

## Comparison of Findings Reported by Self-report and Objective Measures of Driving Exposure and Behaviours: A Systematic Review

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### Abstract

We reviewed the peer reviewed scientific literature for road safety studies which had incorporated both self-report and objective measures of driving exposure and on-road behaviours. Utilising the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines, a total of 4,426 articles were identified during the initial search phase, with 20 studies retained for review. Overall, the findings were mixed, with some studies showing general correspondence between self-report and objective measures and other studies showing inconsistencies between these two types of measurement techniques. The implications of the findings for future research will be discussed in the presentation.

### Background

Previous research in road safety has relied heavily upon self-report measures to assess on-road driving behaviours. However, while there has been some evidence supporting the use of these measures as reliable indicators of actual driving behaviour (Taubman- Ben-Ari, Eherenfreund-Hager, & Prato, 2016), self-reports have been criticised for having a number of biases. These bias include, social desirability effects (af Wåhlberg, 2010) and reports of either overestimating or underestimating driving distances (Huebner, Porter, & Marshall, 2006). More recently, and due to technological advancements, more studies are including objective measures in the attempt to understand driving behaviour. To evaluate if disparities (or similarities) exist between these measures, this research systematically reviewed the extant literature in regards to studies which have used both self-report and objective measures of actual driving behaviour.

### Method

The review followed the PRIMSA guidelines (Moher, Liberati, Tetzlaff, Altamn, and the PRISMA Group, 2009). The search strategy was developed by SK, in consultation with IL and JF and conducted in February, 2017. Table 1 presents the search terms. The review comprised of articles published in PsycINFO, PubMed, and Scopus. Due to the large number of articles identified in Scopus, limits were put on language (English) and journals (i.e., road safety and psychophysiology journals). No limits were applied to the remaining two databases. Further, no limits were applied to dates.

In total, 4,426 records were identified (see Figure 1). To proceed to full-text data extraction, articles were required to meet the following criteria, 1). peer-reviewed full-text articles, 2). focused on road safety, and 3). included both subjective and objective measures. Sixteen articles met the criteria, with an additional two articles identified via cross-reference and one article which was known to the authors. One article consisted of two studies (i.e., Taubman-Be-Ari et al., 2016) and therefore, a total of 20 studies were included as part of the review.

### Results

All studies were published in English between 2005 and 2017, with the research conducted in developed counties (i.e., six studies in Australia, six studies in Canada, three studies in the US, three studies in Israel, and one study each in Ireland and Germany). Overall, the studies were found to

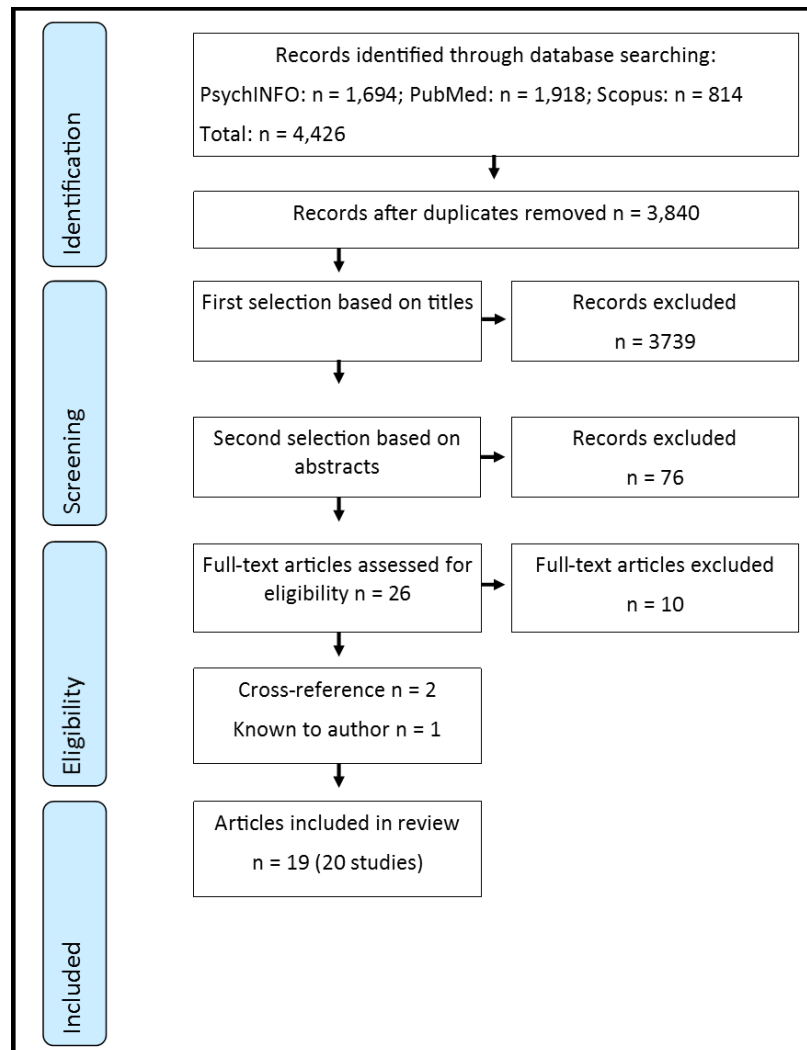
report mixed findings regarding the correspondence between self-report and objective measures. For example, and in terms of driving exposure, Potter et al. (2015) reported that 45.3% of their sample made errors of both under- and over-estimation when estimating their driving exposure. Marshall et al. (2007), however, reported a significant strong positive relationship between self-reported driving, as reported in a driving diary, and in-vehicle devices. In terms of assessing drivers' speeding behavior following exposure to anti-speeding road safety advertisements, Kaye, Lewis, Algie, and White (2016) found that drivers' self-reports, as assessed in a survey, corresponded with objective measures as gained via in-vehicle devices. In contrast, Plant, Irwin, and Chekaluk (2017), also in regards to assessing behavior following exposure to an anti-speeding message, found that actual behaviour change was not associated significantly with self-reported intentions to reduce speeding.

## Conclusions

More research is needed to determine the extent to which disparities (or similarities) exist between self-report and objective measures. Given that research in this field has traditionally relied heavily upon self-report measures, and given the mixed findings that this review has found, further research is needed to examine the correspondence between self-report and objective measures of driving exposure and behaviour. To do so would help to ensure that the methods used offer the most reliable means of assessing on-road behaviours.

*Table 1. Search terms*

	<b>Search terms</b>
<b>Objective measures</b>	objective measure OR driving simulator OR in-vehicle device OR in-vehicle data OR CarChip OR global positioning system OR GPS OR on-board diagnostic system OR OBDII OR physiological OR intelligent speed adaption device OR ISA device OR electronic device
<b>Subjective measures</b>	subjective measure OR self-report OR driving diary OR travel diary OR survey OR questionnaire OR estimate
<b>Behaviours</b>	driving behaviour OR driving behavior OR driving ablit* OR driving exposure OR speed OR distraction OR fatigue OR drink driving OR seat belt OR seat-belt OR driving distance OR persuasi* OR actual behavio* OR on-road behavio* OR self-regulation



**Figure 1. Review and selection process**

## References<sup>1</sup>

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