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Which Cognitive Tasks Predict Traffic Accidents in Professional Drivers? Comparison between Middle-Aged and Older Drivers*

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While most research on safe driving has focused on young adults and the elderly, professional drivers are typically middle-aged or older adults. To address this gap, we examined differences in cognitive functions between middle-aged and older adult drivers and identified which tasks predicted traffic accidents for each group. We administered tasks related to Useful Field of View, Visuomotor Speed, Spatial Judgment, Visual Working Memory, and Multitasking to each group and compared their performance with traffic accident records from the past 5 years. Results showed that older drivers performed significantly worse than middle-aged drivers on all cognitive tasks except Visuomotor Speed ($p < .10$), which was measured using a foot-pedal. We also found that cognitive function tasks could predict traffic accidents in both groups. Our findings suggest the need to include middle-aged drivers in research on safe driving, and to develop tailored driving aptitude tests that reflect the needs of this population.

Key words : safe driving, professional drivers, cognitive tasks, middle-aged drivers, older drivers

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Introduction

A growing body of literature has continuously investigated the relationship between age and traffic accidents. Most research points to significant differences between young adults and older drivers in terms of accident involvement (e.g., Buckley et al., 2014; Chapman et al., 2014; Chung et al., 2014; Chung et al., 2011; Clarke et al., 2006; Gaines et al., 2011; Kim et al., 2006; Park et al., 2009; Stutts et al., 1998; Wood et al., 2013; Zhang et al., 2019). High traffic accident rates have been linked to various explanations, such as the greater impulsivity of younger individuals or the decline of cognitive abilities in old age (e.g., Classen et al., 2008; Fraade-Blanar et al., 2018; Hatfield et al., 2017; Lundberg et al., 1998; Miller et al., 2021; Pearson et al., 2013; Wong et al., 2012). Although this approach is one way of preventing hazards on the road, a different approach is needed when targeting professional drivers.

In 2020, professional drivers were involved in 19.1% of traffic accidents in the whole South Korea despite the fact that only 7.2% of all registered vehicles are for such professionals to use (MOLIT, 2021). Given the significantly longer time spent on the roads, professional drivers are much more likely to be involved in traffic accidents than non-professional drivers. Moreover, as professional drivers often transport large groups of passengers, the consequences of their accidents can be much more severe. Therefore, it is crucial to comprehensively assess the needs and specifics of professional drivers to reduce the rate of traffic accidents and help prevent road tragedies

The biggest difference between professional and non-professional drivers lies in the age distributions. In 2020, young adults (20-39 years old) accounted for 33.8% of all drivers' license holders in Korea, middle-aged adults (40-64 years old) made up 54.2%, and seniors (65 years or older) comprised 11.1% (TAAS, 2021). However, only 7.5% of professional drivers were young adults, with the majority - 73.2% - being middle-aged, and 19.3% being seniors (TS, 2021). Unlike the general population, individuals under the age of 40 represent only a very small proportion of professional drivers, highlighting the need to examine professional and non-professional drivers separately.

The accident rates for occupational drivers in 2020 were as follows: 68.9% for middle-aged drivers, 26.3% for older drivers, and 4.8% for young adults (TS, 2021). As expected, older drivers had more accidents than predicted by the age distribution. However, the accident rate of middle-aged drivers is still compellingly high, whereas the rate for younger drivers is relatively low. This suggests that research targeting professional drivers should primarily focus on the middle-aged and older groups to decrease the number of traffic accident occurrences. Yet, only a few studies on this topic are currently available, especially those looking into the effects of cognitive decline with age in both groups.

Although cognitive decline has been linked to unsafe driving regardless of age (Alonso et al., 2016; Bahrampouri et al., 2021; Dawson et al., 2010; Kim, 2014; Mayhew et al., 2006; Zicat et al., 2018), cognitive, visual, and physical abilities are known to deteriorate most significantly as one grows older, making age a critical factor for safe driving. However, research has found only a marginal difference between the driving abilities of young adults and middle-aged drivers, with a sharp decline occurring later in the senior age group (Ledger et al., 2019).

According to the systematic review by Depestele et al. (2020), when considering the relationship between cognitive function and driving behavior, a driver's general cognition, visuospatial perception, attention, memory, and executive function have, for example, been linked to proper lane-keeping (Andrews & Westerman, 2012; Bunce et al., 2012). Similarly, one's overall behavior behind the wheel correlates with attention, processing speed, and memory skills (Ledger et al., 2019; Stinchcombe et al., 2011). For a detailed review, see Depestele et al. (2020).

When age is added to the model, although young and middle-aged adults show significantly better overall driving performance than the elderly, the difference in cognitive functions between the first two age groups remains marginal. Stinchcombe et al. (2011) found only a minimal variation between young and middle-aged drivers' performance when looking at their attention and response times, utilizing Useful Field of View, Simple Reaction Time (RT), Choice (RT), and Trail Making tasks. Another study reported no difference between the two age groups on the Cellphone Task, which tests the effect of low to moderately demanding distraction while driving (Reimer et al., 2008).

Few studies have explored the relationship between cognitive function and driving ability in both middle-aged and older adults (Alonso et al., 2016; Dawson et al., 2010). Dawson et al. (2010) found that older adults exhibited lower performance than middle-aged individuals on all cognitive tasks except the Complex Figure Test (CFT)-Copy and the Structure From Motion tasks when comparing the two age categories, with older drivers making overall 24% more driving safety errors than middle-aged ones.

The same study also reported an inverse correlation between safety errors and performance on CFT-Copy, CFT-Recall, Block Design, Near Visual Acuity, and the Grooved Pegboard tasks (Dawson et al., 2010), indicating that among other cognitive skills, visuospatial and visuomotor abilities are crucial predictors of driving performance in older adults. However, since the study mainly focused on senior drivers, it is unclear whether visuomotor abilities would predict safety errors in middle-aged drivers in the same way since the predicting factors for middle-aged drivers remain unidentified (Dawson et al., 2010). Furthermore, since Dawson et al. (2010) did not find any significant relationship between age and safety errors in the middle-aged group, it is likely that the factors influencing safe driving differ between the two age groups.

The purpose of this study was to expand previous research and focus on cognitive abilities predicting safe driving of both middle-aged (40 to 64 years old) and older drivers (65 and above) who account for the majority of professional drivers. So far, only a very few studies examined the cognitive factors predicting safe driving according to drivers' age despite the fact that cognitive ability has already been identified as a critical predictor of safe driving not only in the case of senior drivers. Moreover, in many OECD countries such as the US, UK, Japan, Germany, Denmark, New Zealand, and South Korea, cognitive ability-focused aptitude tests are already being required. This study has the potential to offer further suggestions for such future measures

Our study specifically targeted cognitive abilities that have shown to possess a strong relationship with safe driving - attention (Ball et al., 1993; Duchek et al., 1998; Hutchinson & Badham, 2013; Kim et al., 2011; Kwon, 2014; Park et al., 2006; Richardson & Marottoli, 2003; Son & Park, 2013), visuomotor speed (Horswill et al., 2015; Park et al., 2006; Shin & Lee, 2012), visuospatial judgment (Etienne et al., 2013; Lee et al., 2008; Owsley et al., 1999; Verhaeghen et al., 2002), and visual working memory (Lafont et al., 2008; Lim & Lee, 2012; Park et al., 2006; Son & Park, 2013). Previous studies have indicated that attention, visual-related functions, and memory are highly correlated with driving performance and tend to decline significantly with age (Bahrampouri et al., 2021; Depestele et al., 2020; Tarawneh et al., 1993). In addition, since driving is a task that requires the use of multiple cognitive functions in a complex manner, testing each cognitive ability one by one would be insufficient to fully evaluate drivers' real-life performance. Additionally, we chose to assess drivers' multitasking skills by examining their ability to switch between cognitive functions and use more than two at the same time (Wechsler et al., 2018). This allows us to further enrich prior research which has mainly focused only on a limited number of cognitive functions at once or only on drivers' multitasking abilities (Alonso et al., 2016; Bahrampouri et al., 2021; Dawson et al., 2010; Wechsler et al., 2018; Zicat et al., 2018).

Overall, the results of this study not only allow for a deeper understanding of the relationship between cognitive abilities and safety in middle-aged and older drivers but also have the potential to contribute to the creation of more comprehensive aptitude tests for professional drivers based on their respective age and establish further related interventions. By clarifying which different cognitive abilities decline with age in middle-aged and elderly drivers, this research establishes a solid base for regular driving aptitude testing targeted at the essential cognitive skills of professional drivers. We thus expect to improve the current system and help prevent traffic accidents.

Method

Participants

For this study, we recruited participants through South Korean professional drivers associations: the Seoul Metropolitan Townbus Association, Seoul Private Taxi Association, Seoul Metrobus Company Association, and Korea Trucking Association. The initial sample consisted of 260 professional drivers with more than 5 years of driving experience. During the data analysis stage, due to incomplete data, one participant was excluded, making the final number of participants 259 - see Table 1 for a complete summary. The Older Drivers group consisted entirely of male participants. Out of the Middle-aged Drivers group, 4 participants were female, and the remaining 117 were male. Before proceeding with the experiment, we asked all participants to provide proof of normal or corrected-to-normal vision and a valid driver's license. All 260 participants received a monetary reward after completing all tasks.

Table 1. Summary of Participant Data

	Middle-aged (n = 117)	Older (n = 142)
	$M(SD)$	$M(SD)$
Average age	55.55 (6.44)	68.29 (2.84)
Average range	40~64	65~77
Average Driving Exp. (Years)	19.61 (9.65)	28.19 (12.02)

Apparatus

For the experiment, we created a simple driving cabin to measure participants' cognitive and visual abilities in an environment that replicates real-life driving conditions. The cabin was equipped with a 27-inch LCD monitor, a reaction plate with buttons, a joystick, driving pedals, and a main computer body. During the multitasking trial, participants were provided with headphones to receive auditory stimuli.

Cognitive and visual tests

We measured each participant's cognitive abilities (Visuomotor Speed, Visual Working Memory, Spatial Judgment) and visual ability (Useful Field of View), which have been identified as two central components of the Multifactorial Model of Driving Safety (Anstey et al., 2005). In addition, we also assessed participants' multitasking ability, an essential skill for driving that has been largely overlooked by previous studies focusing on neuropsychological assessment batteries (Dawson et al., 2010).

Useful Field of View (UFOV)

The useful field of view (UFOV, see Figure 1) task evaluates age-related declines in a person's visual function. We adopted a measurement used in previous research (Ball & Owsley, 1993), asking the participants to find a target that appeared momentarily on the edges of the screen. Each test item consisted of three slides. First, a small red circle was presented in the middle of a black screen for 2,600 ms. Then, on another screen, three concentric circles appeared, each made up of small inverted triangles. In one of the eight quadrants of the largest circle, a car-shaped image popped up for 400 ms. Lastly, eight small rectangles, one in each of the eight quadrants, were shown delineating a circle the size of the outer ring of the circle from the prior screen. At that time, we asked participants to mark the spot where the car-shaped image had appeared on the prior slide. The whole task consisted of 16 trials, beginning after one practice trial. The collected value was the number of correct responses, with the maximum being 16.

Visuomotor Speed (VS)

The Visuomotor Speed (VS) task assessed participants' reaction time to visual stimuli (see Figure 2). In neuropsychological research, VS task is used to measure reaction time specifically to stimuli unrelated to each other. In this study, stimuli were designed to relate to real-life driving situations. Participants were seated in front of an LCD screen displaying a generic road image, and at the same time, we asked them to have their right foot ready on the

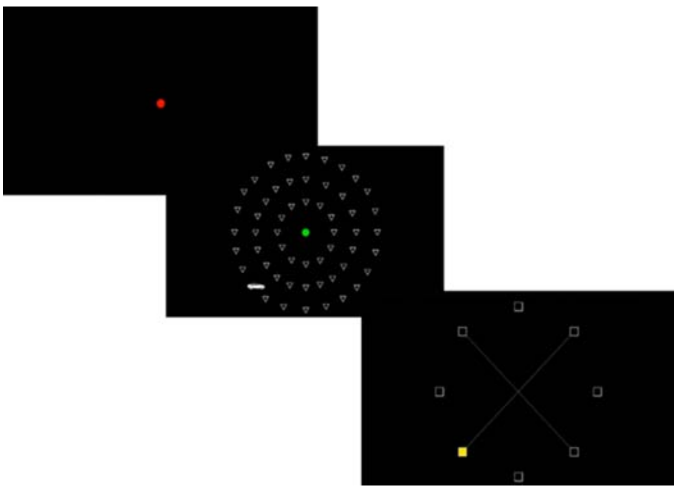

Figure 1. An example of three slides for the UFOV item

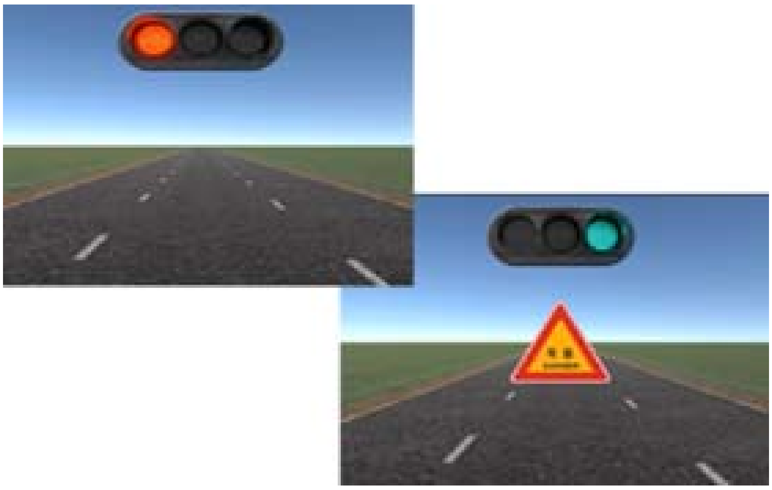

Figure 2. An example of the screen displayed in the VS test

accelerator section of the foot-pedal (connected to a computer). When a start signal popped up on the screen, participants were supposed to step on the accelerator, and as long as the traffic light located at the top center of the screen was green, keep accelerating. While doing this, the screen showed a projection simulating the participant's move forward on the road - as if they were driving a real-life vehicle. We instructed participants to brake (step on a brake section of the foot-pedal) as quickly as possible whenever the traffic light on the screen turned red or if a "danger" sign appeared on the monitor. When the traffic light turned green again or the danger sign disappeared, they were supposed to take their foot off of the brake, step on the accelerator, and continue driving as before. Following one practice round, the main task began with a total of 10 red signal and 5 danger signs presented in a random order. The final collected measure was made up of the total time from the moment a red light/danger stimulus appeared on the screen until the participant stepped on the brake.

Spatial Judgment (SJ)

The Spatial Judgment (SJ) task evaluated participants' ability to sense and judge useful spatial information (See Figure 3). SJ tasks are usually relatively straightforward, for example, picking out specific information from a larger variety of spatial cues or comparing cues within given spatial information (Turriziani et al., 2009). However, in this study, we modified the task to include spatial cues reflecting real-life driving conditions. Participants were asked to - as quickly as possible - choose which of the roads presented to them on the screen led from the starting point to their desired destination (garage). Each round varied by difficulty level,

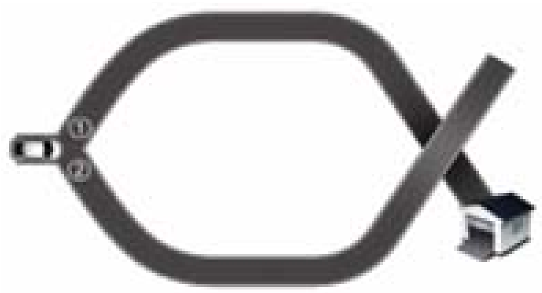

Figure 3. An example of the screen presented in the SJ test

according to the number of roads and intersections presented on the screen. Participants had 20 seconds to choose the correct road from the moment the stimulus appeared. After two practice trials, the main task started made up of a total of 20 trials. The measurement was the number of correct answers given within the allotted time.

Visual Working Memory (VWM)

The Visual Working Memory (VWM) task measured participants' ability to temporarily retain and recall visual stimuli in their minds (See Figure 4). We followed the VWM measurement system used in previous neuropsychological research (Vogel et al., 2001) modifying it to suit driving situations. Participants were asked to remember road names and directions in order to find their desired location, which was revealed on the screen. First, streets with road signs (designed to resemble real-life road signs) indicating street names and directions to various destinations were presented to the participants on the screen for 6 seconds. Then, the signs disappeared and a command to select the correct direction toward a specific destination (also shown on the screen) appeared. Participants were given 5 seconds to select what they believed was the correct way. Following two practice trials each respondent completed 15 rounds. The final measure consisted of the total number of correct answers out of 15.

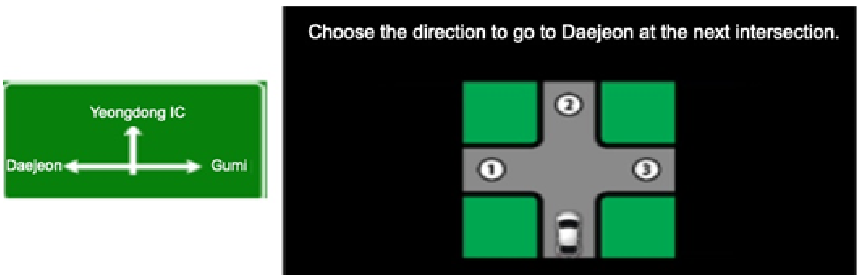

Figure 4. An example of the screen presented in the VWM test

Multitasking

The Multitasking task aimed to assess participants' ability to process two or more sensory information at once (See Figure 5). Such tasks typically require one to perform two or three different activities simultaneously (Burgess et al., 1996). We decided to focus on sensory reactions commonly co-occurring during driving: auditory, visual, and motor functions. Through headphones, participants were presented with an auditory string of numbers and asked to respond whenever they heard the number "seven" (Auditory Task). Each participant listened to a total of 80 numbers following in two-second intervals, with the number "seven" occurring a total of 20 times. At the same time, mimicking a real-life driving experience, we asked participants to avoid visible obstacles on the highway displayed on the screen in front of them using a joystick (Motor Task). Finally, we instructed them to press either a red or a green button matching it with the color appearing at the center top of the screen every eight seconds (Visual Task). After several practice trials, participants completed the main task, which lasted for a total of 160 seconds. The Auditory Task was assessed based on the total number of times the participant correctly responded to the number "seven" cue (out of 20), the Motor Task was evaluated based on the number of times a participant failed to avoid any of the obstacles on the highway. In the Visual Task, we counted the number of times a correct matching color button was pressed. All three tasks were carried out simultaneously by the participant during the whole duration of 160 seconds.

Unsafe driving: Traffic accidents

As the dependent variable in this study, we obtained each participant's traffic accident record for the past five years from the official police database. Unfortunately, due to practical constraints,

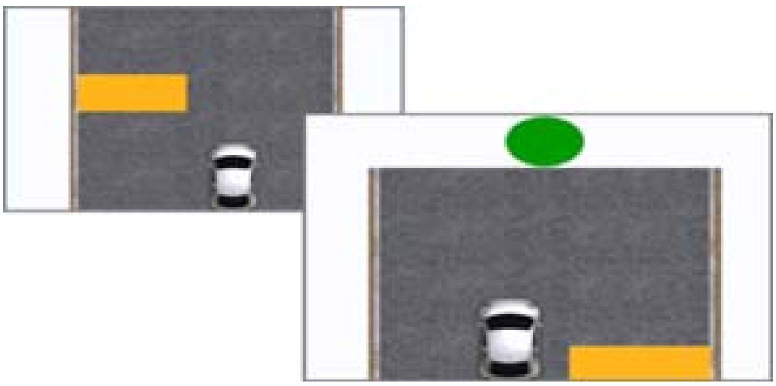

Figure 5. An example of the screen presented in the multitasking test

we were unable to measure variables related to unsafe driving behavior in this experiment.

Results

Between-group differences for the cognitive and visual tasks

The results of the cognitive task performance of each group are presented in detail in Table 2. The difference between the two groups was significant for all cognitive tasks except the Visuomotor Speed Task which reported only a marginally significant difference. As expected, Middle-aged Drivers performed better than Older Drivers on all cognitive tasks.

Predicting traffic accidents using performance on cognitive tasks

We performed multiple linear regression analysis to evaluate which cognitive tasks significantly predicted unsafe driving in both groups. The measures from each of the tasks were log-transformed and entered as predictors of each participant's traffic accident record. Age, which was hypothesized to affect the accident rate, was also included in the model. In the case of the Middle-aged Drivers group, the motor and visual tasks included as part of the Multitasking trial significantly predicted the number of traffic accidents, explaining 13.5% of accident rate variance $F(8, 116) = 2.10$, $p < .05$, and $R^2 = .135$. When looking at Older Drivers, our cognitive tasks also significantly predicted the number of traffic accidents, explaining 13.6% of the total variance. $F(8, 141) = 2.62$, $p < .05$, and $R^2 = .136$. However, the specific predictors differed from the Middle-aged Group: in the case of Older Drivers Useful Field of View, Spatial Judgment, and Visual Working Memory tasks were all significant predictors of traffic accidents. A

Table 2. Summary of Group Differences for Cognitive Tasks

	Middle-Aged *M*(*SD*)	Older *M*(*SD*)	*t*
Useful Filed of View	15.17 (1.28)	13.81 (2.60)	5.48******
Visuomotor Speed	0.71 (0.13)	0.73 (0.13)	-1.78†
Spatial Judgment	18.34 (2.07)	17.69 (2.11)	2.49**
Visual Working Memory	12.21 (1.98)	10.61 (2.42)	5.85******
Multitasking_Motor	2.52 (2.39)	4.34 (3.89)	-4.61******
Multitasking_Auditory	74.79 (7.06)	70.57 (12.14)	3.48****
Multitasking_Visual	19.48 (1.30)	18.75 (2.87)	2.69****

******$p < .001$, ****$p < .01$, **$p < .05$, $^{\dagger}p < .10$

summary of the regression coefficients for each predictor in both age groups is presented in Table 3.

Discussion

This study aimed to compare the cognitive abilities of middle-aged and senior drivers, who are currently representative of most professional drivers in South Korea. We further examined which cognitive tasks predict safe driving behavior by referring to official traffic accident records. Our research not only provides an important answer to which cognitive tasks relate to safe driving in middle-aged adults but also

Table 3. Summary of Regression Coefficients for Predictors in Each Age Group

Predictor	*B*	*SE*	β	*t*
Middle-Aged drivers				
Constant	35.88	15.13		2.37*
Age	-0.02	0.05	-.05	-0.49
Useful Field of View	-2.64	2.94	-.09	-0.90
Visuomotor Speed	0.98	1.45	.06	0.68
Spatial Judgment	-1.85	1.96	-.09	-0.94
Visual Working Memory	0.92	1.44	.07	0.64
Multitasking_Motor	0.87	0.40	.22	2.18*
Multitasking_Auditory	0.14	2.59	.01	0.06
Multitasking_Visual	-7.64	3.29	-.22	-2.32*
Senior Drivers				
Constant	9.77	7.76		1.26
Age	0.03	0.08	.04	0.42
Useful Field of View	-1.86	0.77	-.21	-2.42*
Visuomotor Speed	-0.93	1.30	-.06	-0.72
Spatial judgment	-3.83	1.64	-.20	-2.34*
Visual Working Memory	1.71	0.83	.17	2.06*
Multitasking_Motor	0.05	0.27	.02	0.17
Multitasking_Auditory	1.48	1.15	.28	1.29
Multitasking_Visual	-1.32	1.49	-.19	-0.89

$^{*}p < .05$

displays greater objectivity and connection to real-life situations than many past studies achieved by using existing accident records rather than relying solely on self-reported measures.

As predicted, middle-aged drivers outperformed older drivers on all cognitive tasks except for the Visuomotor Speed Task. This result is consistent with previous research that found older drivers have worse cognitive task performance than their middle-aged counterparts (Dawson et al., 2010). However, Dawson et al. (2010) reported a significant difference ($p < .001$) in the Grooved Pegboard Test, which measures drivers' motor speed. This discrepancy may be due to differences in the study sample and measurement methods. In Dawson et al.'s study, participants were general drivers, and motor speed was measured using a task performed with their hands. Our study, on the other hand, only included driving professionals, and our motor speed task required participants to use a pedal similar to a real-life car brake. It is possible that professional drivers' foot-stepping motor speed may be less affected by aging because they perform such actions more frequently than the general population. Previous research has suggested that the speed of cognitive decline resulting from aging is moderated by one's expertise and training (Kramer & Willis, 2002; Williams & Kemper, 2010). Our findings suggest that traditional cognitive task performance may not always accurately reflect real-life driving performance, as there was no difference in motor speed between middle-aged and older drivers. Therefore, future research should use tasks that closely mimic the target behavior to improve the accuracy of cognitive performance assessments.

Other major finding of our study is that the predictors of safe driving were not identical for both age groups, despite a shared explained traffic rate variance of approximately 14%. While extensive research has examined the cognitive functions related to hazardous driving and informed many aspects of driving aptitude tests, only a few studies have explored whether such general cognitive functions predict traffic accidents in real life. Specifically, the causal relationship between cognitive function and traffic accidents in middle-aged drivers, who make up the majority of professional drivers, has not been adequately investigated. Our study has revealed that multitasking - motor and visual tasks - may predict driving behavior in middle-aged drivers. These results have important implications for the composition of driving aptitude assessments, given that multitasking is currently mostly included in tests targeting senior drivers.

In contrast, for older drivers, the Useful Field of View, Spatial Judgment, and Visual Working Memory tasks were all significant predictors of traffic accidents, while multitasking was not a significant predictor. These results are consistent with previous studies that have highlighted the role of Useful Field of View and Visuospatial

Abilities tasks in predicting safe driving in the senior population. (Dawson et al., 2010; Ledger et al., 2019; Goode et al., 1998; Hoffman et al., 2005; Sims et al., 2000). The fact that tasks related to actual traffic accident records differ between the two age categories suggests that different cognitive abilities can explain individual differences in safe driving depending on one's age.

During middle age, cognitive decline is not yet very prominent, so individual differences in performance on simple tasks are less relevant, and it is instead necessary to focus on variation in drivers' multitasking ability. In contrast, for older drivers, cognitive decline occurs much more commonly and severely, and individual differences are more pronounced when looking at simple cognitive tests, rather than in complex and difficult tasks such as multitasking, which show minimal variation between individuals.

To our knowledge, this is the first study to demonstrate that cognitive tasks which effectively predict traffic accidents differ between middle-aged and older drivers. This finding has significant implications for future practice, as it suggests that aptitude tests for professional drivers should be tailored to each age group. Age-specific tests can improve the effectiveness of predicting safe driving while simultaneously becoming more focused, leading to shorter and simpler assessments. It is worth noting that current aptitude tests in South Korea only include a multitasking ability assessment for senior drivers, which contradicts our findings. Therefore, it is crucial to further verify our results through future research and consider revising aptitude tests to better account for the unique cognitive abilities of drivers in different age groups.

We suggest implementing regular aptitude tests for professional drivers as they progress through different age groups to ensure their continued competence. Additionally, developing targeted educational training programs aimed at improving cognitive functions that are known to decline significantly with age would be beneficial. For instance, the training curriculum could focus on the cognitive functions that drivers exhibit the weakest performance in, as identified by their aptitude test results.

In addition, previous research has shown that older drivers tend to use various compensatory strategies, such as intentionally reducing their speed or increasing their time headway, to counteract the risks posed by their cognitive decline (Chen et al., 2021). Therefore, based on individual test results, providing professional drivers with a systematic compensation strategy guide that corresponds to their most vulnerable cognitive functions may be another crucial way to enhance safety on roads.

Finally, the focus has primarily been on the traffic accidents of either the young or the elderly, with the relationship between cognitive function and safe driving remaining unidentified across all age groups equally. However, unlike the general driving population, professional drivers are predominantly middle-aged adults, indicating the need to appropriately develop optimal driving aptitude tests that are inclusive of all ages and target the specific needs of the middle-aged driver population. This will require additional research as well.

Limitations

This study had several limitations. Firstly, although we aimed to examine which cognitive predictors of traffic accidents are significant according to drivers' age, our study scope did not include all age groups, excluding young adults. While some researchers have suggested that cognitive functions related to safe driving may not differ significantly between young and middle-aged adults (e.g., Stinchcombe et al., 2011; Reimer et al., 2008), only a few studies have directly examined safe driving predictors across all age groups. Therefore, in the future, it is necessary to confirm which cognitive tasks predict traffic accidents for all age groups, including young adults, middle-aged adults, and senior drivers.

Secondly, since the majority of our sample was male, our results might not be fully applicable to female drivers. Although gender differences in cognitive decline have been found to be negligible (Barnes et al., 2003), future studies should verify this by including more female drivers.

Thirdly, for our dependent variable, we obtained traffic accident records based on the model proposed in previous research (Chan & Chen, 2011; León-Domínguez et al., 2017). However, longitudinal studies are needed to more accurately understand the causal relationships between our proposed variables.

Finally, although we maintained the structure of traditional neuropsychological tests when conducting the cognitive tasks, the images and methods used were modified to resemble real-life driving experiences. Our findings are mostly consistent with those from unmodified neuropsychological tests, but the results of the Visuomotor Speed Task suggest that there may be differences between the measures of motor speed depending on whether participants respond using their hand or their foot. Therefore, future research should directly compare the two methods.

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교통사고 예측 인지과제에 대한 연령의 효과: 중년 및 고령 사업용 운전자 비교

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연령과 안전 운전 간 관계에 대한 연구는 주로 청년과 고령 운전자 간 비교에 집중되어 왔다. 본 연구는 일반 운전자와 달리 사업용 운전자의 대부분을 차지하고 있는 중년 및 고령 사업용 운전자의 인지기능 차이와 두 집단에서 교통사고를 예측하는 인지 과제가 어떤 것인지 알아보고자 하였다. 40-64세 중년 직업운전자와 65세 이상의 고령 직업운전자를 대상으로 인지 기능을 측정하는 과제가 실시되었으며, 과거 5년간의 교통사고 기록이 종속변인으로 사용되었다. 분석 결과, 브레이크를 밟는 속도로 측정된 Visuomotor Speed (p < .10)를 제외한 모든 인지 과제에서 고령운전자가 중년 운전자보다 유의하게 낮은 수행을 보였다. 또한 중년 운전자 집단에서는 멀티태스킹 과제 중 시각과 운동 과제만이 교통사고에 대한 유의한 예측자였던 반면 고령운전자 집단에서는 Useful Field of View, Spatial Judgment and Visual Working Memory가 유의한 예측자였다. 이러한 결과를 바탕으로 시사점과 추후 연구에 대한 방향성이 논의되었다.

주요어 : 안전운전, 직업운전자, 인지과제, 중년운전자, 고령운전자