

Effects of Video-Based Reflection and Positive Self-Evaluation on Anxiety in Novice Drivers

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Achieving a safe and reassuring automotive society requires, in addition to the enhancement of safety technologies, support focusing on drivers' psychological peace of mind. Previous studies have shown that performing positive self-evaluations after watching one's own driving footage can reduce anxiety in novice drivers. This method is thought to promote cognitive reappraisal by reinterpreting one's driving from something "dangerous" into something "manageable." However, previous research has been limited to driving on narrow roads, and the applicability to other driving situations remains unclear. In addition, because individuals prone to anxiety tend to evaluate their own performance negatively, asking them to perform positive self-evaluations may impose a psychological burden. Therefore, this study investigates the applicability of a review method combining video viewing and positive self-evaluation in lane-changing scenarios, which tend to cause anxiety for novice drivers. Furthermore, we propose a "stepwise self-evaluation" method in which positive feedback from others precedes self-evaluation, and verify its effectiveness in reducing anxiety.

42 participants with high trait anxiety who drive once a week or less (mean age: 21.3 years) completed two driving trials on a driving simulator course featuring merging and lane changing. The participants were randomly assigned to one of three groups (Control group: Video viewing only, Single self-evaluation group: Video viewing + positive self-evaluation, Stepwise self-evaluation group: Video viewing + positive evaluation by others + positive self-evaluation). Following the first trial, each group reviewed their driving performance according to their designated method. Prior to each driving trial, participants completed a driving state anxiety scale to evaluate changes in driving-related anxiety. Figure 1 shows the experimental setup. Figure 2 shows scene from the reflective video.

As a result, driving state anxiety was significantly reduced during the second trial compared to the first across all groups. The lane-changing course in this experiment provided a relatively manageable driving environment where surrounding vehicles maintained safe following distances and speeds. Therefore, through video viewing, participants may have reinterpreted their driving as manageable upon confirming that they completed the drive safely, which is presumed to have contributed to the decrease in anxiety scores. However, because the anxiety-reduction effect of video viewing alone was substantial, it was not possible to examine differences in anxiety reduction between the single self-evaluation and stepwise self-evaluation methods. Thus, Experiment 2 was conducted with redesigned traffic conditions on the lane-changing course to investigate the environmental factors that influence the anxiety-reducing effect of video viewing and to re-examine the differences between the two evaluation methods.

Compared to Experiment 1, Experiment 2 set up a course with an unsafe environment and high psychological pressure. Specifically, modifications were made such as increasing traffic density, destabilizing surrounding vehicle behavior, and increasing the proportion of heavy vehicles. Participant screening, group allocation, and experimental procedures were identical to Experiment 1, with 44 participants (mean age: 21.4 years) taking part. Figure 3 shows scene from the reflective video.

As a result, a significant reduction in driving state anxiety was observed exclusively in the stepwise self-evaluation group. In complex traffic environments with increased unsafe situations, video viewing alone was likely insufficient to allow drivers to reinterpret driving from dangerous to manageable, and thus anxiety was not reduced. As a reason why no decrease in anxiety scores was observed in the single self-evaluation group, it is possible that the discrepancy between the negative self-awareness of driving and the task of exploring positive aspects generated psychological resistance to the task. In contrast, in the stepwise self-evaluation, positive evaluation by others preceding self-evaluation mitigated psychological resistance and made it easier to positively reinterpret one's own driving, which can be interpreted as leading to a reduction in anxiety.

These findings suggest that in post-driving reflection for novice drivers, it is effective to provide stepwise support incorporating positive feedback from others in situations with high psychological load, while taking into account environmental factors such as traffic complexity.



Figure1 Experimental view



Figure2 Reflective Video (Exp.1)



Figure3 Reflective Video (Exp.2)