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Whether or not to ride with an intoxicated driver: Predicting intentions using an extended version of the theory of planned behaviour

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Whether or not to ride with an intoxicated driver: Predicting intentions using an extended version of the theory of planned behaviour

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Abstract

The purpose of this study was to determine to what extent the theory of planned behaviour (TPB) extended with past behaviour, moral norm, descriptive norm, demographic variables and frequency of alcohol use is able to predict intentions not to ride with an intoxicated driver. Second, to examine whether different processes guide intentions among young passengers (35 years and below) versus passengers aged above 35 years, and women's versus men's intentions. Questionnaires were sent to a sample of 4000 people in Norway aged between 18 and 70 years, and were completed by 1025 respondents, 44.9% were men (M = 43.9 years). The results showed that the TPB variables explained 19% (*Adjusted* R^2) of the variance in intentions, and that the extension variables gave a significant contribution to the explained variance (R^2 change = .04), after controlling for the impact of the TPB components. Age, gender and frequency of alcohol use had no significant impact on intention after controlling for the TPB components. Perceived behavioural control was the strongest predictor of intention (β = .25, p < .001), followed by moral norm (β = .16, p < .001), past behaviour (β = -.12, p < .001), descriptive norm (β = .09, p < .01) and subjective norm (β = .08, p<.05). Several group differences were found. The extended TPB model explained 27% and 17% (*Adjusted* R^2) of men's and women's intentions, respectively, and 40% and 20% (*Adjusted* R^2) of the variance in intentions among young and older passengers, respectively. The practical implications of these results for the development of interventions to motivate passengers not to ride with intoxicated drivers are outlined.

Key words: drink-driving, theory of planned behaviour, descriptive and moral norm, past behaviour, age and gender differences, alcohol use.

1. Introduction

Two hundred and fifty people are killed and 12.000 people are injured in road traffic in Norway each year. Half of those being killed are car drivers and the rest are passengers, pedestrians and bicyclists (Christophersen, 2012). It is estimated that 90% of the road traffic accidents are caused by human factors, e.g., high speed, lack of driver experience, alcohol and drug use (World Health Organization, 2004). Studies have shown that between 21% and 39% of Norwegian drivers that are involved in fatal traffic accidents were influenced by alcohol, and that intoxication from either alcohol and/or drugs was an important cause of road accidents (Brevig, Arnestad, Mørland, Skullerud, & Rognum, 2004; Gjerde, Beylich & Mørland, 1993). While Assum et al. (2005) demonstrated that the relative accident risk increased significantly with a blood alcohol concentration (BAC) above 0.5, i.e., 50 mg alcohol per 100 ml blood, Compton et al. (2002) found that the relative risk of crash involvement was significantly elevated beginning at a BAC level of 0.04. Moreover, in a case-control study conducted in Norway among drivers killed in road traffic accidents in the period 2003–2010 (‘cases’) and random drivers in normal traffic (‘controls’) both from whom blood samples were tested, the odds ratio (OR) for being killed in a traffic crash with a BAC above the legal limit of 0.02 was 199.5 (95% CI 112.6–353.2) (Gjerde, Christophersen, Normann, & Mørland, 2013). Hence, the above studies clearly demonstrate that riding with an intoxicated driver will increase the risk of getting injured or killed in an accident. Riding with an intoxicated driver also, indirectly or directly, encourages drink-driving and hence car passengers might also represent a threat to road safety. It has also been shown that drinking drivers are more likely to be passengers of drinking drivers (44% versus 4% of nondrinking drivers) (Dellinger, Bolen & Sacks, 1999; see also Cartwright & Asbridge, 2011). Studies that have addressed drinking and driving and riding with drinking drivers indicate that the behaviours are influenced by similar factors and consistent with this strong positive correlations have been reported between the two behaviours (see Cartwright & Asbridge, 2011; Finken, Jacobs & Laguna, 1998; Labouvie & Pinsky, 2001). However, despite the knowledge that the two behaviours drink driving and riding with drinking drivers are strongly related, passengers of drinking drivers seem to be a neglected group in the work to promote road safety and thus it was decided to focus on this group of road users in the present study.

Lowering the legal BAC limit is regarded as one of the most effective strategies to prevent alcohol-related road accidents (cf. Elvik & Vaa, 2003). Norway was the first country in the world to introduce a legal BAC limit of 0.05% in 1936, and thus has a long tradition of strict enforcement. After Sweden reduced the legal BAC limit from 0.05% to 0.02% in 1990, the pressure increased for a similar reduction in Norway, and the amendment came into effect by

January 1, 2001. The number of arrests due to a suspicion of alcohol use has been relatively stable since 1995, i.e., approximately 5000-5500 per year. Generally, men aged 35 years and below are more often involved in risky behaviour in traffic, e.g., drink-driving (Christophersen, 2012), compared to road users older than 35 years and compared to women. The majority of Norwegian license holders consider driving with a BAC above the legal limit reprehensible (Vaas & Elvik, 1992). Nevertheless, as demonstrated above, a relatively large fraction of road accidents are caused by alcohol use. This inconsistency between attitudes and behaviour indicates that factors besides attitudes might influence behaviour in this context. Hence, if the psychological mechanisms which motivate passengers not to ride with intoxicated drivers can be identified, then there is a potential to develop interventions which may lead to changes in behaviour (Stead, Tagg, MacKintosh & Eadie, 2005).

Both drink driving and riding with an intoxicated driver are complex behaviours (Nygaard, Waiters, Joel, Grube & Keefe, 2003), with a broad range of determinants. As shown above, previous experience with drunk driving increases the likelihood of riding with a drinking driver. However, experience with riding with an intoxicated driver does not seem to increase the likelihood of drunk driving (e.g. Yu & Shacket, 1999). One plausible explanation of this finding is that – at least in Norway – driving with a BAC limit above 0.02 is illegal while riding with an intoxicated driver is not. Furthermore, it has been demonstrated that the risk of riding with drinking drivers increases with decreasing age, with reported alcohol use, heavy episodic drinking or problematic alcohol use, and with drinking on specific locations such as in the car and with friends' support for drinking (Cartwright & Asbridge, 2011; Shope, Raghunathan & Patil, 2003; Walker, Waiters, Grube & Chen, 2005). Another characteristic commonly found among people involved in risky behaviours is impulsivity or low self-control (Ainslie, 2001), which has appeared as a strong determinant of drunk driving and riding with an intoxicated driver (Curran, Fuertes, Alfonso, & Hennessy, 2010; Ryb, Dischinger, Kufera, & Read, 2006; Stanford, Greve, Boudreaux, Mathias, & Brumbelow, 1996). Moreover, it has been shown that those who reported riding with an intoxicated had lower perceptions of risk associated with drinking and driving and reduced feelings of control around drinking and driving. In addition, those who reported riding with an intoxicated driver were less likely to report that their friends would disapprove of such behaviours (Grube & Voas, 1996; Nygaard et al., 2003). The aim of this study was not to predict the actual behaviour – riding with an intoxicated driver, but to identify determinants of the motivation not to ride with an intoxicated using an integrated model of predictors.

Within social psychology, researchers have mainly been developing integrated attitude-behaviour models, including additional predictors of behaviour such as social norms or intentions

(Olson & Zanna, 1993). Such models typically focus on the motivational factors underlying individuals' decisions to perform (or not perform) behaviours, and hence these models has been referred to as *motivational* models (cf. Armitage & Conner, 2000). The most well-known motivational model is perhaps the Theory of Planned Behaviour (TPB; Ajzen, 1991). The TPB also provides a basis for practical interventions along with models such as the Health Belief Model (HBM; Janz & Becker, 1984) and Protection Motivation Theory (PMT; Rogers, 1983) (see Fylan, Hempel, Grunfeld, Conner, & Lawton, 2006, for an evaluation of the practicality of the models). However, in terms of predictive utility the TPB provides an improvement on the HBM and PMT. This finding is based on studies that have directly compared the models, and which have found the TPB to be the superior in the prediction of intentions and behaviour (e.g., Armitage & Conner, 2000; Quine, Rutter & Arnold, 1998).

1.1 The theory of planned behaviour

According to the TPB, the proximal determinant of behaviour is the *intention* to engage in a particular behaviour. Behavioural intentions are assumed to "…capture the motivational factors that influence a behaviour, they are indicators of how hard people are willing to try, of how much effort they are planning to exert, in order to perform the behaviour." (Ajzen, 1991, p. 181) and is assumed to be a function of an (i) individual's *attitude* towards the specific behaviour, i.e., a positive or negative evaluation of the behaviour, (ii) *subjective norms* (also referred to as injunctive norms) which refer to an individual's perception that important others in his or her social environment wish or expect him or her to behave in a certain way, and (iii) the *perceived behavioural control* (PBC) over the behaviour. PBC is defined as the person's own perception of how easy or difficult it is to execute the behaviour.

Armitage and Conner (2001) reported in a meta-analysis of 185 studies that the TPB accounted for 39% of the variance in intentions. Attitude was the strongest predictor of intention across studies, followed by PBC and subjective norm. Moan and Ulleberg (in preparation) conducted a meta-analysis of 23 studies which have applied the TPB to predict risky road behaviours. The TPB variables explained 36% of the variance in intentions and 42% of the variance in behaviour, respectively. PBC appeared as the strongest predictor of intention, followed by subjective norm and attitude. In terms of Cohen's (1988) classification of effect sizes, meta-analyses thus show that the variance explained by the TPB in intention and behaviour resembles large effect sizes (cf. Armitage & Conner, 2001; Moan & Ulleberg, in preparation; Sheeran, 2002). Similar analysis of the HBM and PMT reveal that the models typically account for small to medium proportions of the variance in behaviour (cf. Armitage & Conner, 2000).

Five studies have applied the TPB to study intentions to drink and drive (cf. Armitage, Norman & Conner, 2002; Chan, Wu & Hung, 2010; Marcil, Bergeron & Audet, 2001; Parker, Manstead, Stradling & Reason, 1992a; Parker, Manstead, Stradling, Reason & Baxter, 1992b), all of which showed that the TPB successfully predicted intentions (R^2 = 42-79%). Moan and Rise (2011) found, however, that the TPB was less successful with respect to predicting intentions *not* to drive after drinking in the sample overall (R^2 = 10%). Based on the findings that drink-driving and riding with an intoxicated driver are influenced by similar factors and that strong positive correlations have been reported between the two behaviours (see Cartwright & Asbridge, 2011; Finken et al., 1998; Labouvie & Pinsky, 2001), the above results suggest that the TPB represents a good point of departure for studying intentions not to ride with an intoxicated driver.

Moreover, the above results illustrate that the impact of the TPB components might differ across behavioural domains, a finding which corresponds with the assumptions of Ajzen (1991), i.e., that the effect of the TPB components is expected to differ across populations, behaviours and situations. Thus, in light of the fact that men aged 35 years and below more often are involved in risky behaviours in traffic (Christophersen, 2012), it is important to examine gender differences as well as age differences when studying a topic such as riding with intoxicated drivers. This reasoning is supported by the findings of Moan and Rise (2011), i.e., that the TPB performed better in predicting intentions not to drive after drinking among male drivers as opposed to female drivers (R^2 = 16 versus 5%, respectively) and drivers aged 35 years and below compared to drivers above 35 years (R^2 = 26 versus 9%, respectively). Consistent with this, Rivis, Abraham and Snook (2011) found that the construct in the TPB and the Prototype Willingness Model (PWM) explained more variance in young male drivers' willingness, i.e., the 'recognition that one would be willing to engage in the behaviour under some circumstances' (Gibbons & Gerrard, 1995, 1997), to drive while intoxicated than in older drivers' willingness (65% versus 47%, respectively).

The TPB is held to be a complete theory of behaviour, i.e., demographic variables, past behaviour and personality traits are assumed to have impact on behaviour *via* influencing components of the model (Ajzen, 1991). Few previous studies have examined the impact of age and gender on intentions to drink and drive over and above the effect of the TPB components. However, Parker et al. (1992b) found that demographic variables accounted for 0.9% additional variance beyond the TPB components, i.e., a small effect according to Cohen (1988). Parker et al. (1992b) suggested that a possible explanation of why the TPB did not fully mediate the effects of age and gender could be attributed to a failure to assess the model's components fully or reliably

enough (see also Armitage et al., 2002). The present study extends previous research by examining both the predictive utility and the potential moderating effect of age and gender.

Although the TPB is regarded as a complete theory of behaviour, Ajzen (1991) described the model as open to further elaboration if further important determinants are identified. O'Keefe (2002) stated that two criteria should be used to evaluate additional predictors in the TPB. First, a given conceptual candidate should provide a large additional contribution to the prediction of intention which reaches well beyond statistical significance. Second, the constructs should demonstrate its utility across a wide range of behavioural domains. A number of variables have been shown to be useful additions to the TPB, and past behaviour, descriptive norm and moral norm are some of the most consistent additional predictors both in terms of additional variance explained in intentions and in terms of predictive utility across behavioural domains (cf. Conner & Armitage, 1998; O'Keefe, 2002). However, no study seems to have examined the relative impact of these predictors and the predictors of the TPB in relation to intentions to drink and drive (i.e., Armitage et al., 2002; Chan et al., 2010; Marcil et al., 2001; Parker et al., 1992a,b) or in predicting intentions not to ride with an intoxicated driver.

1.2 Extending the TPB

Studies employing the TPB generally reveal that subjective norm is the weakest predictor of behavioural intentions (cf. Armitage & Conner, 2001). Armitage and Conner (2001) found that the number of items used to measure subjective norm significantly moderated the subjective norm-intentions correlations, i.e., multiple items resulted in stronger correlations across tests than single-item measures. However, nearly half of the studies which have applied the TPB to study intentions in the context of risky road behaviours found subjective norm to be the weakest predictor, even when multiple items was used to assess subjective norm (cf. Moan & Ulleberg, in preparation). Thus, another explanation of the weak impact of subjective norm is that the definition of the construct is too narrow to capture all aspects of social influence (cf. Conner & Armitage, 1998; Terry, Hogg & White, 1999).

According to Cialdini, Reno and Kallgren (1990) normative influences may stem from a variety of sources, and they suggest that it may be useful to distinguish between injunctive norms (as specified in the TPB) as they concern the social approval or disapproval of others, descriptive norms, which is concerned with what others are doing, and moral norms, which concern what is right or wrong to do. Ajzen (2002) recognized that since important others generally are perceived to approve of desirable behaviours and disapprove of undesirable behaviours, subjective norm is

often found to have low variability. To alleviate this problem he recommended that the measure of subjective norm also should include items designed to capture descriptive norm.

Descriptive norm reflect what is perceived as common or normal, i.e., what most people do. Rivis and Sheeran (2004) found in a meta-analysis that descriptive norm increased the variance explained in intention by 5% after the TPB components had been taken into account (i.e., an improvement representing a small-to-medium effect size). Moreover, younger samples and health and risk behaviours were both associated with stronger correlations between descriptive norm and intentions.

Moral norm represent the conviction that some forms of behaviours are inherently right or wrong, regardless of their personal or social consequences (Ajzen, 1991). In a review of TPB studies it was shown that moral norm on average explained 4% of the variance in intention, beyond the impact of the TPB components (cf. Conner & Armitage, 1998). Parker, Manstead and Stradling (1995) found that moral norm exerted a significant impact on intentions to perform a number of risky road behaviours, beyond the impact of the TPB components. Particularly, moral considerations should have an influence on the performance of those behaviours with a clear moral or ethical dimension, e.g., like riding with an intoxicated driver (Beck & Ajzen, 1991).

Whether or not a person decides to drive after drinking or ride with an intoxicated driver is also likely to depend on the persons previous experiences with drunk driving, either his or her own drunk driving (e.g., Dellinger et al., 1999) our through experience of being a passenger of intoxicated drivers. Consistent with this reasoning, a number of studies have shown that past behaviour predict intentions, beyond the effect accounted for by the TPB components (e.g., Conner & Armitage, 1998; Ouellette & Wood, 1998). Conner and Armitage (1998) reported that past behaviour explained 7.2% of the variance in intention, after the TPB components had been accounted for. The residual effect of past behaviour beyond the TPB components has been demonstrated in relation intentions to drive after drinking (e.g., Åberg, 1993). This finding suggests that the TPB does not give a complete picture of the intention formation process (e.g., Conner & Armitage, 1998). Previous behavioural experiences obviously provide actors with experience and information about the behaviour not captured by the TPB components and might thus be important when they make decisions of what to do (or not to do) in the future (Ouellette & Wood, 1998).

Alcohol use is a premise for drunk driving, and the expected positive association between alcohol consumption and drunk driving is well-documented (see Moan, Norström & Storvoll, 2013, for review). Moreover, those who drink alcohol are more likely to be passengers of drunk drivers (Calafat et al., 2009; Pounlin, Boudreau, & Asbridge, 2007; Walker et al., 2005).

However, previous studies applying the TPB to study intentions to drink and drive have not examined the impact of alcohol use beyond the impact of the TPB components.

1.3 Hypotheses

Based on the above reasoning, it was hypothesized that:

(i) the components in the TPB will predict intentions not to ride with an intoxicated driver, and that,

(ii) past behaviour, descriptive norm and moral norm predict intentions, after accounting for the impact of the TPB components, age, gender and frequency of alcohol use.

In light of Ajzen's (1991) idea that the impact of the TPB components is expected to differ in different target populations, an additional aim of this study was to examine whether different processes influence the motivation in subgroups of the sample. As stated above, men aged 35 years and below are more often involved in risky behaviour in traffic such as drink-driving (Christophersen, 2012) compared to road users older than 35 years and compared to women. Accordingly, it was decided to examine whether the predictive utility of the extended TPB model differed for women and men, and for drivers aged 35 years and below compared to drivers above 35 years. It has been shown that drink-driving and riding with an intoxicated driver are influenced by similar factors and strong positive correlations have been reported between the two behaviours (see Cartwright & Asbridge, 2011; Finken et al., 1998; Labouvie & Pinsky, 2001). Thus, based on the results from previous studies examining the moderating effect of age (Moan & Rise, 2011; Rivis et al., 2011) on the relationship between intention/willingness to drink and drive and a set of predictors, it was expected that:

(iii) the extended TPB model would provide more explained variance in intentions among passengers aged 35 and below as opposed to those aged above 35 year, and that,

(iv) the specified predictors would explain more variance in intentions among male than female passengers.

2. Method

2.1 Procedure and respondents

Questionnaires were sent via traditional mail to 4000 randomly drawn persons from the national register in Norway aged between 18 and 70 years in November 2007, and were completed by 1025 respondents. The data collection was conducted by Norfakta Markedsanalyse AS

(http://www.norfakta.com). It was not possible to compare those who completed the questionnaire with those who did not complete the questionnaire with respect to demographic variables such as gender and age. There were 44.9% men in the sample and the average age was 43.9 years (*SD* = 14.1 years). The majority of the sample had a driver license (92.9%). However, since the motivation to ride with an intoxicated driver might differ between those experienced in driving a car compared to those without such experience, it was decided to control for this possibility by including a dummy variable in the final step of the regression analysis.

2.2 Measures

2.2.1 The components of the theory of planned behaviour

The questionnaire first introduced a scenario for a potential drinking and driving situation. The participants had to imagine themselves being at a pub, restaurant, dinner party or another place outside the house where alcohol is being consumed. Moreover, they were asked to imagine themselves deciding whether or not to ride with a driver who they knew recently had been drinking 2 bottles of beer (0.7 l) (see Marcil et al., 2001; Moan & Rise, 2011; Parker et al., 1992a,b, for similar scenarios). The legal BAC limit in Norway is low (0.02), the knowledge about the legal limit is high and the acceptance for driving after drinking is low (Assum, 2010). Thus, it is assumed that most participants would think that the drivers exceeded the legal limit. Keeping this scenario in mind, the participants completed the questionnaire.

In the following paragraphs, each scale of the questionnaire is described with a measure of its internal consistency (Cronbach's alphas, and Pearson's *r's* in instances where 2 items were used). All scales ranged from 1 to 7, except from the attitude-scale which ranged from -3 to +3.

Attitude was assessed using 5 items with the stem "To ride with an intoxicated driver the next 12 months, would for me be…": (1) Wrong – Right, (2) Foolish – Wise, (3) Unpleasant – Pleasant, (4) Unnecessary – Necessary, (5) Punishing – Rewarding. Alpha (α) = 0.89.

Subjective norm was assessed using 2 items: (1) People that mean a lot to me, thinks that I should avoid riding with an intoxicated driver in situations like that during the next 12 months, Completely disagree – Completely agree, (2) People that mean a lot to me, thinks it is okay that I ride with an intoxicated driver in situations like that during the next 12 months, Completely disagree – Completely agree. The last item was reversed before computing the index (r = 0.69).

Perceived behavioural control was assessed using 3 items: (1) During the next 12 months I can easily avoid riding with an intoxicated driver in situations like that, if I want to, Very unlikely – Very likely, (2) During the next 12 months it is likely that I can avoid riding with an intoxicated driver in such situations, if I try, Very unlikely – Very likely, (3) Not riding with an intoxicated

driver in such situations during the next 12 months, will for me be, Very difficult – Very easy (α = 0.71).

Intention was assessed using 4 items with the stem: "During the next 12 months…" (1) I intend not to ride with an intoxicated driver in such situations, (2) I will try avoiding riding with an intoxicated driver in such situations, (3) I plan not to ride with an intoxicated driver in such situations, and (4) I will not ride with an intoxicated driver in such situations, Very unlikely – Very likely (α = 0.84).

2.2.2 Extension variables

Descriptive norm was assessed using 2 items: (1) Think about your friends, how many would ride with an intoxicated driver in a situation described above?, None of them – All of them, (2) Think about your friends, to what extent would they agree that one should avoid riding with an intoxicated driver in a situation like that?, To a small extent – To a large extent (r = 0.67).

Moral norm was assessed using 3 items: (1) To ride with an intoxicated driver in such situations during the next 12 months is morally wrong, (2) I would feel guilt if I ride with an intoxicated driver in situations like that during the next 12 months, (3) I would get a bad conscience if I ride with an intoxicated driver in such situations during the next 12 months, Completely disagree – Completely agree (α = 0.91).

Past behaviour was measured using one item, i.e., During the past 12 months, have you been riding with a driver who was intoxicated by alcohol? Never (1) – More than 10 times (8).

Frequency of alcohol use was measured using one item, i.e., How often do you drink alcohol? The response options were Never (1), 1-2 times per year (2), 3-11 times per year (3), once a month (4), 2-3 times per month (5), 1-2 times per week (6), 3-5 times per week (7) and Every day (8).

The above results showed that Cronbach's alpha was generally higher than 0.70, indicating a satisfactory level of internal consistency (cf., Nunnally, 1978).

3. Results

3.1 Descriptive statistics and correlations

The correlations among the variables as well as the descriptive statistics of the variables are presented in Table 1.

Insert Table 1 here

The results show that all independent variables were significantly correlated with behavioural intentions, except age and frequency of alcohol use. The correlation between PBC and intention appeared as the strongest (r = .40, p < .001), followed by moral norm (r = .33, p < .001) and subjective norm (r = .28, p < .001).

3.2 Predicting intentions using an extended TPB model

A hierarchical regression analysis was used to predict intentions among all respondents, entering the TPB components in Step 1, past behaviour, moral norm and descriptive norm in Step 2, and gender, age, frequency of alcohol use and driver license in Step 3. Since several variables were skewed, an analysis was performed to test whether the residuals were normally distributed[1]. The results are presented in Table 2.

Insert Table 2 here

The results showed that the TPB components accounted for 19% (*Adjusted* R^2) of the variance in intentions. PBC exerted the strongest impact on intentions (β = .32, p < .001), followed by attitude (β = .14, p < .001) and subjective norm (β = .12, p < .001). The results from Step 2 showed that the extension variables added 4% to the explained variance in intention, beyond the impact of the TPB components. Among the extension variables, moral norm (β= .16, p < .001) exerted the strongest impact, followed by past behaviour (β= -.12, p < .001) and descriptive norm (β= .09, p < .01). The results from Step 3 showed that neither of the variables (age, gender, frequency of alcohol use and having a driver licence) exerted a significant impact on intention and were thus excluded from further analyses.

3.3 Predicting intentions for women and men

Two separate regression analyses were conducted to examine whether different mechanisms motivated men and women not to ride with an intoxicated driver. The results are presented in Table 3.

Insert Table 3 here

In Table 3 it can be seen that the TPB components explained 12% and 26% of the variance in intentions among women and men, respectively. The final step of the regression analysis showed that PBC was the strongest predictor of intentions among men (β = .36, p < .001), followed by

[1] Royston's (1982) extension of the Shapiro and Wilk's W statistic was used to test whether the residuals were normally distributed. A Shapiro-Wilk score which is not significantly different from 1 indicate normality. The regression analysis performed revealed normally distributed residuals (Shapiro-Wilk score: 0.986). Moreover, a test was conducted to determine whether the residuals were heteroscedastic (i.e. whether the variance in the residuals were associated with the predicted value) by making a scatterplot of the standardized predicted value of intention and the standardized residuals. The plots revealed that residuals were homoscedastic. Thus, the results supported use of parametric statistics (Hankins, French & Horne, 2000).

moral norm (β = .16, p < .01). Among women, on the other hand, past behaviour was the strongest predictor of intentions (-.18, p < .001). The remaining variables were all significantly related to intentions among women, with betas ranging from .10-.12 (p < .05). The extended TPB model explained 17% and 27% (*Adjusted* R^2) of the variance in intention among women and men, respectively. To test the potential moderating effect of gender, the unstandardized regression coefficients for women and men were compared as suggested by Baron and Kenny (1986) using the test given in Cohen and Cohen (1983, p. 56). One significant gender difference was found: PBC was more strongly related to intentions among men than among women (t = 3.89, p < .001).

3.4 Predicting intentions for those aged 35 and below and for those above 35 years of age

Finally, two separate regression analyses were conducted to predict intentions among those aged 35 and below and among those aged above 35 years. The results from the analyses are presented in Table 4.

Insert Table 4 here

The results presented in Table 4 shows that the TPB components accounted for 39% and 14% of the variance in intentions among passengers aged 35 years and below and among those aged above 35 years, respectively. The final step of the regression analysis showed that PBC was the only significant predictor of intentions among young passengers (β = .52, p < .001). Among those aged above 35 years, all predictors were significantly related to intentions. Past behaviour had the strongest impact on intentions (β = -.18, p < .001), followed by PBC (β = .16, p < .001), moral norm (β = .16, p < .001), attitude (β = .13, p < .001), subjective norm (β = .08, p < .05) and descriptive norm (β = .07, p < .05). The extended TPB model accounted for 40% and 20% (*Adjusted* R^2) of the variance in intentions among the young and the older passengers, respectively. The unstandardized regression coefficients for the two age groups were compared using the test given in Cohen and Cohen (1983, p. 56), revealing three significant differences: attitude (t = -3.02, p < .01) and past behaviour (t = 2.87, p < .01) were significantly stronger related to intentions among passengers aged above 35 years than among young passengers, and PBC was a significantly stronger predictor of intentions among passengers aged 35 years and below than those aged above 35 years (t = 5.33, p < .001).

4. Discussion

First, this study showed that the TPB components explained 20% of the variance in intentions in the sample as a whole, and that the model did benefit from being extended with past behaviour, moral norms and descriptive norms (R_{change} = .04, p < .001). Age, gender, frequency of alcohol

use and having a driver license did not have a significant impact of intention beyond the impact of the TPB components. Second, the extended TPB model accounted for more of the variance in men's (*Adjusted* R^2 = .27) as opposed to women's (*Adjusted* R^2 = .17) intentions not to ride with an intoxicated driver. The predictive pattern was also different among women and men. While all predictors exerted a significant (although modest) impact on intentions among women, perceived behavioural control and moral norms were the only significant predictors of men's intentions. However, only one of these differences were statistical significant. i.e., PBC was more strongly related to intentions among men than among women. Third, the extended TPB model explained more of the variance in intentions among passengers aged 35 years and below (Adjusted R^2 = .40) than among those above 35 years of age (*Adjusted* R^2 = .20). While PBC was the only significant predictor of intentions among young passengers, all variables exerted a significant impact on intentions among passengers above 35 years. Attitude and past behaviour were significantly stronger predictors of intentions among passengers aged above 35 years than among those aged 35 years and below, and the PBC-intention relation was significantly stronger among passengers aged 35 years and below than among those above 35 years.

4.1. Predicting intentions using an extended TPB model

The results of this study showed that the TPB components explained 20% of the variance in intentions in the sample as a whole. This figure is considerably lower than the figure found in the meta-analysis of Armitage and Conner (2001), i.e., 39%, and in the meta-analysis conducted by Moan and Ulleberg (in preparation) where the TPB variables explained 36% of the variance in intentions.

However, the predictive pattern of the present study was similar to that of the meta-analysis of Moan and Ulleberg (in preparation) in that PBC turned out to be the strongest predictor of intentions. The meta-analysis of Armitage and Conner (2001), which contained studies from a broad range of behavioural domains, revealed that attitude was the strongest predictor of intention. No studies have previously applied the TPB to study intentions not to ride with an intoxicated driver, and the results from studies which have applied the TPB to predict intentions to drink and drive are not consistent. While Marcil et al. (2001) found attitude to be the strongest predictor of intentions, Parker et al. (1992) and Moan and Rise (2011) found that PBC was the strongest predictor of intentions. However, the study of Marcil et al. (2001) was conducted among 115 male drivers aged between 18 and 24 years in Canada. Parker et al. (1992a,b) conducted their study among a stratified sample of 800 drivers in England (50% women and men, aged between 17 and 55 + years). Similarly, the study of Moan and Rise (2011) was conducted

among a national sample (46.6% men) aged between 18 and 70 years that were randomly drawn from the national register in Norway. Thus, the results from studies conducted among a broader range of the population seems to be quite consistent with perceived control emerging as the strongest predictor of both drunk driving and riding with an intoxicated driver. This is consistent with findings from other studies where reduced feeling of control around drinking and driving situations (e.g., because of a perceived lack of transport alternatives) increased the likelihood of riding with an intoxicated driver (e.g., Grube & Voas, 1996). In sum, when looking at the first hypothesis of the study, i.e., the TPB components will predict intentions not to ride with an intoxicated driver, all three predictors emerged as significant predictors. However, when comparing to research applying the TPB in other areas, the model accounted for a relatively low share of the variance in intention and thus the results suggest that the model does not represent an ideal model in this context. Hence, the first hypothesis is only partly supported by the results. The low predictive utility of the TPB in this context is discussed more thoroughly in section 4.3.

Although past behaviour, moral and descriptive norms were significantly related to intentions, after controlling for the impact of the TPB components, the contribution was small in terms of explained variance, i.e., $R^2_{change} = .04$, $p < .001$ (cf. Cohen, 1988). Meta-analyses have shown that the three construct contribute with an average of 7%, 4% and 5%, respectively, after accounting for the effect of the TPB components (Conner & Armitage, 1998; Rivis & Sheeran, 2004). Hence, with an average performance the constructs should have contributed with around 16% of the variance in intentions beyond the TPB components. Thus, the conclusion with respect to the second hypothesis in this study is that it was only partly supported by the results.

Moreover, the results from this study showed that the predictive pattern of the TPB components differed across gender and across different age groups, a finding which is in accordance with the assumption of Ajzen (1991) that the impact of the TPB components is expected to differ across different populations. Based on findings from previous studies it was hypothesized that the extended TPB model would account for more variance in the intention among men than women, which was supported by the findings (27% versus 17%, respectively). Moreover, it was hypothesized that the specified model would account for more variance in younger than older passenger, and this was also supported by the results (40% versus 20%, respectively).

Perceived behavioural control was significantly stronger related to intentions among the passengers aged 35 and below than among passengers aged above 35 years, and PBC was more strongly related to intentions among men than among women, findings that are in accordance with the results in the study of Moan and Rise (2011). It is also consistent with the study of Rivis

et al. (2011) who found that PBC was the strongest predictor of willingness to drink while intoxicated among young males, and was a stronger predictor of willingness among younger as opposed to older males. Young adult men in Norway, i.e., those aged between 20 and 30 years, drink more alcohol than older individuals (Horverak & Bye, 2007), and they are more often involved in drink-driving situations (Christophersen, 2012). Since men aged 35 and below are exposed to such situations more frequently than older passengers and women, they might also be tempted to ride with intoxicated drivers in various situations more so than older drivers. In light of this, perceived behavioural control is an important aspect to retain an intention not to do so.

Moreover, the results showed that the intention formation process among those aged above 35 years was more strongly guided by attitudes, i.e., rational considerations of the consequences of riding with an intoxicated drivers, compared with passengers aged 35 and below. This seems to fit well with findings that adolescents and young adults are less guided by rational considerations than older individuals (see Gibbons, Houlihan & Gerrard, 2009, for review). However, it should be noted that although the group difference was statistically significant ($p < .001$), the differences in the beta coefficients were rather small.

Finally, the finding that the past behaviour-intention relation was significantly stronger among those aged above 35 years as opposed to the younger passengers, may imply that the history of the younger passengers is not long enough to have an impact on intention formation. Moreover, one plausible explanation of the low impact of past behaviour in the sample overall might be that passengers who have been riding with intoxicated drivers in the past had no other transport options at that time. Another explanation might be that riding with an intoxicated driver is relatively uncommon in Norway and thus by choosing a longer time period for the measure of past behaviour would have ensured more behavioural incidents (see Åberg, 1993). However, it cannot be ruled out that other experiences with drunk driving such as the passengers own experience with drink-driving (cf. Dellinger et al., 1999) would be a better predictor of intentions in this context. The relative impact of various drink driving experiences on intentions could be an interesting issue for future research.

While two previous studies have found that the TPB failed to fully mediate the effect of demographic variables on intentions to drink and drive (Armitage et al., 2002; Parker et al., 1992b), the present study found no significant impact of age and gender on intentions to ride with an intoxicated driver after accounting for the impact of the TPB components (see Calafat et al., 2009, for similar results). Thus, the results provide some support to the assumption of Ajzen (1991) that demographic variables influence behaviour indirectly *via* the TPB components. Moreover, the present study suggest that gender and age differences are less pronounced with

respect to decisions to ride with an intoxicated driver than decisions to drink and drive, a finding which is not that surprising considering the fact that men of all ages drive more often, both sober and intoxicated, than women.

Several studies have shown that those who drink alcohol are more likely to be passengers of drunk drivers (e.g., Calafat et al., 2009; Pounlin et al., 2007). However, no previous studies have examined the impact of alcohol use on intentions to drink and drive beyond the impact of the components of the TPB. The results from the current study showed that frequency of alcohol use did not have a significant impact on intentions not to drink and drive, after accounting for the TPB components. Although this finding do provide some support of the assumption by Ajzen (1991), it should be emphasized that it is reasonable to expect heavy drinking/drunkenness to be stronger related passengers' decisions to ride with drunk drivers (see e.g., Calafat et al., 2009), implying that future studies applying the TPB should rather assess frequency of heavy episodic drinking in the context of drunk driving. Another interesting issue for further research could be to examine the impact of heavy episodic drinking among passengers at the particular night when considering riding with an intoxicated driver, and not only the typical measure of frequency of heavy drinking during the past 12 months. Finally, it could also be valuable to apply more widely used screening instruments such as AUDIT (Saunders et al., 1993) when studying drunk driving or riding with intoxicated drivers, because it is sensitive not only to medically diagnosable alcohol addiction or abuse, but also to psychosocial problems resulting from excessive alcohol use. Consistent with this, Cartwright and Asbridge (2011) demonstrated that problematic alcohol use was indeed a risk factor for riding with a drinking driver.

4.2 Practical implications

Traffic violations in Norway and in other parts of the world are mainly conducted by young men (Christophersen, 2012). The results from this study showed that the extended TPB model was better suited to predict intentions among men and those aged 35 years and younger than among women and passengers aged above 35 years, a finding that corresponds with the results in the study of Moan and Rise (2011). Thus, the results may have some practical implications for the most important target group in this context, i.e., young male passengers. Particularly, the results indicate that future interventions should attempt to increase the control perceptions of young passengers. Perceived behavioural control was the most consistent predictor of intentions in this study, across age and gender, but it was a particularly strong predictor of young passenger's intentions not to ride with an intoxicated driver and among men. Bandura (1986) outline three ways in which perceptions of control over a behaviour (or self-efficacy) can be enhanced:

through personal mastery experience by setting and achieving sub-goals (avoiding situations where riding with an intoxicated driver would be an option, e.g., by taking the bus or a taxi to the destination of interest), through observing other's who decide not to ride with intoxicated drivers (e.g., modelling famous personalities who clearly state that they will not do so), and through standard persuasive techniques. In order to alter the motivation among older passengers, the results suggest that targeting attitudes, e.g. by addressing the consequences of riding with an intoxicated driver would be fruitful.

4.3 Theoretical considerations and possible avenues for further research

Although the present study address some limitations of the TPB, e.g., not taking into account the impact of past behaviour and the narrow conceptualization of social influence, there still remains a large amount of unexplained variance in intentions. There are several possible explanations of the relatively low share of explained variance accounted for by the specified model. The TPB rely on a expectancy-value (EV) approach which maintain that behaviour is a result of a deliberative process that includes an assessment of antecedent factors that leads to the development of an intention to perform or not perform the behaviour. Many types of health-promoting behaviours, such as condom use and smoking cessation require forethought or dileberation (Gollwitzer, 1999). Similarly, some risky behaviours, e.g., speeding, involve at least some forethought. Driving after *heavy* drinking or riding with an intoxicated driver after *heavy* drinking, on the other hand, oftentimes do not involve much forethought. Hence, the decision-making process is likely to differ across different behaviours and models relying on the EV approach have thus neglected some central elements of risky behaviours, some of which have been identified as moderators of the intention-behaviour relationship.

EV-models have been criticized for underestimating the impact of emotions or ‘hot processes’ on the actual decision process (Conner & Sparks, 2005; Peters, Västfjell, Gärling & Slovic, 2006). Affect appears to have more of an impact on ’hedonic’ behaviours such as drink-driving whereas cognitive constructs, e.g. represented by the TPB, have more of an impact on ‘utilitarian’ behaviours such as donating blood (Kidwell & Jewell, 2003). Thus, future studies examining the motivational determinants of drink-driving would most likely benefit from including measures of affect in their model.

Affect relate to another characteristic commonly found among those involved in risky behaviours, namely impulsivity (Ainslie, 2001). We know that not all drinking events results in drunk driving or riding with an intoxicated driver and thus some other conditions needs to be fulfilled. Accordingly, impulsivity has appeared as a strong determinant of drunk driving (Curran

et al., 2010; Ryb et al., 2006; Stanford et al., 1996). People who are impulsive are more shortsighted and more prone to take risks compared with individuals with a high degree of self-control and are therefore more likely to engage in risky and criminal acts such as drunk driving (Gottfredson & Hirshi, 1990). Impulsivity has also been found to moderate the relationship between alcohol use and drunk driving, i.e., the association between drinking and drunk driving was nearly twice as strong among those with a high score on impulsivity compared with those who have a low score (Moan et al., 2013).

Consistent with the above reasoning, intentions have been found to be of less predictive utility in relation to health risk behaviours performed in social contexts than health-protective behaviours (Webb & Sheeran, 2006). Based on these findings, it has been argued that impulsive and social undesirable behaviours are better predicted by behavioural willingness, i.e., the 'recognition that one would be willing to engage in the behaviour under some circumstances' (Gibbons & Gerrard, 1995, 1997; Gibbons et al., 2003) than by measures of intentions. In a study on drink driving among adolescents, Gibbons et al. (1998b) found that both intention and willingness predicted future behaviour, and that they predicted behaviour independently of one another.

More recent studies, however, have showed that the relative contribution of behavioural intention versus behavioural willingness in predicting health risk behaviours can vary across groups. Pomery, Gibbons, Reis-Bergan and Gerrard (2009) found that willingness was a stronger predictor of risky behaviour among young adolescents (13 years) with little experience with the behaviour, i.e., substance use, than among middle aged adolescents (aged 16 years) and that intentions became stronger predictors as experience with the behaviour increased. Nevertheless, Gibbons et al. (1998b) demonstrated that both willingness and intention are useful predictors of drink driving behaviour, and Rivis et al. (2011) showed that applying both the Prototype Willingness Model (PWM) and the TPB provided useful information about the motivational determinants of willingness to drink and drive. A nice extension of the study of Rivis et al. (2011) could be to measure both willingness and intention to ride with an intoxicated driver in the same study, preferably with the opportunity to examine age and gender differences, and to examine the predictive utility of relevant predictors and potential moderators such as affect and impulsivity on both willingness and intention.

4.4 Methodological considerations

A number of potential methodological problems with the present study warrant attention. First, the lack of data on subsequent behavioural performance is of course a weakness in the present

study. Nevertheless, since the particular behaviour has received scant research attention in general, as well as specifically in terms of not having been studied within the framework of the TPB, this topic deserved more research attention. Given the importance of drink-driving as an important threat to public health, this study has provided useful information about the motivational processes underlying the decisions of passengers not to ride with intoxicated drivers. However, intentions have been found to correlate strongly with behaviour across a wide variety of behavioural domains (Sheeran, 2002), including risky road behaviour (Moan & Ulleberg, in preparation). Second, the study relied on self-report measures. Results from a meta-analysis (Armitage & Conner, 2001) showed that the TPB account for a relatively large amount of the variance both of observed (R^2 = .20) and self-reported behaviour (R^2 = .31). However, measuring attitudes and intentions in relation to behaviours such as drink-driving and riding with an intoxicated driver represents an extra challenge. It is assumed that the questionnaire was completed by sober participants. However, they were asked to imagine themselves being at a pub or another place outside the house where alcohol is being consumed. In light of the fact that 90-95 % of the Norwegian population drinks alcohol (Horverak & Bye, 2007), the vast majority of the respondents would at least to some degree be intoxicated by alcohol when being in such a situation. Consequently, in the actual decision process of whether or not to ride with an intoxicate driver, attitudes and intentions are likely to be affected by alcohol intake. Consistent with this, MacDonald, Zanna and Fong (1995) found in a laboratory experiment and 2 field studies that when participants were asked general or noncontingent questions, sober and intoxicated participants were equally negative about drinking and driving. However, when a contingency was embedded in the question (e.g., "would you drink and drive only a short distance?") intoxicated participants were significantly less negative about drinking and driving. The results are consistent with the alcohol myopia, i.e., the notion that alcohol intoxicated decreases cognitive capacity so that people are more likely to attend to only the most salient cues (Steele & Josephs, 1990). In this respect, measuring behavioural willingness would also be challenging since a heavyily intoxicated person will most likely be more willing to ride with an intoxicated driver than a sober individual responding to a questionnaire. Thus, further experimental work on manipulation of relevant predictors and potential moderators (e.g., alcohol use and impulsivity) with subsequent measurement of intentions and willingness, and behaviour, is required to demonstrate the causal relationship between the constructs. Third, although the respondents were randomly drawn from the national register in Norway, the response rate was low and thus it is uncertain whether this sample can be regarded as representative of the population in Norway. Fourth, the fact that the respondents did not know whether or not the driver described in the scenario exceeded the legal

BAC limit may have affected the results. Unfortunately, it was not possible to examine how this may have affected the results in the current study. Thus, future studies applying scenarios similar to the one used in the present study should state explicitly whether or not the alcohol consumed by the driver exceeds the legal limit (see Rivis et al., 2011, p. 448, for one possible approach). A fifth potential threat to the reliability and validity of the TPB measures is social desirability. Sheeran and Orbell (1996) found some effect of social desirability on the reliability of the measures, and the correlations between the components in the protection motivation theory, while Beck and Ajzen (1991) and Armitage and Conner (1999b) could not confirm this finding when studying potential effects of social desirability on the relationship between the TPB components. Armitage and Conner (1999b) therefore suggested that Sheeran and Orbell's (1996) findings were artifactual. In conclusion, self-reports by means of questionnaires cannot be viewed as a neutral method for data collection, but neither can experiments nor any other psychological method (see Cook & Campbell, 1979).

5. Conclusions

The results from this study showed that the extended TPB model accounted for a relatively small amount of the variance in intentions in the sample as a whole. However, the model was better suited to predict intentions among men and passengers aged 35 years and below compared to women and passengers aged above 35 years. Perceived behavioural control was the most consistent predictor of intentions across age and gender, but was a particularly strong predictor of intentions among young passengers, and male passengers. Since male passengers aged 35 years and below represent the most important target group in the context of drink-driving, the results from this study indicate that future interventions should target perceived behavioural control. In order to alter the motivation among older passengers, the results suggest that targeting attitudes would be fruitful.

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Table 1. Descriptive statistics and correlations among intentions (int), past behaviour (pb), attitude (att), subjective norm (sn), perceived behavioural control (pbc), moral norm (mn), descriptive norm (dn), age, gender, frequency of alcohol use (alcohol) and drivers license (license) (N = 1025).

	1	2	3	4	5	6	7	8	9	10	11
Pb (1)	-										
Att (2)	-.24***	-									
Sn (3)	-.18***	.25***	-								
Pbc (4)	-.21**	.23***	.37***	-							
Mn (5)	-.20***	.41***	.29***	.34***	-						
Dn (6)	-.13***	.16***	.17***	.17***	.20***	-					
Age (7)	-.14***	.22***	.01	.02	.22***	.19***	-				
Gender (8)	-.04	.09**	-.13***	.10**	.22***	.10**	-.01	-			
Alcohol (9)	.13***	-.12***	-.01	-.02	-.14***	.01	.04	-.10**	-		
Licence (10)	-.11***	.10**	.07*	.15***	.07*	.01	.10**	-.06*	.09*	-	
Int (11)	-.24***	.24***	.28***	.40***	.33***	.19***	.02	.11***	-.05	.14**	-
M	1. 08	1.15	6.56	6.68	6.31	5.57	43.88	-	4.41	-	6.67
SD	0.41	0.39	1.07	0.89	1.36	1.18	14.05	-	1.68	-	0.97

***p<.001, **p<.01, *p<.05 (two-tailed)

Table 2. Predicting intentions using an extended version of the theory of planned behaviour (N = 1025).

Step	Predictors	β Step 1	β Step 2	β Step 3	R^2	*Adjusted* R^2	F_{change}
1.	Attitude	.14***	.06	.06*			
	Subjective norm	.12***	.09**	.08*			
	Perceived behavioural control	.32***	.27***	.25***	.20	.19	82.77***
2.	Past behaviour		-.12***	-.12***			
	Moral norm		.16***	.16***			
	Descriptive norm		.08**	.09**	.24	.23	18.37***
3.	Age			.04			
	Gender			.03			
	Alcohol use			.00			
	Drivers license			.05	.24	.23	2.25

*p<.05, **p<.01, ***p<.001

Table 3. Predicting intentions for women (N = 565) and men (N = 460) using an extended TPB model.

		Women			Men			
Step	Predictors	β	*B*	*SE*	β	*B*	*SE*	*t-values*
1.	Att	.10*	.22	.10	.06	.15	.12	-0.50
	Sn	.11*	.10	.04	.07	.07	.04	-0.48
	Pbc	.12*	.13	.05	.36***	.40	.05	3.89***
2.	Pb	-.18***	-.38	.08	-.07	-.20	.11	1.28
	Mn	.11*	.08	.03	.16**	.11	.03	0.61
	Dn	.11*	.07	.03	.04	.04	.04	-0.74
R^2 (Step 1)		.12	*$F_{change,}$ 26.16****		.26	*$F_{change,}$ 51.89****		
R^2 (Step 2)		.18	*$F_{change,}$ 13.37****		.28	*$F_{change,}$ 5.79***		
Adj. R^2(Step 2)		.17			.27			

Note. Only coefficients from Step 2 are presented in the table. *p<.05, **p<.01, ***p<.001

Table 4. Predicting intentions for those 35 years and below (N = 316) and those above 35 years of age (N = 709) using an extended TPB model.

		35 years and below			Above 35 years			
Step	Predictors	β	*B*	*SE*	β	*B*	*SE*	*t-values*
1.	Att	-.02	-.04	.10	.13***	.41	.11	-3.02**
	Sn	.08	.08	.05	.08*	.07	.03	0.12
	Pbc	.52***	.55	.06	.16***	.18	.04	5.33***
2.	Pb	-.07	-.14	.09	-.18***	-.52	.10	2.87**
	Mn	.07	.04	.04	.16***	.13	.03	-1.79
	Dn	.09	.08	.04	.07*	.06	.03	0.40
	R^2 *(Step1)*	.39	$F_{change,}$ *66.51***		.14	$F_{change,}$ *39.37***		
	R^2 *(Step2)*	.41	$F_{change,}$ *3.00**		.21	$F_{change,}$ *19.18****		
	Adj. R^2*(Step 2)*	.40			.20			

Note. Only coefficients from Step 2 are presented in the table. *p<.05, **p<.01, ***p<.001