Visual demands of traffic signs in control drivers and drivers with reading impairment.

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Driving a vehicle places a high burden on the visuo-attentional system. One of the potential sources of increased visual demands while driving are traffic signs. Importantly, the design and content of traffic signs can be carefully considered to minimise the negative consequences of an excessive load, particularly among vulnerable drivers. In this context, the objectives of the current study are twofold. First, we analyse the effect on eye movements of two word-related factors (word frequency and word length) in a driving simulator showing 64 names of cities (e.g. "Barcelona") on a sequence of overhead information signs during a motorway route. Participants were instructed to approach each sign at a constant speed (120 km/h) and read aloud the content as soon as they could correctly do it. Second, we compare gaze indicators of a group of control drivers and a group of participants with reading impairment (dyslexia) while reading the overhead information signs in the simulated driving task. Recent evidence on the neurocognitive bases on dyslexia suggests that their difficulties may be remarkably noticeable while driving, since the visuo-attentional system could be particularly impaired in dyslexic individuals. Previous results in our lab showed significant word frequency and length effects on correct reading distances and also that dyslexic participants had shorter reading distances. Now, we analyse eye-tracking data to clarify whether or not drivers have to invest more gaze time to read long and/or infrequent words on traffic signs and also whether or not adult participants with dyslexia, despite the potential use of compensatory strategies, have to dedicate further time to visually inspect traffic signs before being able to correctly read their content. The ultimate goal of the current study is to assess potential difficulties of dyslexic and non-dyslexic drivers and then propose measures based on cognitive human factors to improve the readability of traffic signs.