A BIVARIATE ORDERED PROBIT MODELING FOR KOREAN YOUNG DRIVERS’ RISKY BEHAVIOR AND PERCEPTION

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ABSTRACT
It has been known that young drivers are more reckless and less experienced, and are more likely to cause traffic crashes and violate traffic rules. The fatal crash rate of young drivers in Korea is 94.5 per 100,000 licensed drivers whereas overall rate is 66.3, which shows that the higher crash rate of young drivers is one of serious traffic safety problems in Korea. There have been many studies exploring the young drivers’ attitudes, perception, and behavior in other countries. The study of Vassallo et al. (2007, 2008) analyzed young drivers in Australia, and found that specific behavior such as over-speeding, drowsy driving, and not wearing a seat belt might increase the probability of traffic violations and crashes. Hassan and Abdel-Aty (2013) explored the safety implications of young drivers’ behavior, attitudes, and perceptions in the United States. The results discovered that in-vehicle distractions, attitudes toward speeding and demographic factors were significant for young drivers’ crash involvement in the United States while exceeding speed limits was the major reason for receiving citations. Alver et al. (2014) investigated the relationship between sociodemographic characteristics, traffic violations and crashes among young drivers (18-29 years old) in Turkey. The authors identified that DUI (driving under the influence), exceeding the speed limit, and not fastening a seat belt while driving are the most common traffic rule violations and are significant factors in crash involvement. Hassan (2016) examined the driving behavior of young drivers (18-24 years old) in Saudi Arabia. The study aimed to discover the significant factors associated with crash involvement and traffic violations. The author showed that an aggressive behavior (i.e., pressing the brakes and accelerator simultaneously), an ordinary behavior (e.g., driving so close to the car in front that it would be difficult to stop in an emergency), attitudes toward speeding were the significant factors for Saudi young drivers’ crash involvement. The author revealed that exceeding the speed limit, running late, and testing the performance of the car or showing off were the main reasons for traffic violations.

However, not many efforts have been conducted to gain in-depth understanding of the specific behavioral problems of young drivers in Korea. Thus, the main objective of this study is to investigate and provide in-depth understanding of the attitudes, perceptions and behavior of Korean young drivers aged between 18 and 24 years old. Overall 188 survey questionnaire responses were collected to find the significant factors affecting the involvement of young drivers in crashes and traffic violations in Korea. The survey targeted a random sample of young drivers in South Korea: Respondents were limited to adults between the age of 18 to 24 years who have a valid driver’s license. Two approaches were used for the survey; the first survey approach was handout questionnaires. Two hundred forms
were printed and distributed randomly in December 12-16, 2011 among undergraduate students at Ajou University. A total of 158 completed forms were collected. However, five forms were disregarded since they had many missing or improper responses. Therefore, 147 handout surveys’ forms were used in the analysis. Furthermore, 37 responses were received on-line by the survey’s website. Two responses were removed because they were filled out by drivers older than 24 years old. The majority of the responses (81%) were collected by hard copies and 19% of responses were gathered on-line. Two-way analysis was conducted to find out factors associated with age, gender, crash and traffic violations, as a preliminary analysis.

Based on these factors, a bivariate ordered Probit model was developed to identify the contributing factors for crash occurrences and violations. The bivariate model enables to estimate the two subject variables (i.e., crash occurrences and violations) simultaneously and handle the shared unobserved heterogeneity across them. The crash occurrence modeling result indicated that the respondent’s age, whether daily transport mode is car, adjusting car audio, driving under the influence of alcohol, and cell phone use while driving are positively related with the crash occurrence. On the other hand, seat-belt use, yield for pedestrians and bicycles to pass first, and driving cautiously at night have a negative association. In addition, the violation occurrence modeling result showed that respondent’s age, whether daily transport mode is car, adjusting audio, and using cell phone while driving at adverse weather have a positive relationship with the traffic violations, whereas yielding for pedestrians and bicycles to pass first is negatively associated.

It is concluded that there are several dangerous actions and attitudes that increase the possibility to be involved in at-fault crashes and traffic violations for young drivers in Korea. These results can be used for municipal government officials, police and driving school instructors to focus on specific items to ameliorate the driving behavior and attitudes, which have effects on traffic crashes as well as traffic violations, by young drivers in Korea. Although we have found several significant dangerous driving behavior and attitudes, it would be beneficial if we extend our investigation to identify whether those actions originate from certain demographic, socioeconomic, cultural or educational groups within Korea or could be generalized to the whole country or similar rapidly developing countries in south east Asia. In addition, whether some of these aspects are unique to the region or a common nature of young drivers worldwide.