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A Systematic Review of Intervening to Prevent Driving While Intoxicated

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Abstract

Background—Driving while intoxicated (DWI) is a significant public health issue. The likelihood someone will intervene to prevent driving while intoxicated is affected by the characteristics of the individuals and the context of the potential driving scenario. Understanding such contexts may help tailor public health messages to promote intervening from those who are nearby to an intoxicated driver.

Objective—This systematic review investigates the behavior of those close to an intoxicated driver and factors associated with increasing the likelihood they will intervene in situations where driving while impaired may be likely. The review of the literature is guided by an orienting framework, namely the classic social psychology theory of decision-making proposed by Latané and Darley.

Results—Drawing upon this framework, the review examines the extent to which research has focused on factors which influence whether or not an individual identifies a need to intervene and identifies a serious/dangerous situation. In addition, consideration is given to perceived personal responsibility. The final two components of the model are then discussed; the perceived skill an individual who may intervene has (in their ability to intervene) and their actual enactment of the intervening behavior.

Conclusions/Importance—Drawing upon such a well-considered theoretical framework, this review provides guidance on key components likely to assist in the development of targeted, more effective public education messages/campaigns that dissuade individuals from drinking and then driving.

Keywords

driving while intoxicated; DWI; alcohol; review; helping; emergency situations A Systematic Review of Intervening to Prevent Driving While Intoxicated

The problem of driving while intoxicated (DWI)

Across the US, there were more than 10,000 fatalities from alcohol-related crashes and over 1.4 million drivers arrested for driving under the influence of alcohol or narcotics in 2010 (NHTSA, 2013). Despite reductions over recent years in overall motor vehicle fatalities, the proportion of alcohol-involved motor vehicle crashes have changed little in the since 1994; at around one-third of fatal crashes (NHTSA, 2013).

DWI is less common among young adults however the severity and likelihood of an alcohol-involved crash is greater. Further, college student drinking in general is a significant health concern (American College Health Association, 2014). Data from the National Survey on Drug Use and Health suggests 65% of college students (18–22 year olds) drink alcohol in a given month and the proportion who binge drink has remained relatively stable between 2002–2010 (44% in the past 30 days) (White & Hingson, 2014). Such numbers highlight the need for continued understanding of factors that reduce impaired driving particularly for young adults.

Community and health promotion based approaches have included attempts to promote individuals' intervening behavior, that is, where one individual intervenes in order to prevent another from driving while impaired. An approach that has included messages such as, "friends don't let friends drive drunk". Efficacy in public health messaging however is typically more likely when strategies for alternative behaviors are provided (Lewis et al., 2013). This paper examines the literature relating to intervening behavior in potential DWI situations, in particular aims to identify factors that increase the likelihood of intervention. Understanding the context of intervention strategies may help enhance public health messaging that focuses on intervening behavior that prevents driving while impaired.

Social intervention in DWIs

The public health strategy to promote intervention in the DWI context may therefore be a target for change in health behavior programs and campaigns. There has been considerable research examining the driver and the drivers' decision to DWI however, there is less research examining the role that those individuals (whether passengers in the vehicle or more broadly in the situation prior to the driving occurring) are able to play in preventing or reducing the likelihood of DWI. There is research to suggest that many individuals intervene, and that this can prevent drinking and driving (at least as evidenced from intervener self-report data). For example, Newcomb et al. (1997) found 68% of those in their study had reported intervening, and 73% of these individuals reported the intervention was successful in preventing the driving after drinking. Typically intervention self-reported intervention rates are around two-thirds to three-quarters of those surveyed (e.g. Labouvie & Pinsky, 2000; Hernandez, 1999). Such findings highlight a potentially important opportunity

for intervention whereby those less intoxicated may be a source of influence to dissuade an individual from DWI (Gustin & Simons, 2008).

Decision-making around alcohol use is situation specific, such that combined person-environment factors influence the likelihood a decision is made to reduce risk (Monk & Heim, 2013). Intervention in DWIs are similarly situation specific (Labouvie & Pinsky, 2001). Thus it is necessary to identify person-environment detail about safety behaviors to better understanding ways to prevent DWIs. Further the limited effectiveness of knowledge- or direction-only messages are highlighted across many health behaviors, including information-only designated-driver strategies (Ditter et al., 2005). Anderson (2009) highlights that public health campaigns that provide skills, motivation, and efficacy are met with greater success than information-only messages. By providing detail about underlying constraints, barriers, and facilitators to DWI intervention, it provides campaign developers with the information needed to develop strategies that are likely to be more effective at producing behavior change. An approach that would see the development of strategies that go beyond a campaign of “friends don’t let friends’ drive drunk”, to a campaign that better provides strategies on how to perform such behavior. Health promotion campaign literature supports the role of providing concrete strategies and/or actions that individuals can enact; namely, messages which contain high levels of response efficacy are associated with enhanced persuasiveness (Lewis et al., 2013). A recent New Zealand advertisement to reduce DWIs, “Legend” illustrated aptly the role that another individual (in this instance, the main characters were young males) may play in deterring a friend from driving when intoxicated. This paper seeks to provide a systematic overview of the research on direct social intervention in DWIs and seeks to understand the characteristics of those who intervene and the context in which it is done.

Latané and Darley’s explanation of social intervention

The social intervention approach may be particularly pertinent to young people who often drink in social situations and who value looking out for their friends (Armstrong, Watling, & Buckley, 2014). In any case for young people, peers and partners are important sources of social influences and it is this influence that could potentially be used to alter behavior. There appears however to be little consistency in the types of studies that examine this active social intervention. Some studies have examined different characteristics of the individual intervener or the intoxicated driver and other studies have examined the social environment (e.g. presence of others and their relationship). Previous research in other domains has sought to understand bystanders to reduce harmful situations, including bullying (Pozzoli & Gini, 2013), and dating violence and sexual assaults (Coker et al. 2011; Katz et al., 2014). The current research similarly explores the use of a classical social psychology theory as originally outlined by Latané and Darley (1970) to understand the research on social intervention in DWIs. This model looked to explain individuals’ willingness to help in emergency situations as a function of a range of factors (individual and situational). Specifically, the model proposed that the potential intervener must (a) notice an event, (b) interpret the event as an emergency and not as something innocuous, (c) take responsibility for intervention, (d) know what to do, and ultimately (e) decide to take action.

The first step of the model is that the event must be noticed. It is important to note that many emergencies do go unnoticed (e.g. needing to know someone has been drinking and is about to drive). Also, an impaired or self-absorbed individual may not be sufficiently aware of surroundings. The second step relates to interpreting the environment; the event needs to be salient and perceived with limited ambiguity of negative outcomes. The event and potential consequences must be considered by the individual as being serious or dangerous, however individuals may look to others to help them interpret events or approve of their interpretation. The third component suggests an individual possessing a sense of personal responsibility to act. In regards to the situation of potentially intervening to prevent another individual from a DWI, a key facilitator of one holding a sense of personal responsibility to act is to have a connection to the potential intoxicated driver. This connection may include an individual perceiving themselves as being similar to driver or being part of the same network (family/friends). The last two components, knowing what to do and deciding to act, require skill, confidence and sense of efficacy to perform an intervention and an understanding of methods that might be successful.

The role of another individual in intervening to stop a friend from driving while intoxicated appears an important strategy; a strategy which public education messages and campaigns could highlight (Anderson, 2009; Dejon & Atkin, 1995; Guerette et al., 2013). Such an intervention may be effective because it may take advantage of a less intoxicated individual whose judgment may be less impaired (by alcohol). This systematic review aims to provide an overview of the research on direct social intervention in a DWI context and identifying the key factors which promote intervening, conceptualized with the Latane and Darley model (1970). Such key factors then suggest foci for public education messages and campaigns.

Method

A systematic literature review was conducted using online databases, for articles available as of January, 2015. Key phrases were prepared and searched in combination, within scholarly databases including PubMed, PsychInfo, ERIC (Education Resources and Information Clearinghouse), CINAHL (Cumulative Index to Nursing and Allied Health Literature), and Criminal Justice Abstracts. Key search terms include, Interven* OR Protect* OR Pro Social OR Social Responsibility AND Driv* OR Passenger OR Car OR Road OR Transport* OR DUI. Articles were selected for inclusion in this review based on five criteria. Each article was required to 1) examine strategies or factors relating to intervening behavior, 2) focus on young people (aged 16 – 25 years), and 3) relate to DWI. While some articles focused on reducing drinking behavior, they were included only where there was specific mention of drinking and driving. Articles were also only included if they were 4) published in English, and 5) published since 1999.

The key phrases were searched in combination within the databases. Additionally, cited references in identified articles were examined for inclusion. All references identified through these searches were extracted. At the conclusion of the search process and review of abstracts and titles, 18 peer-reviewed articles were identified and catalogued and required further examination. The full text of these was obtained for a more thorough review, 10 of

these met all relevant inclusion criteria; these latter articles are described in the current review (see Table 1). Typically the reason for exclusion was the age of the sample (e.g. Guerette et al., 2013; Otto et al., 2014) or lack of mention of DWI (e.g. Buckley & Foss, 2012).

Results and Discussion

Study Design

Due to heterogeneity in the included articles, studies are presented as a narrative relating to the theory. A meta-analysis was also thus not conducted, as studies were not comparable in terms of the relationships or outcomes assessed, or the statistical methods reported. Rather, the narrative sections describe the results of these studies in detail, and discuss key themes in results identified included across all of the reviewed papers.

Table 1 provides an overview of the research including further detail about the original studies (e.g. number of participants, measures, data collection procedure). The majority of studies used undergraduate students, from a single university, with the exception of three school-based studies (Buckley et al., 2014; Flanagan et al., 2004; Smith et al., 2004). There were also some studies that intertwined intervention efforts related to DWI with other drinking and related harms (Boekeloo et al., 2009; Buckley et al., 2014). Related were many single-item assessments of variables or forced choice following a vignette (while likely to represent the majority of options, it may not actually represent all participants circumstances). Most research involved a quantitative survey. However Anderson (2009) used an experimental design to increase efficacy and intended intervention through viewing advertisements (the constructs were then quantitatively assessed). Buckley et al. (2014) and Smith et al. (2004) used qualitative research methods although their studies mostly focus on intervention strategies. Intervention strategies were also the focus of research by Shore and Compton (2000) rather than what predicts intervention. Of note, while intended intervention behavior was the outcome in a number of studies, other researchers limited the sample to those who have intervened and focused on past behavior (Hernandez et al., 1999; Labouvie & Pinsky, 2001; Mauck & Zagumny, 2000; Shore & Compton, 2000). Thus there are some studies examining intended behavior and other examining past behavior.

Model components

Noticing the event and interpreting the event as dangerous—The first two components in the theoretical model proposed by Latane and Darley (1970) relate to the way in which the potential DWI event is perceived. First, the event must be noticed and second the event must be interpreted as an emergency rather than something innocuous. These initial factors play to one of the key advertising messages approaches; looking out for friends or mates. The work of Labouvie and Pinsky (2001) showed own DWI was an associated with reported intervening behavior and both reported engagement in intentionally deciding not to drive after drinking and greater frequency of riding with a driver who has been drinking. Such associations suggest that participants are aware of DWI behavior. Mauck and Zagumny (2000) found less intoxication of the intervener (greater comparative intoxication) to be associated with past intervening. Greater potential impairment and

intoxication of the driver was associated with greater intended intervening (Gustin & Simons, 2008) suggesting more obvious signs to interpret (and potentially more harm) associated with intervening.

In related work, Hernandez et al. (1999) assessed feelings of anxiety about DWI consequences, and found associations with likelihood of intervening. They found that greater endorsement of a cluster of emotions that included stress, worry, nervousness, and frustration (termed anxiety) was associated with having intervened suggesting sufficient arousal is associated with intervention. Frequency of attempts to intervene moderated the relationship between these emotions and successful intervention. This anxiety cluster was however directly associated with less success at passive intervention (e.g. getting coffee, asking the person to stay longer). Such findings suggest that success in passive intervention is associated with repeated attempts to intervene, highlighting potentially a more complicated relationship than merely noticing and perceiving potential danger in the event. In qualitative research, the participants of Buckley et al.'s (2014) study described the imminence for physical harm was associated with reported of intervening, although descriptions were not limited to DWI harmful contexts.

To further support the need to consider perceptions of danger to promote social intervention, Gustin and Simons' (2008) study examined the role of situational factors that can be construed as likely to increase the interpretation of impending harm. They found that the perceived likelihood of arrest and greater distance to drive home predicted greater likelihood of intervening. Of interest, greater travel distance was considered as a potential harm; as consistent with the occasionally held belief that less distance to drive after drinking alcohol is associated with reduced harm. Similarly, in the strategies for intervention described by the participants in the work of Shore and Compton (2000) and Smith et al (2004), those considered more threatening typically involved threatening with likelihood of arrest.

Perceived responsibility to intervene—The next component of Latane and Darley's model is that the individual must consider themselves as personally responsible to act. Across the reviewed studies, few provided reference to the construct of personal responsibility; however the research did support the importance of responsibility in social intervention. Hernandez et al. (1999) showed that greater rating of responsibility was associated with greater likelihood of an assertive intervention and that chivalry was associated with greater passive interventions (e.g. providing coffee). Mauck and Zagumny (2000) used a 20-item measure of moral/social obligation that included specific mention of responsibility and they found a significant relationship with greater intervening behavior. This was one of the few instances of a multi-item assessment of the construct.

Boekeloo and Griffin (2009), although focused on drinking more generally, noted decreased likelihood of intervening with relationships that were more distal. Intervention was rated by participants to be most likely when they were with a room-mate, followed by someone residing on the same dorm-wing, with little likelihood of intervening with a stranger. This finding however should be interpreted with some caution in relation to the DWI context as it was only a described relationship (based on observed mean differences). When related to more broadly alcohol-harm contexts, it was statistically significant in predicting intervention

(regression analyses). Further in qualitative research, the likelihood of intervention was described among friends only (Buckley et al., 2014). Latané and Darley (1970) do not consider the nature of the relationship in their model, however it is likely that the responsibility that can be seen in close relationships holds in this context that may not have been so with emergencies that are more likely unexpected, such as stopping to assist a random act of violence. Issues of responsibility could be derived from an assumption that that a close affinity is associated with greater responsibility to protect. For example, being the partner, spouse or a close friend of the intoxicated driver was associated with intervening or being the recipient of intervention (e.g. Shore et al., 2000).

Skills and ability to intervene—A critical aspect to the decision making process of the model is that the potential intervener has knowledge and skills about how to intervene (Latané & Darley, 1970). Correspondingly, much of the reviewed research included an assessment of confidence to intervene or perceived ability to intervene. Boekeloo and Griffin (2009) found that as confidence was greater so was the likelihood of intervention in any alcohol context (including reducing DWI). In one study, Anderson (2009) found exposure to behavioral and verbal modeling (through exposure to mock a television commercial) related to greater efficacy to intervene and intended intervening. The ability to increase efficacy (relative to the control condition) was associated with intended intervening and highlights an important association between perceived ability to intervene and likelihood of doing so. Further, Mauck and Zagumny (2000) found that the more individuals the intervener consulted the more likely they were to report greater intervening (in a presented scenario) providing potential for reinforcement of the strategy.

The final component to the model proposed by Latane and Darley (1970) is that individuals take the information that they have processed in the previous steps and intervene. As noted, a number of studies have found young people would intervene. Research by Shore and Compton (2000) found college students generated strategy options for intervention, including different ways to talk to friends, take away keys, and monitor drinking. In qualitative research, Buckley et al. (2014) and Smith et al. (2004) explored adolescents' consideration of intervening more generally and their participants reported multiple strategies. Flanagan et al. (2004) too found high school student endorsed multiple strategies, although they were presented with strategy options. Thus research has noted that participants may have a number of strategies from which to draw and the resources available to intervene.

Summary

Value in the contextual framework

Overall, based on the literature reviewed, the findings support the veracity of the Latane and Darley model as a framework to help identify factors which influence individuals' intervening behavior in DWI contexts. One important factor that may overlie a number of the components of the model however is in having others around, whether in the vehicle or prior to getting in the vehicle. Typically the research in helping in emergency situations suggests that, through a diffusion of responsibility having more people around decreases the likelihood one person will intervene (Latané & Darley, 1970). However, when all individuals

can communicate (as is likely to be the case among friends and family) then the responsibility to intervene can become a shared and communicated responsibility (Shore & Compton, 2000). Newcomb et al. (1997) found that although the number of individuals present was not related to intervening in DWI, having a conversation about intervening was related to an intervention. The importance of understanding the impact of others around has implications for influencing various stages of the framework, in facilitating the interpretation of the event as an emergency (decreasing ambiguity), in understanding one's responsibility to act, and in being supported or encouraged to have the confidence to act. Another factor that may affect the various components of the research is the potential impairment of the intervener. Impairment may impact on the individual's ability to notice and interpret the event as harmful and it might impact on ability to comprehend responsibility and belief in, and ability to, intervene. Mauck and Zagumny (2000) found the greater difference in intoxication between the intervener (being more sober) and the potential driver was a factor in predicting intervention. Gustin and Simons' (2008) work points to the potential impact on intoxication on perceptions of risk, finding that greater intoxication was associated with intervening, however when adding risk perception factors to the predictive model, intoxication was no longer a significant predictor.

Limitations

Overall a limitation of the study relates to the quality of the research in the area. Primarily research has focused on undergraduate students, who while at risk of DWI behavior (Hingson et al., 2009) may not be representative of other young people intervening in friends' DWIs. Further, single-item assessment of variables limits our understanding of the strength of the relationship in the research. Further, research may need to begin to develop better measurement of assessment of intervening behavior and the contexts in which it occurs. The limited number of studies and the inclusion of qualitative studies and an experimental study make comparisons across research difficult. The work is also limited in some cases, by unclear target behaviors that is, the research is sometimes focused on more general alcohol-harm contexts. Research that explores how generalizable intervention strategies and contexts are across alcohol-related harm contexts would provide valuable information to understand how intervention strategies apply across situations. Of note, many of the studies were published through the early 2000s, with more recent research focused broadly on alcohol-harm contexts. Increasingly there is interest in the bystander role in college student safety yet this does not always translate to research and programmatic work has typically focused on interpersonal violence, including sexual assault prevention. The research in this study provides an overview of work undertaken on bystander safety in the DWI context and may provide a basis from which to develop and update intervention design and evaluation.

Implications for practice

There are a number of implications for practice following on from the findings. It appears that multiple components of the model are associated with intervening likelihood and an effective intervention campaign could consider addressing components sequentially or concurrently (future research would be needed to ascertain temporal importance). In addition, it highlights avenues to explore with regard to the need for consideration of the full

framework, that is, whether targeting only one element, such as attempting to improved perceived danger of events is associated with preventing DWIs. Advertising messages might seek to explore these five areas in more detail and provide humor or focus on different components of the model. Lewis et al. (2013) suggest that there is a clear need to dedicate focus to the nature of strategies used and the relevance of such strategies to the target audience in order to increase acceptance and minimize rejection. The current research thus provides context for strategies that are relevant to young adults who may be faced with their friends' DWI. The information may allow the development of more refined strategies that fit with the emotion and persuasive needs of young adults. Further, the research suggests a complementary set of strategies be developed targeting multiple components of the Latane and Darley framework. The inclusion of key, effective strategies for DWI intervention would thus help individuals focus on their skills and abilities to keep their friends safe.

Conclusions

Young adults are at the greatest risk of experiences of road trauma disproportionately to those in other age groups. While the influence, of peers in particular is commonly associated with motor vehicle crashes and injury in a negative ways, there are limited studies that have examined protective behavior of friends. There continues to be around one-third of fatal motor vehicle crashes attributed to DWIs in the United States (NHTSA, 2013). Although overall fatalities from MVCs have occurred across the U.S. many of the reductions can be attributed to other road safety efforts such as graduated driver licensing, seatbelt use, child passenger safety, and air bag safety (Ferguson, 2012). There does however remain space for public health campaigns that recognize the social and context of DWI (Ferguson, 2012).

The aim of this paper was to conduct a systematic review on protective behavior in DWI situations and conceptualize the findings in a theoretical framework. The model originally described by Latane and Darley (1970) appears to be supported by the reviewed literature suggesting a potentially useful framework of developing targeted interventions. Each of the constructs represents factors that are likely modifiable. The theory is also parsimonious which is valuable in program design. Interestingly, much of the research summarizes behaviors and contexts that are proximal to the driving situations. There is however scope to expand considerations to assist with planning (such as organising transportation home) and the context before the individual is perhaps intoxicated and challenged in making safe decisions. Further there is potential scope to expand theory and research in the area to better understand a more complex pattern of factors that can explain reduced alcohol-related harms.

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Table 1

Summary of included articles.

Reference	Sample	Method & procedure	Key findings
Anderson (2009)	N=241 (72% female) students at single university (45% seniors, 27% juniors, 14% sophomores, 12% freshman; 74% White, 9% Asian, 8% African American, 8% Hispanic). Mean age 21 years (range 17–43). 78% had expressed concern to a friend about their drunk driving; 22% had not.	Experimental design with 4 conditions, random assignment to promote efficacy/confidence in intervention through advertisement (through behavioral modelling, verbal modelling, verbal persuasion, control). Following exposure to advertisement, participants rated strength of confidence (5-items) and intention to intervene (toward an acquaintance, toward stranger) (11-point scales). Also asked about general self-efficacy to intervene rated on same scale; regarding how confident they would be when with an acquaintance or stranger. Items developed for research.	Advertisements improved efficacy and intentions (greatest following advertisements that included in descending order - behavioral modelling, verbal modelling, verbal persuasion, control) – multiple comparison of means between groups (t-tests). Also percent of high efficacy (mean score 7–10) compared between groups (chi-squared) showing significant differences of the same pattern. In a comparison of means of general efficacy – no difference between behavioral and verbal modelling however both means greater than verbal persuasion and control groups. Comparison of means of general intentions – behavioral modelling mean greater than other conditions.
Boekeloo et al. (2009)	N=509 (60% female) freshmen, living on campus. 57.3% reported having driven or walked someone who had been drinking home in the previous two months	Web survey, new measures developed: Social drinking intervention (11-items of intervening in past 2-months, in many alcohol-related harm scenarios), 1 item related to driving). Intention to intervene (4-items related to who intervene with). Intervention confidence (6-items, related to confidence in different drinking contexts, DD only 1-item).	Intervention confidence was higher for intervening in single item of past 2-months intervention than other contexts – comparison of means. Past intervening more frequent among those in closer relationship (room-mate, dorm-wing resident, stranger) – comparison of means. No statistical test of difference reported with the aforementioned, only examination of absolute mean and SD – statistical tests of significance compared single items by participant sex, males intervene more often with strangers. Linear mixed model showed intention to intervene and intervention confidence predicted intervention (findings of model related to overall drinking intervention and not specific to DD).
Buckley et al., (2014)	N=44 older adolescents (16–17yo) in high school from Queensland Australia (data also collected from early adolescents – some quotes age not clear).	Qualitative discussion, prompts focused on intervention in risk-taking broadly, some responses related to intervention in DD (not always clarified). Prompts related to motivations for intervening and the characteristics of youth who intervene.	Themes around: looking out for close friends, potential for physical harm (not clear that it is specific to drink driving intervention)
Flanagan et al. (2004)	N=2697 (54% female) 5 th – 12 th grade students (only those aged 13years+ received DD vignette, n=1397), 74% European, 12% African, 5% Latino. Across 8 school districts in 2 US states.	Vignettes provided including one regarding friend's drinking and potential driving, participants asked to indicate likely response in the scenario (5-point scale). Other vignettes related to intervening in other alcohol and drug contexts. Options developed from pilot work.	Most likely strategies endorsed; find another ride, talking to friend, taking their keys (observed means, not a statistical test of difference). Age and sex differences of likely response tested for significance. Relevant to DD vignette; those aged 16+ more likely to endorse taking keys than talking to friend (examined parameter estimates).
Gustin & Simons (2008)	N=277 (75% female; 96% White, 1% Asian, 2% multi-racial) undergraduate students (Mean age 20.5, range 18–45 years) from a single university. 42% reported DD.	Online survey – Modified Daily Drinking Questionnaire (measures past drinking). Provided with a scenario that varied number of drinks consumed, time consumed and distance to drive home (received 4 of possible 24 scenarios, thus some within and between subject responses). Participants rated (9-point scale) – intoxication (21-point scale, –10 to 10, where 0 legal limit), impairment (9-point scale rating 'impaired' summed with it was 'safe to drive' rating), likelihood of an accident (9-point scale, single item), likelihood someone would	Use of random effects models to allow nesting of repeated observations (multiple scenarios), controlled for sex, weekly alcohol consumption and BAC. Regression: likely intervention was predicted by distance (greater), perceived impairment (greater), likelihood of arrest (greater), likelihood of accident (greater). Both arrest and accident-likelihood predictive over and above greater intoxication, thus suggesting intoxication associated only with intervention through perceived risk.

Reference	Sample	Method & procedure	Key findings
		intervene, likelihood they would be receptive of an intervention.	Perceived receptiveness was predicted by distance to drive (greater), perceived impairment (greater), perceived intoxication (ns for within subjects measure when considered over and above risk; lower - on the between-subjects measure, suggested by authors to be negatively associated because of greater likelihood of driving).
Hernandez et al. (1999)	N=192 (59% female) college students, sociology class from single university. 70% reported having intervened in a drunk driving situation (59% female) only these included in analyses. (Mean age 19; 40% freshmen, 34% sophomores, 17% juniors, 9% seniors; 46% White, 22% Asian, 15% Latino, 13% Black, 3% Native American)	Survey of emotions (stress, worry, nervous, frustration, cool, calm) and cognitions (responsibility, vulnerability, indifference, chivalrous, excited) associated with previous attempt to prevent DD. Rate 1-5, 11 items, single item per emotion/cognition. Identified (yes/no) behaviors used for intervention and success of intervention that was grouped as assertive (e.g. took keys, told person not to) and passive (e.g. asked person to stay longer, offered coffee).	Structural equation model, latent constructs of 'anxious' and 'control' emotions, all other variables manifest. Emotions factors included, anxious (stressful, worried, nervous, frustrated) and control (cool, calm). The anxious factor predicted successful passive and active interventions indirectly through greater engagement in such interventions. Control predicted successful active interventions. Successful assertive interventions also predicted by responsibility (related to the anxious emotion factor). Less feeling vulnerable predicted assertive attempts, again related to anxious emotion factor. Chivalrous, excited cognitions predicted passive attempts (related to controlled emotion factor). Telling person not to drive was most frequently attempted assertive intervention. Asking person not to drive was most frequently attempted passive intervention.
Labouvie & Pinsky (2001)	N=1380, 90% White, 21yo from a birth cohort study in New Jersey began when participants were 12, 15, 18 years (data also reported at mean age 28yo). 78.4% of males, 77.3% of females intervened at least once, past 3 years.	Individual interviews asking frequency prevent someone from driving under the influence (of alcohol or marijuana) in the past 3 years. Also asked own DD, RWDD, intentionally did not DD in past 3 years (5-point scale, highest, 10 times or more).	Intervening predicted in structural equation model by frequency RWDD and frequency intentionally decide not to DD.
Mauck & Zagumny (2000)	N=200 university students in psychology, sociology, biology classes. 119 intervened and only these included in analyses (Mean age 22.32 years, 60% female).	20 minute pen-and-paper survey including 20-item measure of moral/social responsibility to intervene (own and friends), and participant's asked to reflect on most recent potential to intervene in DD scenario - rate own impairment, comparative impairment to potential driver, affinity with driver and identify number of people known in scenario, number consulted with, number supported intervention. Also indicate one of eight possible intervening behaviors and success.	Path analyses; comparative impairment, moral/social obligation and number of people consulted significantly predicted intervention. Correlations ($p < .01$): number of people known with comparative impairment ($r = .25$) and number of people consulted ($r = .32$). Effort of intervention predicted intervention success.
Shore et al. (2000)	N=100 (60% female) college students, single psychology class (Mean age 24.3, range 17-51 years). n=54 who had intervened, n=46 recipient of intervention. Group 2= n=65, mean age 22.82 years, 79% had tried to intervene, 34% had been recipient of intervention.	Participant asked what was said and forcefulness of statement - content of what was said coded by researchers (group 1, paper survey) and forcefulness rated by second group of participants (group 2, computer-administered list).	Most intervened with known person, friend (55.6%), boy/girlfriend (17.2%), other relative (13.1%). Intervener was more sober (2% more impaired). Most common intervention method was offering suggestions of how to get home (37%), followed by asking permission to drive (36%), simply stating that the person is drunk (11%), actively taking over without questioning (10%) and demanding they not drive (6%). Latter was most often rated as threatening.
Smith et al. (2004)	N= 52 (46% female, 29% 16yo, 54% 17yo, 17%	Participants individually wrote a story of when they may be able to intervene as a passenger in a DD situation. Asked to	Intervene through persuasion (e.g. coax, ask, explain), interference (e.g. take keys,

Reference	Sample	Method & procedure	Key findings
	were 18yo) recruited from 4-H classes.	describe the situation and then how they might intervene. Qualitative analysis of themes.	block car), plan ahead (e.g. designated driver), and threaten (e.g. re police).

Note. DD = drink driving, RWDD = riding with a drink driver

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