Due to comfort, convenience, and flexibility, taxis become more and more prevalent in China, especially in large cities. As reported by Beijing Traffic Development Research Center, there were 696 million taxi person-rides in Beijing in 2011. However, many violations and road crashes that were related to taxi drivers occurred more frequently. According to the survey, there were a total of 17,242 taxi violations happened in Beijing in only one month in 2003, which accounted for 56% of all drivers' violations. Besides, taxi drivers also had a larger accident rate than other drivers, which showed that nearly 20% of taxi drivers had accidents each year. This study mainly focuses on investigating differences in driving behavior between taxi drivers and non-professional drivers. To examine the overall characteristics of taxi drivers and non-professional drivers, this study applied a hierarchical driving behavior assessment method to evaluate driving behaviors. This method is divided into three levels, including low-risk level, medium-risk level, and high-risk level. Low-risk level means the basic vehicle control. Medium-risk level refers to the vehicle dynamic decision. High-risk level represents the driver avoidance behavior when facing a potential crash. The BJTU driving simulator was applied to test different risk level scenarios which purpose is to find out the differences between taxi drivers and non-professional drivers on driving behaviors. Nearly 60 subjects, which include taxi drivers and non-professional drivers, were recruited in this experiment. Some statistical methods are applied to analyze the data and a logistic regression model is used to perform the high-risk level. The results showed that taxi drivers have more driving experience and their driving style is more conservative in the basic vehicle control level. For the car following behavior, taxi drivers have smaller following speed and larger gap compare to other drivers. For the yellow indication judgment behavior, although taxi drivers are slower than non-professional drivers when getting into the intersection, taxi drivers are more likely to run red light. For the lane changing behavior, taxi drivers' lane changing time is longer than others and lane changing average speed of taxi drivers is lower than other drivers. Another different behavior in high-risk level is that taxi drivers are more inclined to turn the steering wheel when facing a potential crash compared to non-professional drivers. However, non-professional drivers have more abrupt deceleration behaviors if they have the same situation. In general, taxi drivers spend a large amount of time on the road so that the driving experience of taxi drivers must exceed that of non-professional drivers, which may bring more skills to taxi drivers.