, compared to those that do not?

2. Is there a difference in older driver's **self-perception of their driving**, in those who receive video-based feedback as compared to those that do not?

Methods: Study Design

2-arm Parallel-Group Double-Blinded Randomized Controlled Trial (RCT)

- Participants: Community Dwelling older adults (65-79)
  - Valid driver license; access to insured vehicle; English fluency; corrective lenses updated
  - No medical contraindications to drive; pass cognitive screens

- Data Collection
  - Demographic Questionnaire
  - Self-reported Outcome Measures
  - Naturalistic Driving Route
    - 25 mins; 12km
    - MTO Maneuvers
    - In-vehicle GPS recording device; Vehicle Speed

Visit #1 (n = 80)
- Demographic Questionnaire
- Questionnaires
- Naturalistic Drive

Visit #2 (n = 76)
- Watch 30 minute Video

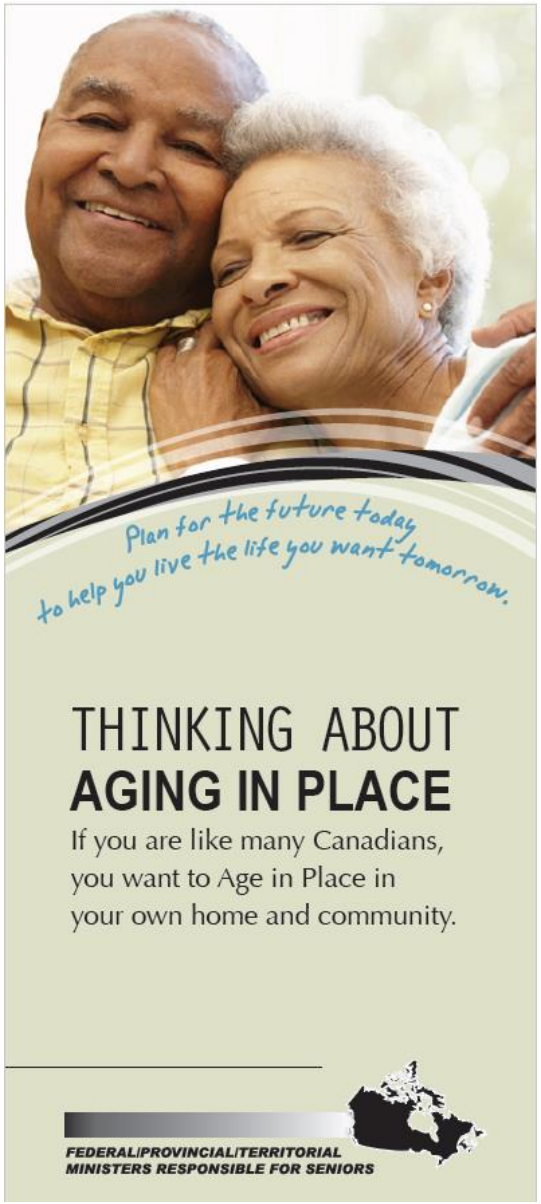
Visit #3 (n = 39)
- Questionnaires
- Naturalistic Drive

Intervention Arm

#2: Mirror only on left lane change

- You signalled and maintained speed well for the lane change.
- You moved to a new lane without making a shoulder check.
- Reminder: There is an area on each side of your vehicle where you cannot see.
- Turning your head is the only way to make sure there is nothing in your blind-spot.

Control Arm


Plan for the future today
to help you live the life you want tomorrow.
THINKING ABOUT
AGING IN PLACE
If you are like many Canadians,
you want to Age in Place in
your own home and community.
FEDERAL/PROVINCIAL/TERRITORIAL
MINISTERS RESPONSIBLE FOR SENIORS

Methods: Outcome Measures

- Demographic Questionnaire
- Self-Reported Outcomes
  1. Driving Habits Questionnaire
  2. Driving Behaviour Questionnaire
  3. Perceived Driving Abilities
  4. Driving Comfort Scale: Day & Night
  1. Situational Driving Avoidance
  2. Situational Driving Frequency

Owsley et al., 1999; Reason et al., 1990; Cordazzo et al., 2014; MacDonald et al., 2008; Meyers et al., 2008;

- Objective Outcome

1. Vehicle Controls
   - E.g. Hand position; Acceleration; Signaling
2. Procedural Errors
   - E.g. Vehicle positioning; Vehicle flow; response to traffic lights
3. Errors in Observation
   - E.g. Mirror use; Blind spots; scanning
4. Compliance Errors
   - E.g., Right of way; speeding; Turning into wrong lane
5. Total # Errors

Porter 2013; Sawula e al., 2017

Results
Participant Characteristics

Preliminary Analysis

	Intervention Group (n = 40)	Control Group (n = 40)	Between-Group Difference
Age [*mean* (*SD*)]	71.6 (4.0)	70.4 (3.8)	*p = 0.2*
% Female	50	52.5	
Education Completed [%] *High School* *Post-Secondary* *Graduate*	 8 67.5 25	 15 75 10	Fisher's Exact = 0.2
Living Arrangement [%] *Alone* *With another driver* *With another non-driver*	 32.5 62.5 5	 35 65 0	Fisher's Exact = 0.6
Geographical Location % Rural	 15	 12.5	X^2 = 0.1, *p = 0.7*
Novice Driver Education % Yes	 45	 55	X^2 = 0.8, *p = 0.4*
Additional Driver Education % Yes	40	25	X^2 = 2.1, *p = 0.2*

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Results

Self-reported Outcomes: Baseline

Preliminary Analysis

	Intervention Group (*n* = 40)	Control Group (*n* = 40)	Between – Group Difference
Driving Behaviour Questionnaire [*mean* (*SD*)]	32.4 (15.0)	34.5 (14.9)	*p = 0.5*
Perceived Driving Abilities Current [*mean* (*SD*)] Change [*mean* (*SD*)]	 35.1 (5.3) 34.75 (8.0)	 34.0 (6.1) 33.4 (7.6)	 *p = 0.4*[1] *p = 0.5*
Driving Comfort Scale – Day [*mean* (*SD*)]* Driving Comfort Scale – Night [*mean* (*SD*)]	78.0 (13.8) 70.2 (16.9)	74.7 (20.2) 66.9 (22.7)	*p = 0.2*[2] *p = 0.5*
Situational Driving Avoidance [*mean* (*SD*)]	4.1 (2.9)	5.2 (3.5)	*p = 0.2*[3]
Situational Driving Frequency [*mean* (*SD*)]	37.9 (7.2)	37.2 (6.0)	*p = 0.6*

* n = 79
[1] X^2 = .3, df = 1
[2] X^2 = .14, df = 1
[3] X^2 = 1.8, df = 1

Results

Self-reported Outcomes: Post-Pre Scores

Preliminary Analysis

	Intervention Group (*n* = 17)	Control Group (*n* = 22)	Between – Group Difference
Driving Behaviour Questionnaire [*mean diff* (*SD*)]	10.8 (11.5)	7.9 (1.3)	*p* = 0.3
Perceived Driving Abilities Current [*mean diff* (*SD*)] Change [*mean diff* (*SD*)]	 3.2 (2.7) 4.8 (5.2)	 3.1 (3.4) 4.5 (4.0)	 *p* = 1.0 *p* = 0.8
Driving Comfort Scale – Day [*mean diff* (*SD*)] Driving Comfort Scale – Night [*mean diff* (*SD*)]	6.2 (6.0) 8.8 (5.4)	11.0 (17.3) 13.2 (19.3)	*p* = 0.3 *p* = 0.4
Situational Driving Avoidance [*mean diff* (*SD*)]	1.4 (1.3)	1.8 (1.9)	*p* = 0.4
Situational Driving Frequency [*mean diff* (*SD*)]	3.4 (2.1)	3.5 (2.8)	*p* = 0.9

Results
Examples of Driving Error

Preliminary Analysis

	Intervention Group (*n* = 6)	Control Group (*n* = 7)	Between – Group Difference
Total # of On-Road Errors [*mean diff* (*SD*)]	12.5 (9.9)	6.7 (5.3)	*p* = 0.2

Errors in Observation

- *Scanning intersections before stopping*
- *Scanning intersections when driving straight*
- *Rear-view mirror – before stopping; after turn*
- *Blindspot when lane changing*

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Discussion

- Bad Driving Habits vs. Age-related changes
- Matching perceptions with actual performance
- Measurement tools not designed to evaluate change after an intervention

Future Directions

- Comparing retraining approaches
- Combining driving feedback with mobility planning & alternative transportation use
- Influence of previous training and driving history

Feedback from participants

- I could see, when I watched the video, **I could see exactly what I was doing wrong** and somethings I didn't see.. when the lady spoke I thought it was excellent actually.

  (*Olivia, 79)*

- It was instructional because the camera doesn't.. well it does lie sometimes (laughs) **but the camera doesn't lie,** it doesn't show everything, but no, I thought it was very helpful.

  (*Tim*, 72)

- I think it was positive, and I thought the instructor …had good things to say, and **things that you should remember to do, so that was good.** Just another kind of reminder, you know?

  (*Kenneth, 73*)

Thank you

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