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Distracted pedestrians in crosswalks: An application of the Theory of Planned Behavior

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ABSTRACT

Thousands of adult pedestrians are killed or injured each year. In spite of ever growing knowledge of correlates of risk pedestrian behavior, much remains to be learned. A small body of research has applied the Theory of Planned Behavior (TPB) to the problem of risky crossing decisions. We employed TPB to examination of intentions to cross under varying types of distraction. Eighty adults completed measures of injury exposure, followed by a questionnaire structured around TPB assessing intentions to cross streets under common conditions of self-imposed distraction. Results were similar to other research, suggesting attitude and perceived behavioral control predicted intentions to cross streets while distracted. Results are discussed in the context of similar studies, and with regard to future directions and injury prevention efforts.

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1. Introduction

Pedestrian injury is a major public health problem among adults. Each year more than 68,000 adult pedestrians 18–35 years of age are injured in collisions with motor vehicles in the United States ([National Center for Injury Prevention and Control \[NCIPC\], 2015](#)). In addition, approximately 1400 fatalities occur among pedestrians in this age range ([NCIPC, 2015](#)). Pedestrian injury among younger adults also constitutes a significant financial burden for society. Data from 2005 indicate the cost of medical expenses and lost wages among younger adults injured as pedestrians exceeded 1 billion US dollars, and was more than 180 million for injuries requiring treatment and release from an emergency room ([NCIPC, 2015](#)).

Research over the past two decades has increased knowledge of behavioral antecedents of pedestrian injury. Earlier work linked pedestrian injury risk to environmental characteristics (e.g., [Roberts, Norton, Jackson, Dunn, & Hassall, 1995](#)). More recent work, primarily on children, revealed relations of pedestrian injury risk to personality factors ([Barton & Schwebel, 2007](#)) and cognitive development ([Barton & Morrongiello, 2011](#)). Such studies expanded knowledge of environmental factors and individual differences as predictors of pedestrian behavior under normal traffic conditions.

However, pedestrians are increasingly crossing streets under conditions of self-imposed distractions, such as while listening to music or texting. Distracted crossing is particularly frequent among younger adults (e.g., [Neider, MacCarley, Crowell, Kazcmariski, & Kramer, 2010](#)). Recent research has explored behaviors among distracted pedestrians (e.g., [Stavrinos, Byington, & Schwebel, 2009, 2011](#)), but generally lacks theoretical framework. We employed the Theory of Planned Behavior to better understand intentions to cross streets while under conditions of distraction.

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1.1. Theory of Planned Behavior

The Theory of Planned Behavior (TPB) posits intentions to engage in a given behavior predicted by attitudes, subjective norms, and perceived behavioral control (Ajzen, 1985, 1991). For example, in a meta-analysis of TPB, Armitage and Conner (2001) reviewed 185 studies and found TPB variables, attitudes, and subjective norms accounted for 27% of the variance in behavior and 39% in intention. Perceived behavioral control accounted for a significant amount of variance above and beyond the contributions of attitudes and subjective norms. The TPB measure has variously been delivered as a self-report or in interview format. In at least one study (Beck & Ajzen, 1991), the self-report method was linked with social desirability accounting for 5% of the variance in intentions.

TPB has been widely employed in studies of health related behaviors including eating, exercise, lifestyle, sexual health, drug and alcohol use, and hand hygiene (Albarracín, Johnson, Fishbein, & Muellerleile, 2001; Armitage, Armitage, Conner, Loach, & Willetts, 1999; Blue, 1995; Conn, Tripp-Reimer, & Maas, 2003; Courneya & McAuley, 1995; Downs & Hausenblas, 2005; Fila & Smith, 2006; French et al., 2005; Godin & Kok, 1996; Guo et al., 2007; Norman & Conner, 2006; O'Boyle, Henly, & Larson, 2001; Rhodes & Courneya, 2003; Schifter & Ajzen, 1985; Sheeran & Taylor, 1999). Fairly consistent results emerged where perceived behavioral control and attitude are significant in predicting behavioral intentions, however two found subjective norms to be a better predictor of intentions studies (Fila & Smith, 2006; Rhodes & Courneya, 2003). In sum, TPB appears to be quite useful in predicting both behavioral intentions and actual behaviors.

TPB has also been connected to injury etiology and prevention (e.g., Trifiletti, Gielen, Sleet, & Hopkins, 2005) and has been applied to several topics within the injury domain such as bike safety (Lajunen & Räsänen, 2004; Quine, Rutter, & Arnold, 1998, 2001), seatbelt usage (Şimşekoğlu & Lajunen, 2008), and other driving violations (Conner et al., 2007; Forward, 2009; Parker, Manstead, Stradling, Reason, & Baxter, 1992; Warner & Åberg, 2006). Contrary to general health behaviors, injury prevention behaviors showed subjective norms as one of the strongest predictors of intent and behavior, while attitude also played a significant role. A small body of research, to which we now turn, has used TPB to predict intended pedestrian behavior.

1.2. TPB and pedestrian behavior

Foundational research connecting TPB with pedestrian safety emerged within the past two decades. Díaz (2002) was among the first to assess the utility of TPB in predicting pedestrian behavior. Researchers had adults complete a questionnaire on crossing the street, in which they were asked to respond to hypothetical situations. Significant correlations between intentions and attitude, subjective norm, and perceived behavioral control were found. Other early studies used a similar method of presenting hypothetical scenarios (Evans & Norman, 1998). Participants responded to three hypothetical pedestrian scenarios. Perceived behavioral control emerged as the strongest predictor of intentions, accounting for 37–49% of the variance in adult behavioral intentions when crossing the streets. Research also focused on adolescent participants (Evans & Norman, 2003) in which one scenario written in second person was used to encourage realistic responses. TPB variables account for a large portion of the variance in pedestrian intent in comparison to age and sex and, among the components of TPB, perceived behavior control emerged as the largest contributor to the variance.

More recently researchers have incorporated additional predictors in the context of TPB. Holland and Hill (2007) surveyed just under 300 adults who were separated into four categories using accident statistics, gender, and driver status and asked to respond to four hypothetical risky street crossing situations. TPB was useful in all scenarios, accounting for 56–65% of the variance, with attitude being the strongest predictor. In a study examining the role of conformity (Zhou, Horrey, & Yu, 2009), TPB was again useful in predicting behavioral intentions. Perceived behavioral control was the strongest predictor in the conformity situation. Extending previous work, Zhou and Horrey (2010) again examined an adolescent sample using two hypothetical situations comprising conformity and non-conformity ideals. TPB accounted for 30% of the variance in intentions in the non-conformity scenario and 40% in the conformity scenario. Perceived behavioral control, attitude, subjective norms, and anticipated affect were predictors in both scenarios, and again perceived behavioral control was the strongest in the conformity situation. Another more recent study examined pedestrians' intentions to jaywalk (Xu, Li, & Zhang, 2013). Again TPB was useful, accounting for 43% of the variance in behavioral intentions.

2. Aims and hypotheses

We employed TPB in order to examine adults' intentions to cross streets under conditions of distraction. Previous studies have applied the TPB using both adolescent and adult samples in explaining route choices and relations of conformity to street crossing. Our research adds both to the small body of literature employing the TPB in relation to pedestrian safety and to the literature comprising studies of the role of distraction in pedestrian safety. We expected two overall results to emerge. First, we expected the attitudes, subjective norms, and perceived behavioral control aspects of TPB to be more strongly linked to behavioral intentions than demographic factors such as sex, age, and exposure to pedestrian injury risk. Second, similar to previous work (e.g., Evans & Norman, 1998), we expected all three predictive components of the TPB to be significantly related to behavioral intention but that perceived behavioral control would emerge as the strongest predictor.

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