



Using a multidimensional Rasch model approach to measure the police's perceived ability to detect, detain and intercept DWI vehicles when conducting sobriety checkpoints

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ABSTRACT

This study developed a scale to measure 502 Taiwan traffic police officers' perceived ability to detect, detain, and intercept those vehicles whose drivers are driving while intoxicated (DWI) when conducting sobriety checkpoints. Through factor analysis, the officers' enforcement ability was found to consist of two component latent traits: detecting ability (DA) and detaining and intercepting ability (DIA). A multidimensional approach of Rasch models was then applied to measure the police officers' perceived abilities and particular difficulties in conducting sobriety checkpoints. The study results indicated that the majority of police officers performed well in detecting DWI vehicles, but half of the study participants lacked confidence in detaining DWI vehicles and intercepting escaping DWI vehicles. DWI with *weaving* was found to be the most aggressive and threatening behavior to traffic police when conducting sobriety checkpoints. Police officers over age 46 were found to have significantly lower DA and DIA, while branch captains were found to have significantly higher DA than their colleagues. Several strategies and programs are suggested based on the study findings to improve the enforcement ability of police officers.

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1. Introduction

According to statistics for 2002–2010 provided by the Taiwan National Police Agency, on average, drunk driving accounted for 10,618 injury accidents and resulted in 539 fatalities each year. It was ranked the most important contributing factor to fatal accidents in Taiwan. These data indicated that drunk driving is a severe problem and reducing this illegal driving behavior is critical for road safety improvement. Indeed, countermeasures associated with engineering, education and enforcement have been evolved considerably around the world to deal with drunk driving. However, road safety enforcement has been especially emphasized as a deterrence that acts to improve traffic safety through increasing individual's perceived expected cost and hit rate of engaging drunk driving (Tay, 2005a,b,c,d, 2009, 2010; Tay and de Barros, 2011).

Chang and Yeh (2004) studied the lifecycle of the policy for reducing drunk driving in Taipei and found the number of arrested drunk driving offenders had significant and constant effect on reducing fatal drunk driving accidents over time, but the effect of

increasing punishment would significantly decline as time elapsed. It seems to show that increasing the probability of apprehension is more effective than increasing punishment for reducing fatal drunk driving accidents, even though they are the two primary impetuses of deterrence in law enforcement (Tay, 2005a; Tay and de Barros, 2011).

Many enforcement measures have been utilized to deter drivers from driving while intoxicated (DWI), including sobriety checkpoints, saturation patrols and integrated enforcement (NHTSA, 2006). Nearly all of them were found to be effective in reducing alcohol-related vehicular accident fatalities and injuries (Elder et al., 2002; Epperlein, 1985; Lacey et al., 1986; Welki and Zlatoper, 2007). Among these measures, sobriety checkpoints have been used in many countries such as the United States and New Zealand for more than two decades as a strategy to enforce laws against intoxicated driving.

The checkpoints have been proven effective in reducing alcohol-related accidents (Watson et al., 1994; Epperlein, 1985; Lacey et al., 1986; Voas et al., 1985). Levy et al. (1988, 1990), and Ross (1992) further confirmed that frequent checkpoints could substantially reduce alcohol-related vehicular accidents. In the case of sobriety checkpoints, Watson et al. (1994) indicated that operating Reduced Impairment Driving (RID), in which the police are restricted to detaining and testing only drivers whom they suspected had been DWI, could be highly successful in reducing the number of

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