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A Case Study on the Reliability of Online Driving Aptitude Assessment for Older Drivers

- Study on Driver Characteristics for Delaying Driving Cessation (48) -

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This study aimed to examine the reliability of an online driving aptitude assessment for older drivers by comparing results obtained in an online, remote environment with those from in-person measurements conducted in a university laboratory. Using case data from six participants, the correspondence between the two measurement conditions was analyzed.

With the rapid aging of society, extending driving longevity while ensuring safety has become an increasingly important issue. Online driving aptitude assessments offer advantages such as low burden on examinees and the potential for large-scale and continuous evaluation. However, their measurement accuracy and validity have remained a concern.

In this study, six older drivers (both male and female, aged 60 years and over) participated in both (1) online measurements conducted at home or other remote locations and (2) in-person measurements conducted in a university laboratory. Evaluation items included grip strength, cognitive function assessed by the Trail Making Test (TMT-A and TMT-B), visual field function assessed by the Multi-Stimulus Vision Tester (MVT), and risk judgment assessed by a Hazard Perception (HP) task. In addition, a comprehensive total score integrating these indicators was calculated.

The results showed that grip strength estimates obtained online from questionnaire-based measures exhibited a high correlation with grip strength measured directly during in-person assessments (Fig. 1). This finding indicates that grip strength can be estimated reliably in an online environment using a simple and low-cost method.

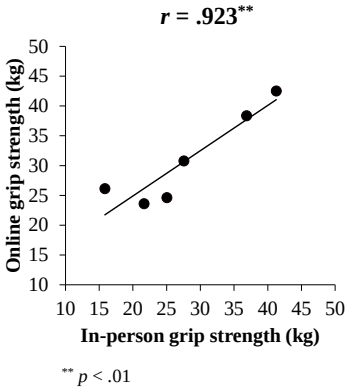
In contrast, for TMT-A and TMT-B, reaction times tended to be longer in the online measurements than in the in-person measurements, suggesting an influence of mouse operation during online testing. Nevertheless, when the weighted composite index (TMTcomp) integrating both TMT-A and TMT-B was used, the correspondence between online and in-person measurements improved. This suggests that with appropriate calibration, online cognitive measures can serve as practical indicators comparable to in-person assessments.

Regarding visual field function (MVT), cases with a high number of unresponsive stimuli showed consistent results between online and in-person measurements, indicating that online testing can identify individuals with suspected visual field deficits. However, when the number of unresponsive stimuli was small, the limitations of online measurements—such as insufficient control of viewing distance and gaze angle—became evident.

For risk judgment (HP), detection rates obtained online were significantly lower than those from in-person measurements. Despite this systematic difference, a clear correlation was observed between the two conditions, implying that online HP scores can be adjusted to approximate in-person results through appropriate correction.

The comprehensive total score also showed a correlation between online and in-person measurements, although online scores tended to be lower overall (Fig. 2). This difference was interpreted as the cumulative effect of systematic differences across individual indicators. Introducing calibration procedures for each indicator may therefore reduce the discrepancy in total scores and further enhance the practical usefulness of online driving aptitude assessments.

In conclusion, this case study demonstrates that online driving aptitude assessments are meaningfully correlated with traditional in-person assessments and have strong potential as simple screening and continuous evaluation tools for older drivers. At the same time, the findings highlight the importance of calibration that accounts for systematic differences between online and in-person measurement environments when applying online data in practical contexts.



** $p < .01$

Fig. 1 Grip strength for in-person versus online measurements.

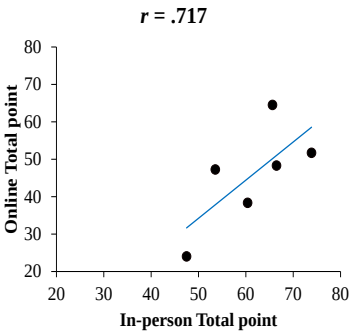


Fig. 2 Total point for in-person versus online measurements.