Validation of the Expert System Traffic: Results of a Cross-Validation Study

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ABSTRACT:

Driving a car is a practically relevant skill for people of varying age. Thus the question whether deficiencies can be compensated for is a central research question in traffic psychological assessment. However, the empirical data relating to this topic is sparse. Current research conducted by Risser et al. (submitted) sheds some light on this research question. In analyzing the criterion validity of a test battery comprising measures of fluid intelligence, reaction speed, reactive stress tolerance, perceptual speed, peripheral perception, selective attention and divided attention taken from the Expert System Traffic the authors compared the performance of artificial neural networks to the one of a logistic regression analysis in order to determine, whether non-linear relations have to be assumed in order to accurately model the data. Due to the fact that artificial neural networks outperformed logistic regression analysis with regard to classification rate, sensitivity, specifity and validity coefficient the authors concluded, that compensatory effects are best understood in terms of non-linear relations between the criterion and predictor measures. Furthermore, current research indicates, that artificial neural networks also outperform clinical judgment formation pointing to the fact that these non-linear relations are rather complex and might exceed the mental capacity of human diagnosticians. The present study attempts to expand this line of research by investigating the generalizability of the results obtained by Risser et al (submitted) to a larger sample of respondents referred to a traffic psychological examination. The new data set will be used as (1) a validation sample and as (2) a calibration sample to compute an artificial neural network which will be compared to the results obtained by Risser et al. (submitted) in terms of classification rate, network architecture and generalizability across both data sets.