

**Does it matter whether friends, parents, or peers drink walk? Identifying which normative influences predict young pedestrian's decisions to walk while intoxicated**

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### Abstract

Drink walking, that is walking in a public place while intoxicated, is associated with increased risk of injury and fatality. Young people and males are especially prone to engaging in this behaviour, yet little is known about the factors associated with individual's decisions to drink walk. The present research explores the role of different normative influences (friendship group norm, parent group norm, university peer group norm) and perceived risk, within an extended theory of planned behaviour (TPB) framework, in predicting young people's self-reported drink walking intentions. One hundred and eighteen young people (aged 17-25 years) completed a survey including sociodemographic measures and extended TPB measures related to drink walking. Overall the extended TPB explained 72.8% of the variance in young people's intentions to drink walk in the next six months with attitude, perceived behavioural control, friendship group norm, and gender (male) emerging as significant predictors. Males, as compared with females, had higher intentions to drink walk and lower perceptions of risk regarding drink walking. Together, these findings provide a clearer indication of the salient normative influences and gender differences in young pedestrian's decisions to walk while intoxicated. Such findings can be used to inform future interventions designed to reduce injuries and fatalities associated with drink walking.

Keywords: intoxicated pedestrian; drink walking; extended theory of planned behaviour; intentions; perceived risk and normative influences.

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## **1.0 Introduction**

The negative impact of alcohol use on driver behaviour has been widely acknowledged; however, pedestrians' use of alcohol and the resulting impact on their safety has received relatively less attention (Haque et al., 2012). It is generally accepted and commonplace for patrons in bars and nightclubs, having consumed alcohol, to choose to walk to their next destination or to start drinking at home and walk to a licensed venue or party to continue drinking (O'Connor et al., 2004). The risks associated with these behaviours, known as drink walking, are perceived by the general public, and young people particularly, to be less dangerous than drink -driving (Lang et al., 2003). Perceptions of risk and other factors likely inform pedestrian's choices to walk while intoxicated; however, there is little evidence available to draw definitive conclusions (Haque et al., 2012). Furthering our understanding of pedestrian's choices to drink walk and the factors that inform this decision is essential to develop countermeasures that reduce alcohol-related injuries and fatalities for this vulnerable road user group.

From the outset, it is to be noted that there is, currently, limited definitional clarity, with respect to defining drink walking (an issue which is discussed further in Section 1.1); however, for the purposes of this study we have adopted an objective and measurable definition of drink walking that is consistent with the national drink driving legislation (Federal Office of Road Safety, 1996) and prior Australian research on drink walking (Haque et al., 2012; Lang et al., 2003; McGhie et al., 2012; O'Connor et al., 2004). Specifically, drink walking is defined herein as walking in public (including between or to/from licensed venues, public transportation, or home) with a BAC equal to 0.05g/100ml or more.

### **1.1 The Extent of The Drink Walking Problem**

Crash statistics reflect the extent to which alcohol is a major contributing factor to road deaths. In Australia, in 2009, alcohol contributed to approximately one third of the 1075 male road user fatalities and over 10% of the 409 female road user fatalities. When considering fatally injured pedestrians in particular, during that same time period, alcohol was a contributing factor in 40% of the 136 male pedestrians killed and 17% of the 58 females killed (Australian Government Department of Veterans Affairs, 2009; Bureau of Infrastructure, Transport, and Regional Economics, 2011; see also Australian Transport Safety Bureau [ATSB], 2003). Another Australian study reported that, on average, 100 alcohol-affected pedestrians are killed each year, equating to more than 5% of all road crash fatalities (Cairney & Coutts, 2003). Internationally, alcohol accounts for up to 36% of pedestrian fatalities (Öström and Eriksson, 2001; Prijon and Ermenc, 2009).

Despite the perception that drink walking is less dangerous than drink driving (see Lang et al., 2003), a significant proportion of emergency department presentations and hospital admissions involve alcohol-related pedestrian injuries. For instance, during 2006-2008, alcohol was involved in 264 Victorian traffic-related hospital admissions, with a large proportion of these injuries occurring to male pedestrians (81%), and pedestrians aged 15-29 years (44%) (Cassell et al., 2010). Of note, within Australia, the legal age for consuming alcohol is 18 years. A similar pattern in an inner Sydney hospital during 2002-2004 shows alcohol was a factor in 49% of cases where pedestrians were admitted with injuries (Small et al., 2006). Not only do these injuries and fatalities place a significant cost burden on health care systems, alcohol involvement in pedestrian injuries is frequently underreported in hospital records and emergency department presentations (Cassell et al., 2010), meaning that the extent of the drink walking problem is likely underestimated.

Two further issues confound attempts to obtain a true estimate of the impact of drink walking on pedestrian safety. The first issue relates to the primary focus on risk to pedestrians

at high levels of blood alcohol content (BAC). Information derived from 1997-1999 Australian coronial records show alcohol as the primary cause in two thirds of pedestrian fatalities, and a significant proportion of these fatalities were males (38%) (ATSB, 2003). Of these pedestrian fatalities, 70% had a BAC over 0.05g/100ml, with 5 out of 6 of the pedestrians having a BAC of 0.15g/100ml or above at the time of the crash (ATSB, 2003). There is also evidence for even higher BACs in large proportions of fatalities, at 0.20g/100ml and beyond, a level associated with alcohol misuse and abuse (ATSB, 2003; Blomberg, et al., 1979; Cairney and Coutts, 2003; Hutchinson et al., 2009; Öström and Eriksson, 2001; Small, et al., 2006). Although there are significant risks associated with high levels of alcohol use, risk of injury to pedestrians begins at low levels of alcohol consumption and rises with increasing BAC (Australian Government Department of Veterans Affairs, 2009). The consideration of only higher levels of BAC and subsequent injuries and fatalities means that lower BACs and the associated impacts on pedestrian safety, such as falling and/or stumbling and other minor injuries (e.g., grazed knee/hands, sprained wrists/ankles) (Lang et al., 2003), may be overlooked. The need to monitor and, in particular, increase the monitoring of the BACs of crash-involved pedestrians has been recommended (Cairney & Coutts, 2003; Cassell et al., 2010).

Second, as alluded to earlier, there exist concerns regarding how best to define drink walking and, specifically, a lack of consensus regarding the level of alcohol intoxication deemed necessary to impact pedestrians' safety (Holubowycz, 1995a; Hutchinson et al., 2009). Pedestrians' ability to judge the speed of oncoming traffic and the distance between vehicles reduces with BAC levels from 0.06g/100ml (Oxley et al., 2006). BACs exceeding 0.05g/100ml (Blomberg et al., 1979), especially BACs over 0.15g/100ml (Cairney and Coutts, 2003; Hutchinson et al., 2009), have been associated with pedestrian fatalities. In recognition of the risks associated with both higher and lower BACs and the absence of a legal BAC limit

for pedestrians in Australia (Hutchinson et al., 2010a), drink walking has been defined as walking in public (including between or to/from licensed venues, public transportation, or home) with a BAC equal to 0.05g/100ml or more; with the BAC level based upon that ascribed for drink driving in Australia (Federal Office of Road Safety, 1996).

## **1.2 Reducing the Drink Walking Problem**

Efforts to reduce drink walking behaviour have generally taken two approaches. The first approach involving identification of the sociodemographic characteristics of pedestrians who drink walk has demonstrated an overrepresentation of young adult males (Cairney and Coutts, 2003; Holubowycz, 1995a; Hutchinson, et al., 2009; Mason and Monk-Turner, 2010; Prijon and Ermenc, 2009) and increased prevalence of drink walking behaviour among young adults aged 15 through to 29 years (Fontaine and Gourlet, 1997; Holubowycz, 1995a; Hutchinson, et al., 2009; Öström and Eriksson, 2001; Small, et al., 2006); however there is also evidence of drink walking occurring with adults in their 30s to 40s (Fontaine and Gourlet, 1997; Hutchinson, et al., 2009; Prijon and Ermenc, 2009; Small, et al., 2006). Another consistent feature of people who drink walk was that most had been drinking primarily with friends or family, thus, highlighting the social nature of the behaviour and the tendency for normative influences from important others to be particularly relevant influences of the behaviour (Cairney and Coutts, 2003; Lang, et al., 2003; O'Connor et al., 2004).

A second approach to reduce drink walking has involved the design of countermeasures. Developing countermeasures that effectively reduce drink walking is somewhat problematic given the potentially high cost and that few practical deterrents are possible. Attention has focussed primarily on changes to infrastructure to provide safer roads and passageways (e.g., a reduction in speed limits around licensed venues), and increasing driver awareness of intoxicated pedestrians who may be walking on or alongside roadways or crossing roads (e.g., Cairney and Coutts, 2003; Hutchinson et al., 2010a; Lenné et al., 2007). Few countermeasures

address the behaviour of drink walking at an individual level although it has been suggested recently that legislative sanctions specifying a maximum BAC for alcohol consumption by pedestrians in a public place, including drink walking, (similar to sanctions for drink driving) be imposed (Hawks, 2006; Hutchinson et al., 2010a; Hutchinson et al., 2010b).

An alternative approach to reduce drink walking which has received limited attention to date is to use a theoretically-based framework to identify the key psychosocial determinants of pedestrians' choices to drink walk (Haque et al., 2012; Mason and Monk-Turner, 2010). These key psychosocial determinants may then be used to inform countermeasures such as road safety campaigns and interventions targeting individual decision-making. One theoretical framework that may prove promising in understanding and identifying the key predictors of pedestrian's decisions to drink walk is the theory of planned behaviour (TPB) (Ajzen, 1991).

### **1.3 Understanding Decisions To Drink Walk: Theory of Planned Behaviour (TPB)**

The premise of the TPB is that people make rational decisions to perform a behaviour that is within their control based on an evaluation of the information available to them. The TPB proposes a person's intention to perform a behaviour as the most proximal predictor of his or her actual behaviour (Ajzen, 1991). A person's intention is informed by his or her attitude (favourable or unfavourable evaluation of a behaviour), subjective norm (perceived approval or disapproval from important others for behaviour), and perceived behavioural control (PBC) (perceived ease or difficulty of behavioural performance; PBC is also thought to inform behaviour directly) (Ajzen, 1991). In terms of drink walking, this theoretical framework would predict that a person who has positive attitudes toward drink walking, perceives approval/support from important others for drink walking, and believes drink walking is a behaviour that is easy to perform, would have stronger intentions to drink walk, and ultimately he or she would be more likely to drink walk. While there is considerable

support for the successful use of the TPB to explain a range of health protective and health risk behaviours (e.g., Godin and Kok, 1996; McEachan et al., 2011; Tunnicliff et al., 2012; White et al., 2008), the TPB on average explains 39% of the variance in intention (Armitage and Conner, 2001). Given that much of the variance for intention remains unexplained, one advantage of this model is its ability to incorporate additional variables of interest if such an inclusion enhances the predictive capacity of the model and can be justified theoretically (Ajzen, 1991).

Recently, the TPB has been applied to understand drink walking decisions among young adults aged 17-25 years. Haque et al. (2012) tested the utility of both a standard (including attitude, subjective norm, and PBC) and extended (including attitude, subjective norm, PBC, perceived risk, anticipated regret, and past behaviour) version of the TPB to predict young people's drink walking intentions. The standard and extended TPB explained 63% and 69% of the variance in intention to drink walk, respectively. In both tests of the model, subjective norm was not a significant predictor of drink walking intentions. This finding reflects previous criticisms of subjective norm as having the least predictive power (i.e. lowest beta weight) compared with other TPB components of attitude and PBC (Armitage and Conner, 2001) and subsequent calls for an alternative conceptualisation of the normative component to better align with the way in which the concept of norms is defined in the broader social psychological literature (Terry and Hogg, 1996). On the basis of this finding for subjective norm, Haque et al. concluded that further research was needed to identify the normative influences most salient to young people's decisions to drink walk. In the current study, we build on Haque et al.'s work to include, within an extended TPB framework, an exploration of three specific normative components: friendship group norm, parent group norm, and university peer group norm, and their contribution to young people's intentions to drink walk.

#### **1.4 Friendship Group Norm, Parent Group Norm, and University Peer Group Norm**

While subjective norm reflects an individual's aggregate assessment of the likely approval or disapproval for their behaviour from a range of important others in their life, group norm represents an individual's belief that a specific referent group would approve/disapprove of their behaviour as well as his or her perception of whether people in this specific referent group actually perform the behaviour (Terry and Hogg, 1996; Terry et al., 1999). In other words, subjective norm refers to what important others in general think whereas group norm refers to what the members of a specific referent group think as well as what they do. Three referent groups that likely influence a young person's decisions and, in particular, may serve as models for young adults' drinking behaviour, are friends, parents, and university peers (Borsari and Carey, 2001; Kuther and Higgins-D'Alessandro, 2003; McGhie et al., 2012; Murgraff et al., 1999).

Friendship groups, as a specific referent group of peer influence, can impact significantly upon a young person's decision-making and behaviour especially if he or she identifies strongly with the friendship group (Jamison and Myers, 2008; Johnston and White, 2003; Terry and Hogg, 1996; Terry et al., 1999; Wood et al., 2004). Young people's binge drinking behaviour has been shown to reflect the drinking patterns of their friendship group (e.g., Andrews et al., 2002; Parra et al., 2007; Stappenbeck et al., 2010), and in the case of drink walking, young people reported the highest intentions to drink walk in the company of friends who were also drink walking and crossing the road against the pedestrian traffic signal (McGhie et al., 2012). Together, these findings suggest that young people who perceive support from friends for drink walking and believe that their friends also drink walk, will have stronger drink walking intentions.

In addition to the influence of peers, parental acceptance of alcohol use may influence young adults' drinking behaviour (Wood et al., 2004). College students aged 17 to 21 years

perceiving parents approval for their drinking are more likely to consume alcohol (Kuther and Higgins-D'Alessandro, 2003) and engage in heavy episodic drinking (Livingston et al., 2010). Other research shows that perceived parental approval and disapproval corresponds to increased alcohol consumption and alcohol-related problems (Boyle and Boekeloo, 2006; Neighbors et al., 2007) and reduced drinking and tendencies towards drunkenness (Turrisi et al., 2001), respectively. Extrapolating these findings to drink walking, it can be suggested that young people who perceive approval/support from parents for drink walking and who have parents who drink walk, will have greater intentions to drink walk.

As a young person moves from home to university they may experience a shift in influence from parents to peers at university and increased exposure to alcohol cues and university culture (Borsari and Carey, 2001). University/college peers, therefore, may play a crucial role in the initiation and maintenance of alcohol use, and this influence is compounded in an environment such as the university context, where peer pressure and drinking with friends can have a problematic impact on alcohol consumption (Baer, 1994; Beck et al., 1995; Jamison and Myers, 2008). For instance, Johnston and White (2003) found that university students had greater intentions to binge drink if they perceived normative support for binge drinking and identified strongly with other students at their university. Since alcohol consumption is invariably a precursor to drink walking, the influence of the university or college peer group could also be considered a factor for young people at university in their decisions to drink walk, particularly for students drinking on campus who may walk back to student accommodation or public transport.

To ensure a thorough exploration of the normative influences operating upon a young adult, and given that this study's sample was recruited from a university population, university peer group was incorporated in conjunction with friendship group norm. While it was anticipated that overlap may be likely between these two sources of influence, it was

considered that relevant prior evidence identifying alcohol use (misuse) among university students (e.g., Baer, 1994; Beck et al., 1995; Jamison and Myers, 2008; Johnston & White, 2003), justified inclusion of a university peer group norm in addition to the friendship group norm. As with friendship and parent group normative influences, it is likely that young people attending university who perceive greater support from their university peer group for drink walking and believe that other students at their university drink walk will have stronger intentions to drink walk.

### **1.5 The Current Study**

Considering the high prevalence of drink walking behaviour in the young adult age group, the low perception of risk associated with drink walking, and the need to further understand the normative influences contributing to decisions about drink walking, in the current study we adopted an extended TPB framework incorporating additional normative influences (friendship, parent, and university group norms) and perceptions of risk, to predict university students' intentions to drink walk. Specifically, based on TPB specifications it was hypothesised that young people with greater attitude, subjective norm, and PBC for drink walking would have stronger intentions to drink walk in the next six months (H1). In addition, it was proposed that perceived risk would explain additional variance beyond that of the TPB variables, such that those who perceived drink walking as low risk would have greater intentions to drink walk in the next six months (H2). Furthermore, it was expected that in addition to the TPB variables and perceived risk, greater friendship, parent, and university peer group normative support for drink walking would predict stronger intentions to drink walk in the next six months (H3). Finally, given the evidence suggesting that young males are the most likely to drink walk (e.g., LaScala et al., 2000), and that males as compared with females are likely to have lower risk perceptions (e.g., Flynn et al., 1994), we tested for

gender differences, in intentions and risk as well as the additional normative influences in analyses.

## **2.0 Method**

### **2.1 Participants**

A total of 118 university students were recruited, of which a majority were attending university full-time ( $n = 115$ ; 97.5%). Most were female ( $n = 96$ ; 81.4%), Caucasian ( $n = 101$ ; 85.6%), and ranged in age from 17-25 years ( $M = 19.25$ ;  $SD = 2.21$ ). Most earned less than AUD\$25,000 a year ( $n = 107$ ; 90.7%), 111 (94.1%) students held a current Open ( $n = 21$ ), Provisional ( $n = 68$ ), or Learners ( $n = 25$ ) driver's license (4 students did not specify license type), and 97 (82.9%) owned or had access to a car. In accordance with university ethics approval obtained prior to study commencement, students were notified of the voluntary and anonymous nature of their participation and that submission of a questionnaire confirmed their consent for the researchers to use their responses.

### **2.2 Design and Procedure**

The research was based on correlation design, with examination of the relationship between the independent variables of the standard and extended TPB model, and the dependent variable intentions to drink walk. The survey was piloted initially with seven people to establish time taken for completion and to ensure the comprehensibility of the items. Research team members with relevant permissions from course convenors/lecturers distributed surveys in-person to students during intermission and at the end of first year lectures. Students were also approached in-person by a research team member around the university campus during the day with an invitation to participate in the study. A definition of drink walking as defined by the researchers (see section 2.3.1) was provided in all materials to ensure consistency in responses. Students who returned a completed questionnaire received a

chocolate as a token of appreciation, and eligible undergraduate psychology students received research participation credit.

## **2.3 Measures**

All items were scored on 7 point Likert scales ranging from 1 (*strongly disagree*) to 7 (*strongly agree*) unless otherwise stated, with higher scores indicating more of a construct. Standard TPB measures were based on specifications outlined by Ajzen (1991) and extended TPB measures were informed by prior research (Haque et al., 2012; Rundmo and Iversen, 2004; Terry and Hogg, 1996; Tunnicliff et al., 2012; White et al., 2008). Some reversed items subsequently recoded for analyses were included to reduce response bias. A full list of the study's items is provided in Appendix A.

### **2.3.1 Target Behaviour.**

The target behaviour of drink walking was defined as walking while under the influence of alcohol with a blood alcohol concentration level (BAC) of .05 or more, in the next six months. Of note, "target behaviour" refers only to our defining of the specific behavioural context in accordance with the TPB's TACT principle of defining the target, action, context, and time so as to enhance the model's explanatory utility (see Ajzen, 1991) as opposed to representing the key outcome measure of focus in the research. In relation to the latter, this study's key outcome measure was behavioural intentions and not actual drink walking behaviour (see Section 2.3.3 for description of the study's measures).

### **2.3.2 Demographic Characteristics and Past Drink Walking.**

Students indicated their gender (male, female), age (in years), ethnicity (Caucasian, Aboriginal or Torres Strait Islander, Other), license status (yes, no), license type (open, provisional, learners), study mode (part time, full time), and annual income. In addition, participants indicated on how many occasions in the past six months they had engaged in drink walking (*never to very often*).

### 2.3.3 TPB Variables.

Five items measured *intention* to drink walk (e.g., “I intend to drink walk in the next six months”) and responses to intention items were averaged to form a reliable scale ( $\alpha = .92$ ). *Attitude* comprised four evaluative 7-point semantic differential scales (e.g., *unenjoyable-enjoyable*, *bad-good*) and the averaged means of these items created a reliable scale ( $\alpha = .74$ ). Four items assessed *subjective norm* (e.g., “Those people who are important to me think that I should drink walk in the next six months”) and the averaged items formed a reliable scale ( $\alpha = .90$ ). Two items measured *PBC* (e.g., “If I wanted to, it would be easy for me to drink walk in the next six months”), and these items were positively and significantly correlated ( $r = .77$ ,  $p < .001$ ).

### 2.3.4 Extended TPB Variables.

*Risk perception* comprised seven items, of which five reflected cognitive components of risk (e.g. “how likely is it that you will be seriously injured or killed in a road crash if you were to drink walk?”, scored 1 *extremely unlikely* to 7 *extremely likely*), and two represented affective components of risk (e.g., “if you were to drink walk, how much would you worry about being involved in a road crash?”, scored 1 *not at all worried* to 7 *worried very much*). The risk perception scale was comprised of both these affective and cognitive items with the averaged means of these items forming a reliable scale ( $\alpha = .88$ ). An identical set of six items each for *friendship group norm* and *parent group norm* in relation to drink walking were used, with wording altered to reflect the construct being assessed. These items reflected the approval of friends (parents) for drink walking (e.g., “my friends [parents] think that drink walking would be a good thing to do”), as well as providing an assessment of whether friends (parents) engaged in drink walking (e.g., “most of my friends [parents] would drink walk”). The average of both the six friendship group norm items ( $\alpha = .92$ ) and the six parent group norm items ( $\alpha = .86$ ) formed reliable scales. Six items were initially used to measure

*university peer group norm*; however, principal components analysis<sup>1</sup> showed that two of the university group norm items loaded on the subjective norm construct. These two items were subsequently removed and a four item university peer group norm scale was retained, with acceptable reliability ( $\alpha = .79$ ).

### 3.0 Results

#### 3.1 Data Analysis Overview

Initially, descriptive analyses were performed for the purposes of describing the sample and prior experience with drink walking. Bivariate correlations were used to examine the relationship between the standard and extended TPB predictors and drink walking intentions. A hierarchical multiple regression analysis was then conducted using the Statistical Package for the Social Sciences (SPSS version 18.0) to identify the standard and extended TPB predictors of young people's intentions to drink walk in the next six months. More specifically, attitude, subjective norm, and PBC (standard TPB variables) were entered in Step 1 of the regression analysis. The extended TPB variables of perceived risk (Step 2) and friendship group norm, parent group norm, and university peer group norm (Step 3) were entered in subsequent steps. Gender was controlled for in Step 4. To test for gender differences in intention, perceived risk, and the additional normative influences, a series of t-tests were conducted with a Bonferroni adjustment ( $p = .01$ ) applied to control for Type I error.

#### 3.2 Past Drink Walking

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<sup>1</sup> A principal component analysis with oblique rotation (direct oblimin) was conducted on the four subjective norm and six items each for friendship group norm, parent group norm, and university peer group norm. The KMO (.86) confirmed adequacy of the sample to detect distinct factors. Bartlett's test of sphericity  $\chi^2 (231) = 1753.79$ ,  $p < .001$  identified that the data was factorable. The scree plot and eigenvalues showed four components with eigenvalues greater than 1. Subjective norm explained 41.71%, friendship group norm 6.07%, parent group norm 9.18%, and university peer group norm 13.75% of the variance. The pattern matrix showed that the relevant items loaded onto their respective components with the exception of two university peer group norm items which loaded more highly on the subjective norm construct. These two university peer group norm items were removed and a 4-item university peer group norm scale was retained.

For drink walking in the six month period prior to the study, 22 (18.6%) participants reported never, 20 (16.9%) rarely, and 14 (11.9%) not often, drink walking. For the remaining participants, 20 (16.9%) reported sometimes, 23 (19.5%) slightly often, and 19 (16.1%) very often, drink walking in the last 6 months. Further examination of these descriptives based on gender showed that, of the participants reporting they never (1 male, 21 female), rarely (2 male, 18 female), or not often (5 male, 9 female) engaged in drink walking, most were female (50.1% female, 36.4% male). For the participants reporting they sometimes (3 male, 17 female), slightly often (7 male, 16 female), and very often (4 male, 15 female) drink walk, proportionately more were male (49.9% female, 63.6% male).

### **3.3 Descriptive Analyses and Bivariate Correlations Between Standard TPB Predictors, Extended TPB Predictors And Drink Walking Intentions**

As shown in Table 1, and in accordance with TPB specifications, attitude, subjective norm and PBC were all positively and significantly correlated with intention. Friendship group norm, parent group norm, and university peer group norm had significant positive correlations with intention, with risk perception showing a negative relationship with intention, as expected. On average, participants reported having relatively high intentions to drink walk ( $M = 4.63$ ) and perceived some support for drink walking from their friendship group ( $M = 4.74$ ) and university peers ( $M = 4.89$ ), but not from people in general who were important to them (i.e., subjective norm) ( $M = 3.38$ ), or parents ( $M = 2.38$ ) (Table 1).

As shown in Table 2, in comparison with females, males had significantly higher intentions to drink walk, and perceived significantly less risk for drink walking in the next six months than females. Although the reported means for males were higher for the additional normative influences of friendship group norm, parent group norm, and university peer group norm, as compared with females, no other significant gender differences emerged.

Acknowledging the relatively small number of males in the study's sample, rather than run

separate regressions as a function of gender, the decision was made to control for gender within a step of the regression model.

**[Insert Tables 1 and 2 about here]**

### **3.4 Hierarchical Regression Analysis Predicting Intention to Drink Walk**

As shown in Table 3, the entry of the standard TPB variables of attitude, subjective norm and PBC in step 1 explained 67.3% (66.4% adjusted) of the variance in self-reported intentions to drink walk in the next six months,  $F(3,111) = 76.02, p < .001$ . Entry of perceived risk in Step 2 did not significantly improve prediction of the variance in drink walking intentions ( $\Delta R^2 = .008$ ;  $F\Delta(1, 110) = 2.77, p = .099$ ). Inclusion of friendship group norm, parent group norm, and university peer group norm in Step 3 contributed a further significant 3.8% more variance, over and above the standard TPB variables, in reported intentions to drink walk,  $F\Delta(3, 107) = 4.58, p = .005$ . Controlling for gender at Step 4, increased the explained variance in drink walking intention by an additional 1% ( $\Delta R^2 = .011$ ;  $F\Delta(1, 106) = 4.34, p = .040$ ). At the final step of the model, once all variables were entered, the significant predictors of young people's intentions to drink walk in the next six months, in order of the relative strength of the beta weights, were, PBC, attitude, friendship group norm, and gender, with the extended TPB overall explaining 72.8% (70.8% adjusted) of the variance in intentions to drink walk.

**[Insert Table 3 about here]**

### **Discussion**

In conducting this study we aimed to advance previous research on drink walking (Haque et al., 2012) by further elucidating the role of normative influences in predicting young people's (17-25 years) intentions to drink walk. An understanding of which normative influences contribute to young people's drink walking decisions has significant implications for the formation and targeting of countermeasures such as campaigns to reduce the incidence

of drink walking and subsequent injuries and fatalities in this population. In progressing this aim, we tested the utility of an extended TPB framework incorporating the standard TPB predictors of attitude, subjective norm, and PBC, and the additional normative influences of friendship group norm, parent group norm, and university peer group norm, as well as perceived risk, in predicting university student's intentions to drink walk in the next six months. The extended TPB explained 72.8% of the variance in young people's intentions to drink walk, with attitude (but not subjective norm), PBC, friendship group norm (but not parent or university peer group norms, or perceived risk), and gender (male) predicting intentions. Although limited by the small number of male participants, we explored potential gender differences in responses also. Together these findings offer important theoretical and practical implications.

#### **4.1 Applying the Standard and Extended TPB to Drink Walking**

##### **4.1.1 Attitude, Subjective norm, and PBC**

When considering just the utility of the standard TPB, attitude, subjective norm, and PBC were significant predictors of drink walking intention, as hypothesised. Attitudes toward drink walking on average were not overly positive or negative. Nevertheless, young people who had more favourable attitudes were more likely to intend to drink walk suggesting that there may still be some merit in targeting attitudes toward drink walking to reduce the acceptability of this behaviour. Consistent with previous research (Haque et al., 2012), PBC was strongly related (in terms of a larger beta weight relative to the beta weights of attitude and subjective norm) to drink walking intentions. As noted by Haque et al., interventions could encourage young people to consider that although they feel confident that drink walking is an easy and low-cost transport option, in reality their judgement may be impaired and their lack of control may result in injury or ultimately cost them their life. In conjunction with creating a more realistic perception of the lack of control a young person may have while

drink walking, it is also important to increase young people's confidence in arranging alternative means of transport to ensure their own safety such as choosing licensed venues that have bus services available or pre-arranging a lift home (Haque et al., 2012; Hutchinson et al., 2010a). While subjective norm, in the initial steps of the regression model (prior to all of the extended variables being added) was a significant predictor of intentions, similar to Haque et al., it did not emerge as a significant predictor at the final step of the model.

#### **4.1.2 Additional Normative Influences: Friendship Group, Parents, and University Peers**

Once, the additional normative influences of friendship group norm, parent group norm, and university peer group norm were entered in analyses testing the extended TPB, however, subjective norm was no longer a significant predictor. Of these normative influences, friendship group norm (but not parent group norm or university peer group norm) contributed significantly to the prediction of drink walking intentions. Young people, who perceived that their friendship group approved of drink walking and believed their friends engaged in drink walking were more likely to intend to drink walk in the next six months. This finding can be understood when we consider that subjective norm comprises an aggregate assessment of all normative influences important to the individual which may include friends, parents, or university peers; however, the subjective norm construct in this study did not entirely capture the normative influence of the friendship group. Examination of the means show also that young people believed important others generally and parents particularly had the least approval for drink walking, whereas the university peer group and friendship group had the highest approval. Together, although not an exhaustive investigation of all possible normative influences, these findings give a clear indication of which people or groups are believed to support drink walking and, therefore, offer potential targets for intervention.

Based on the findings regarding university peer group norm, similar suggestions may be offered as those provided by McGhie et al. (2012) in terms of possible interventions. McGhie et al. (2012) found that university students were more likely to drink walk against a pedestrian crossing signal when in the presence of friends as compared with strangers. These authors suggested that introducing preventive interventions that promote resilience to peer influence and health-protective behaviours amongst friends (e.g., Buckley et al., 2010), as well as increasing confidence to intervene (e.g., Buckley et al., 2011), especially when friends are placing themselves at risk such as when drink walking, may be beneficial. A recent December, 2011 community service announcement by the Pedestrian Council of Australia (2012) which encouraged local government councils to stencil the words “Never let a mate walk home drunk” on the footpaths of licensed venues exemplifies another possibility to increase awareness in the form of public awareness campaigns targeting a specific normative group. Although university peer group norm was not a significant predictor of drink walking intentions (an effect that may have been subsumed under group norm given that young people’s friends may also attend university), the university or other educational context may still be an important intervention point for young people. During orientation weeks where large numbers of students are accessible, highlighting the risks of drink walking, the importance of taking care of friends and university peers by preventing them from drink walking, and lowering the acceptability for drink walking among university peers and friends, may be effective. Targeting young people within an educational context may be particularly important given that young people believed both their university peer group and friendship group had higher approval of drink walking.

#### **4.1.3 Perceived Risk**

Consistent with previous research suggesting that drink walking is not considered to be a high-risk behaviour (Haque et al., 2012), especially compared with other behaviours such

as drink driving (Lang et al., 2003), perceived risk was not a significant predictor of intentions to drink walk in the next six months. Indeed, the absence of a legally prescribed BAC limit in relation to the behaviour may further contribute to these relatively lower levels of perceived risk associated with drink walking. The means for the perceived risk measure in this study show also that participants believed drink walking to be only a moderate, rather than a high risk, behaviour. Although, not a significant predictor of drink walking intentions in this study, perceptions of risk for drink walking differed significantly between males and females, with males believing drink walking was associated with less risk compared with females. Together these findings indicate that we cannot entirely discount the role of risk in young people's, especially males', decisions to drink walk. The current study's sample composition precluded separate regressions to be conducted for males and females (given insufficient numbers of males as based upon the recommendation that  $N \geq 104 + m$ , where  $m$  is the number of predictors; Tabachnick & Fidell, 2007), thus making it difficult to understand the role of risk in males' (and females') decision-making when all other variables were also considered. Alternatively, it may be that perceptions of risk do not inform intentions directly but rather contribute to attitudes or PBC towards drink walking; a proposition that remains to be explored in future research. Another possibility is that the measure of risk used in the current study, which focussed on drink walking generally, was too broad. O'Connor et al. (2004) showed that participant's average ratings for the risks/dangers for drink walking differed according to whether an individual was walking on or beside the road or crossing the road, and the environment in which the individual was drink walking (e.g., increased presence of traffic, populated areas). Continued exploration of the perceived risks related to drink walking generally and in specific scenarios will add to our understanding when developing countermeasures to reduce drink walking.

### **4.3 Strengths and Limitations**

While there are a number of strengths of the current study such as the use of a theoretical framework, a more in-depth exploration of normative influences, and a consideration of potential gender differences, in understanding young people's decisions to drink walk, it is acknowledged that this study has limitations that should be addressed in future research. Although we specifically targeted young people aged (17-25 years) in this study, participants were primarily Caucasian, university students. More diverse samples of young people from both university and non-university (e.g., workplace) contexts and different cultural backgrounds, should be recruited in future research. In recognition of the potential gender differences in the predictors of drink walking intentions, especially given the finding which supports previous research (e.g., Cairney and Coutts, 2003; Holubowycz, 1995b; Öström and Eriksson, 2001) that males had greater intentions to drink walk than females in this study, we tested for gender differences in the extended TPB constructs. We were, however, limited by the small number of male participants. Future research comprising samples with even distributions of male and female participants will allow more definitive comparisons of the predictors of drink walking intentions.

In this study we examined young people's self-reported intentions to drink walk rather than their behaviour, given the associated practical and ethical challenges associated with obtaining behavioural measures. Although there are demonstrated strong links between intentions and behaviour (Armitage and Conner, 2001), without a measure of behaviour we cannot rule out the possibility that there may be other factors informing drink walking behaviour. Despite the acknowledge challenges, it is imperative that actual drink walking behaviour be examined in future research including both self-report and objective measures. Ideally, any such measures of drink walking would take into account the range of possible scenarios in which drink walking may occur.

#### **4.4 Conclusion**

Overall, the findings of the current study offer support for the use of an extended TPB framework to explain young people's (aged 17-25 years) drink walking intentions. In particular, this study showed that, in addition to stronger attitudes and PBC, the perception that one's friendship group approved of drink walking and engaged in drink walking, was associated with young people in this sample reporting stronger intentions to drink walk. Male participants especially, as compared with female participants, reported significantly greater intentions to drink walk, perceived more approval from their friendship group for drink walking, and perceived less risk for drink walking. Ultimately, these findings offer a clearer picture of the salient normative influences and gender differences in young pedestrian's decisions to walk while intoxicated. Such findings can be used to inform the development of future research and targeted countermeasures designed to reduce the incidence of injuries and fatalities associated with drink walking.

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Table 1.

*Correlations, Means, and Standards Deviations for the Standard and Extended TPB Predictors and Drink Walking Intention (N = 118)*

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9
1. Attitude	3.77	1.22	-	.47***	.57***	-.36***	.58***	.43***	.30***	-.03	.66***
2. Subjective norm	3.38	1.46		-	.55***	-.39***	.63***	.61***	.40***	-.14	.60***
3. PBC	5.11	1.56			-	-.49***	.66***	.40***	.41***	-.19***	.75***
4. Perceived Risk	3.95	1.26				-	-.44***	-.32***	-.34***	.24**	-.49***
5. Friend group norm	4.74	1.31					-	.47***	.60***	-.19*	.74***
6. Parent group norm	2.38	1.24						-	.33**	-.08	.46***
7. University group norm	4.99	0.92							-	-.09	.47***
8. Gender	-	-								-	-.24*
9. Intention	4.63	1.61									-

*Note* Higher scores represented higher intentions to drink walk. Mean scores computed as average item scores on 7-point scales (except gender).

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

Table 2.

*Mean Comparisons for Standard and Extended TPB Variables Based on Gender*

Variable	Mean (SD)	Gender		<i>t</i> -test
		Male	Female	
Intention	<i>M</i>	5.45	4.45	<i>t</i> (115) = 2.63, <i>p</i> = .010
	<i>SD</i>	1.51	1.58	
Perceived risk	<i>M</i>	3.31	4.10	<i>t</i> (115) = -2.70, <i>p</i> = .008
	<i>SD</i>	1.29	1.22	
Friendship group norm	<i>M</i>	5.24	4.62	<i>t</i> (115) = 2.03, <i>p</i> = .045
	<i>SD</i>	1.17	1.32	
Parent group norm	<i>M</i>	2.58	2.33	<i>t</i> (115) = 0.09, <i>p</i> = .393
	<i>SD</i>	1.32	1.22	
University peer group norm	<i>M</i>	5.06	4.85	<i>t</i> (115) = 0.96, <i>p</i> = .342
	<i>SD</i>	0.75	0.96	

*Note.* To control for Type I error, a Bonferroni adjustment was applied, *p* value cut-off = .01

Table 3.

*Hierarchical Multiple Regression Predicting Intentions to Drink Walk (N = 118).*

Step and variable	B	SE	$\beta$	95%CI	$\Delta R^2$
Step 1 Attitude	.41	.09	.31***	[.23, .58]	.67***
Subjective norm	.22	.07	.20**	[.07, .37]	
PBC	.48	.07	.47***	[.33, .63]	
Step 2 Attitude	.40	.09	.30***	[.22, .57]	.01
Subjective norm	.20	.07	.18**	[.06, .35]	
PBC	.44	.08	.43***	[.29, .59]	
Perceived risk	-.13	.08	-.10	[-.29, -.03]	
Step 3 Attitude	.31	.09	.24**	[.14, .49]	.04**
Subjective norm	.09	.08	.08	[-.08, .25]	
PBC	.35	.08	.34***	[.20, .50]	
Perceived risk	-.10	.08	-.08	[-.25, .06]	
Friendship group norm	.32	.11	.26**	[.10, .53]	
Parent group norm	.03	.09	.02	[-.14, .21]	
University peer group norm	.08	.11	.05	[-.15, .30]	
Step 4 Attitude	.34	.09	.26***	[.17, .52]	.01*
Subjective norm	.10	.08	.09	[-.07, .26]	
PBC	.33	.08	.32***	[.18, .48]	
Perceived risk	.07	.08	-.06	[-.22, .08]	
Friendship group norm	.27	.11	.22*	[.06, .48]	
Parent group norm	.03	.09	.07	[-.14, .20]	
University peer group norm	.13	.12	.03	[-.10, .36]	
Gender	.46	.22	-.11*	[-.90, -.03]	

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

## Appendix A

Standard TPB variables				
Constructs	No. of items	Items	Scale	Source
Intention†	5	I plan to drink-walk. I intend to drink-walk. I do <u>not</u> intend to drink walk. (R) It is likely that I will drink walk. I definitely won't drink walk. (R)	1 strongly disagree to 7 strongly agree.	Adapted from Ajzen (1991); Haque et al. (2012)
Attitude†	4	For me, drink walking would be: unenjoyable – enjoyable. For me, drink walking would be: bad – good. For me, drink walking would be: favourable – unfavourable. (R) For me, drink walking would be: satisfying – unsatisfying. (R)	1 to 7.	Adapted from Ajzen (1991); Haque et al. (2012)
Subjective norm†	4	Those people who are important to me think that I should drink walk. Those people who are important to me think drink walking would be a good thing to do. Most people whose opinions I value would approve of me drink walking. People who are important to me would want me to drink walk.	1 strongly disagree to 7 strongly agree.	Adapted from Ajzen (1991); Haque et al. (2012)
Perceived behavioural control (PBC)†	2	I am confident that I could drink walk. If I wanted to, it would be easy for me to drink walk.	1 strongly disagree to 7 strongly agree.	Haque et al. (2012)
Extended TPB variables				
Constructs	No. of items	Items	Scale	Source
Perceived risk	7	Compared with all other road users, drink walkers are more likely to be injured or killed in a road crash.  How likely is it that you will be hurt or injured in a road crash if you were to drink walk? How likely is it that you will be seriously injured or killed in a road	1 strongly disagree to 7 strongly agree.  1 extremely unlikely to 7 extremely likely.	Adapted from Rundmo and Iversen (2004)

		<p>crash if you were to drink walk?          How likely is it that other people of similar age to you will be hurt or injured in a road crash if they were to drink walk?          How likely is it that other people of similar age to you would be seriously injured or killed in a road crash if they were to drink walk?</p>		
		<p>If you were to drink walk, how much would you worry about being involved in a road crash?</p>	<p>1 not at all worried to          7 worried very much.</p>	
		<p>To what extent would you be anxious about being involved in a road crash when drink walking?</p>	<p>1 not anxious at all to          7 extremely anxious.</p>	
Friendship group norm†	6	<p>How much do you agree with the following statements about your friends' opinions of drink walking...?          My friends would approve of me drink walking.          My friends think that drink walking would be a good thing to do.          My friends think that I should <u>not</u> drink walk. (R)          Most of my friends would drink walk.          My friends would drink walk on a regular basis.</p>	<p>1 strongly disagree to          7 strongly agree.</p>	<p>Adapted from Terry and Hogg (1996);          White et al. (2008);          Tunnicliff et al. (2012)</p>
		<p>How many of your <u>friends</u> would drink walk ...?</p>	<p>1 none to 7 all.</p>	
Parent group norm†	6	<p>How much do you agree with the following statements about your parents' opinions of drink walking...?          My parents would approve of me drink walking.          My parents think that drink walking would be a good thing to do.          My parents think that I should <u>not</u> drink walk. (R)          My parents would drink walk.          My parents would drink walk on a regular basis.</p>	<p>1 strongly disagree to          7 strongly agree.</p>	<p>Adapted from Terry and Hogg (1996);          White et al. (2008);          Tunnicliff et al. (2012)</p>
		<p>How often would your parents drink walk ...?</p>	<p>1 not very often to          7 very often.</p>	
University peer group norm†	4	<p>How much do you agree with the following statements about other QUT university students' opinions of drink walking...?</p>	<p>1 strongly disagree to          7 strongly agree.</p>	<p>Adapted from Terry and Hogg (1996);</p>

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Other students at my university think that I should not drink walk. (R)  
Other students at my university would approve of me drink walking.  
Other students at my university think that drink walking would be a  
good thing to do.  
Other students at my university would drink walk.

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White et al. (2008) ;  
Tunnicliff et al.  
(2012)

(R) = reversed scaled item.

† All items relate to drink walking in the next 6 months