Inter-rater reliability of vehicle color perception for forensic intelligence

ABSTRACT

The topcoat color of motor vehicles offers vital information while investigating vehicular accidents, especially in instance of hit-and-run, since witnesses seldom perceive and retain the plate details. Differences in color perceptions among individuals with normal vision may lead to confusion in determining the color of the car involved. In this way, witnesses of crash accidents could potentially initiate flawed leads in forensic investigation, and thus affect the administration of justice. In this study, the inter-rater reliability of vehicle color determination by different volunteers was explored. Six individuals observed the topcoat colors of 500 stationary and 500 moving vehicles from five locations, employing a common system of color gradation. The outcome was binary: the vehicle color was either a "match" or "non-match". This was followed by statistical analysis in terms of the colors' frequencies and inter-rater reliability, based on which more suitable color descriptions were determined for subsequent comparisons of stationary and moving vehicles. Higher match frequencies and greater interrater reliability were observed when color gradations were disregarded. The frequency of correct matches could have been closely related to their relative on-the-road distribution, regardless of the statuses of observed vehicles. It was also found that black and white were associated with a greater number of matches than were intermediate colors, which should be carefully interpreted during forensic investigation to avoid wrong leads. In conclusion, the present study demonstrated the forensic significance of vehicle topcoat color determination, particularly in cases where witness statements are crucial.