Evidence-Based Behavioral Models and Fatal Vision Goggles

Robert P. Hawkins, Ph.D.
Research Professor & Maier-Bascom Professor Emeritus
School of Journalism & Mass Communication
University of Wisconsin - Madison
With edits by Emily Vraga, Ph.D.c.

Drinking and driving is a costly societal problem involving drivers of all ages, but the problem has especially severe consequences among adolescents and young adults.[i] Drivers ages 16-20 are nearly twice as likely as adults 21 and over to be involved in fatal crashes.[ii] And although alcohol consumption by youth is illegal, underage drivers who die in crashes are just as likely as adults to have consumed alcohol.[ii] Many programs have attempted to reduce the prevalence of driving after drinking, but the problem is a difficult one. Drinking in social situations (i.e., usually away from home) is a normal part of everyday life.[iii,iv,v] For many people, the automobile is likewise the default method of transportation, even more so in evenings when public transport is less frequent and social gatherings are often not on public transit routes.

Although driving after drinking poses objective dangers, it is easy to see how it occurs. Besides the fact that just getting in one's car is the habitual thing to do, there are time, effort and money costs to many of the alternatives. Importantly, as Neil Weinstein began demonstrating in the 1980s, humans have optimistic biases in their expectations for themselves.[vi,vii] In health and safety domains, people underestimate both the degree of their possible incapacitation and the likelihood of negative consequence, including harmful consequences of alcohol use.[viii] These tendencies are even stronger for stigmatized states (such as DUI) and for those perceived to be under one's own control.[ix] And because drinking and driving is so widely accepted as normal in society, those social norms constitute additional pressure on individuals not to stand out or deviate from what others are doing.[x,xi]

Taken together, these habits, norms and beliefs provide drinking-and-driving behaviors with a solid base of acceptance and considerable inertia against safer alternatives: not drinking so one can drive safely, reduced drinking to reduce risks of driving after drinking, or seeking transportation alternatives, including designated drivers. However, even entrenched beliefs and habits can be changed. Decades of research on risk-taking and behavior change in a variety of health contexts have converged on several key types of beliefs as the active ingredients in altering risky behaviors such as drinking and driving.[iii,xii] Marshall Becker's Health Belief Model identified the key motivating force of threat of harm as resulting from the combination of susceptibility and severity. Changes in behavior in response to such threats then depends both on how much benefit one expects from changed behavior and the perceived barriers to carrying out the behavior.[xiii,xiv] Martin Fishbein's Theory of Reasoned Action largely incorporated the Health Belief Model's thinking into its analysis of attitudes toward current and changed behaviors, and added the important counter-balance of subjective norms – beliefs about what behaviors

significant others would approve of.[xv] The TRA was refined into the Theory of Planned Behavior[xvi] by adding perceived behavioral control, or the perception that changing behavior will alter risk and that one is personally able to make such changes (this is essentially identical to Bandura's concept of self-efficacy[xvii,xi]). In both the TRA and TPB, the combination of attitudes, relevant social norms, and behavior control lead to behavior intentions, themselves the best (though not infallible) predictor of actual behavior.

Thus, attempts to alter this pattern of accepting drinking and driving can target any of the many bases of drinking and driving, but generally will be most successful if an integrated approach takes on multiple targets for change:

- emphasizing severity,
- making susceptibility clear,
- undercutting beliefs about peer norms or
- emphasizing norms against drinking, and driving,
- reducing barriers to alternative behaviors, and
- bolstering individual ability to enact change and avoid risky behaviors, among others.

Below we will show how one tool, Fatal Vision Goggles, works on several of these factors. This analysis will also point out what other activities and discussion points should be employed along with Fatal Vision for greatest effect.

How Fatal Vision Works

A key motivator in preventing drinking and driving is how much *threat* the individual thinks it poses.[xii] As Marshall Becker and colleague noted, the degree of threat is itself the interaction of two things, *severity* and *susceptibility*: the size or danger of consequences on the one hand, and the perceived likelihood those consequences will affect the individual on the other. For example, the *severity* of having the flu is (generally) moderate, but one's *susceptibility* or likelihood is high, making it a real threat worth some avoidance behaviors such as hand-washing or avoiding people with the illness. Being struck by lightning, on the other hand, is clearly life-threatening (high *severity*) but quite unlikely (low *susceptibility*), so that most people give it little thought most of the time.[xviii] It is unfortunate but true that most people, and young people in particular, underestimate the *threat* driving after drinking poses for them, and that understanding of *susceptibility* is usually the key failing.[iii]

This *threat* underestimation stems from problems with both *severity* and *susceptibility,* but the latter is the larger problem Fatal Vision Goggles address directly. That is, almost all of us recognize that auto crashes can have serious or even fatal consequence, and that arrest for impaired driving can lead to fines, suspension of license, or even imprisonment (*severity).* Programs to deter driving after drinking may need to clarify these effects for some individuals

(e.g., films or demonstrations of effects of high-speed impact, details on legal consequences), but these merely sharpen awareness that already exists. On the other hand, many of us – and especially young people – grossly underestimate our individual *susceptibility* in this area: "It will never happen to me." "Crashes are pretty rare." "I can handle drinking without it really affecting my driving." "If you pay attention, you can control it and the police can't tell."[xix,xx] That is, the key shared misperception in such statements is the sense that the personal effects of alcohol on one's ability to drive safely are minimal and manageable – in other words, an individual's optimistic bias.

Fatal Vision Goggles convincingly simulate the visual consequences of alcohol consumption, creating degrees of distortion in visual feedback corresponding to five different ranges of blood alcohol levels. Even at the lowest levels of distortions (corresponding to BAC < .06), students wearing Fatal Vision Goggles will be slower to perform simple motor tasks than without the goggles.[xxi] With goggles corresponding to moderate consumption (.07 - .10), speed, equilibrium and accuracy are impaired, and using goggles for the three BAC ranges above .10 produces obvious disruption of simple physical tasks. Although group demonstrations are often amusing to observers, research has clearly shown that the greatest benefits occur when individuals experience the impairment themselves.[xxii,xxiii] What they are realizing, in a way they could not recognize if actually consuming alcohol, is that they too are *susceptible* to substantial and uncontrollable physical impairment due to alcohol consumption – impairment that could lead to arrest or crashes. Thus, by making susceptibility clear, Fatal Vision Goggles make the *threat* drinking after driving poses real.

Interestingly and very importantly, Hennessey's research[xxiv] shows that these effects of Fatal Vision Goggles on beliefs and intentions are stronger for those who already drink more, those who admit that crashes are possible, and those with greater self-efficacy. In the first case, that is greater effect for the group most at risk, and for the other two these results point to targeting these factors elsewhere in a campaign to then increase the effects of Fatal Vision Goggles demonstrations.

Working with other factors

Increasing perceived susceptibility is the primary benefit of using Fatal Vision Goggles, but this interacts well with other bases of the desired behavioral change. In some cases, using the goggles may affect these factors directly, but it is important for a program to address them in variety of ways, so that changes in these beliefs and attitudes are ready to work with the changes made by the goggles.

Optimistic Bias & Personal Relevance. As noted above, optimistic bias plays a key part in people's thinking about their ability to drive under the influence of alcohol. While Fatal Vision Goggles work directly to undercut this perception and highlight an individual's susceptibility to the impairment caused by alcohol, their effects can be amplified even further with clear discussion of why impairment is so devastating. Optimistic bias occurs when individuals perceive they have control over events,[ix, xxv] so instructors should underscore the

inevitability and the uncontrollability of the effects of alcohol on performance. Additionally, optimistic bias is partly driven by perceptions of difference between the self and stereotypical victims unable to improve their chances,[xxv] so examples and statistics that are more directly relevant to the audience will undermine perceived differences between self and others. Using language emphasizing the loss of control that alcohol impairment creates and demonstrating its personal relevance, rather than a generalized other, should increase the effectiveness of the Fatal Vision Goggles experience.

Social Norms. Drinking in social situations is widely accepted as socially normal, even for adolescents not yet of legal drinking age.[iv,v] Further, because driving is also taken as a given for transportation, combining the two is also accepted as normal, implicitly assuming that people are capable of adequate driving performance after alcohol consumption.[x,xxvi] However, widely-accepted social norms also exist against drinking and driving.[xxvii] A recent government study shows 80% of the public sees drinking and driving a threat to personal and family safety.[xxviii] Although the Fatal Vision Goggles do not directly address either of these competing norms, their attack on susceptibility works to undermine the assumption that drinking and driving can safely be combined.

Instructor and peer discussion can further emphasize the importance of the norm against drinking and driving as an unsafe behavior while dismissing norms about the acceptability of driving after drinking. As part of the presentation, instructors might ask attendees whether driving after drinking is an acceptable behavior, leading into discussion of when is it not acceptable. The use of Fatal Vision Goggles to demonstrate that individuals are susceptible to the effects of alcohol at even low levels of impairment should reinforce the norm that driving impaired is an unsafe behavior and the instructor can stress this relationship further through discussion.

Direct impacts on this social norm that combining drinking and driving is okay should also be attempted through examples of alternative responses to drinking/driving situations: e.g., peer endorsement of designated drivers or alternative transportation methods. Highlighting ways in which society endorses these alternative methods, such as bars that provide free soft drinks to designated drivers or free bus service on New Year's Eve, will also undercut the social acceptance of this norm.

Motivation to comply. The other social component in one's behavior is the degree one cares about the beliefs of others and their opinions of oneself.[xiv, xv] This is often particularly important to adolescents and young adults, who place a premium on appearing normal to peers and value adult beliefs far less. Young people will probably always value the opinions of their peers over those of adults, but demonstrations of Fatal Vision Goggles do often result in observers laughing at the failings of those wearing the goggles. If this caring-what-one's-peers-think can be extended to worry about others' reactions to mistakes made while driving after drinking, then this motivation to comply also will act to limit driving after drinking or reducing the number of drinks before driving.

For example, in small groups that appear comfortable with self-revealing discussion, eliciting reports of being with or observing friends unable to drive normally (couldn't back out of a parking space, scraped other cars or barriers, scared passengers with poor decisions, inattention or inaccurate driving, and so on).

Efficacy. Crucial to any attempt toward behavior change are two forms of efficacy.[xvi,xvii] *Response efficacy* is the belief that the behavior in question will actually achieve the desired goals, and *self efficacy* is the belief that one has sufficient abilities and internal command of the situation to in fact enact the behavior (note that the social norm of not wanting to appear different is often directly in conflict with this). Fatal Vision Goggles have the potential to contribute substantially to response efficacy by demonstrating the impact of various levels of alcohol consumption, and thus showing drivers that their BAC really matters for their abilities. Self efficacy is particularly interesting here. One's perceptions that "I can do this" are probably not directly impacted by exercises with the goggles, but Hennessey's research demonstrates that those with higher self-efficacy will be more affected by using the Fatal Vision Goggles.[xxiv] Thus, increasing self-efficacy is a valuable supplement or precursor to use of Fatal Vision Goggles.

Self efficacy can be addressed by discussions, role-playing, or real stories of adopting desired behaviors, such as designated drivers or adopting alternative transportation after drinking. Role-playing exercises with group approval may also enhance self efficacy while also emphasizing the social norms opposing driving drunk. Participants should be encouraged to relate specific instances in which they were successful in altering another's behavior to bolster their sense of ability.

Discussion should also address ways in which people can enact socially responsible behaviors in the face of social pressure. Having groups brainstorm ways to combat others' insistence that it someone "okay to drive" or that the individual is being "uncool" should help boost confidence in the ability to change behaviors when social pressure is applied countering their suggestions.

Reducing barriers. Closely related to social norms and self efficacy, considerable inertia encourages drinking and driving. Barriers to adopting alternative behaviors include social norms and pressure, insufficient efficacy, flawed perceptions of threat, and optimistic biases. Methods for countering each of these barriers are addressed above. But discussion can also involve the practical barriers to alternatives: such as time, money, and effort costs. Instructors should encourage discussion of methods for dealing with these costs, including planning designated driving responsibilities, sharing a taxi, or researching bus routes. Having pertinent local information about these options would be helpful in demonstrating that the costs of not drinking and driving are substantially lower than the costs of driving while impaired, as well as boosting the perceived self efficacy to alter behaviors.

Behavioral intentions. Although what people do is the ultimate test, a great deal of research has shown that one's intent to behave in certain ways is the most important predictor of

what one actually does.[xv,xvi] Peer pressure and fear of violating social norms may sometime interfere with this for young people, but it is always worthwhile to ask participants to consider what they will do the next time they are faced with a potential drinking and driving situation. Having the intention to not drink and drive puts the person at a considerable advantage when placed in the actual situation.

Commitment and consistency. Consistency theories suggest that when people commit to an attitude or behavior, they will act to maintain their position.[xxix] Internal inconsistencies between attitudes, beliefs, or behaviors lead to uncomfortable arousal called dissonance that individuals are motivated to avoid and limit.[xxx] Asking people to formally commit to limiting their drinking and driving behaviors in the future should invoke this internal regulation, leading people to behave in congruent ways.

Further, this desire for consistency can be employed by asking people for small initial favors that are easy to agree to, then asking for larger commitments on similar topics, known as foot-in-the-door techniques.[xxix] The desire for consistency will lead individuals who have initially committed to a small favor to be more likely to grant larger favors. In the context of using Fatal Vision Goggles, this process might be inverted. Participants could be asked whether they would want someone wearing Fatal Vision Goggles to do something small – such as shooting a basket – before asking them whether they would want them driving. By getting individuals to admit they wouldn't want them involved in some small activity that does not carry the weight of social norms, it makes them easier to admit they also do not want someone impaired in more important situations.

Research has also demonstrated that when individuals are asked to make a statement endorsing a behavior they are committed to, then reminded of personal failures to live up to that endorsed behavior, they report higher intentions and actual behavioral changes to match the position they encouraged others to adopt.[xxxi]

Thus, one activity could be asking all participants to record or write statements that support efforts to limit drinking and driving behaviors. Subsequently, ask these same individuals to remember times they had themselves been involved in drinking and driving, either as a passenger or as a driver. By following this activity with discussions meant to reduce barriers and increase efficacy, the formal commitment to an ideal should bolster behavioral intentions and long-term behaviors.

Motivational Interviewing. To elicit the best response from program attendees, motivational interviewing techniques should be used.[xxxii] This technique focuses on allowing individuals to persuade themselves of the necessity of change, as well as their ability to effectively achieve it. Many of its core constructs – avoiding low self efficacy or denial – are already addressed in our program. By encouraging participants to think through their conflict – that they enjoy drinking yet recognize the dangers that drinking can cause, especially while driving – and allowing them to recognize for themselves the necessity of behavioral change circumvents their ability to respond defensively when difficult change is suggested.

Cognitive load. While Fatal Vision Goggles do a good job of simulating the visual impairment that arises from alcohol consumption, they do not replicate mental impairment. This difference needs to be emphasized in any presentation or use of the goggles. While individuals should have a difficult time adjusting to the visual effects, this would be compounded when also confronting the cognitive impact of drinking. To approximate this effect, increasing the cognitive load of the participants may be employed. Because of limitations in working memory, asking individuals to remember a long number – usually between 5-9 digits[xxxiii] – depletes the cognitive resources available to handle other processing.[xxxiv]Therefore, participants will have less cognitive ability to adopt to the visual impairment Fatal Vision Goggles produce, further simulating drinking impairment and highlighting their perceived susceptibility and lack of control.

[i] O'Malley, P.M., Johnston, L.D., Bachman, J.G. (1998) Alcohol Use Among Adolescents. *Alcohol Health & Research World*, 22 (2), 1998

[ii] National Highway Traffic Safety Administration (NHTSA) (2009) *Traffic Safety Facts: Fatal crashes involving young drivers.* Washington, DC: U.S. Department of Transportation. (DOT HS 811 218)

[iii] Leigh, B.C. (1999) Peril, chance, adventure: Concepts of risk, alcohol use and risky behavior in young adults. *Addiction*, 94(3), 371-383.

[iv] Treise, D., Wolburg, J.M., Otnes, C. (1999), Understanding the 'Social Gifts' of Drinking Rituals: An Alternative Framework for PSA Developers. *J. Advertising*, 28(12), 17-32.

[v] Wolburg, J.M. (2001) The "risky business" of binge drinking among collect students: Using risk models for PSAs and anti-drinking campaigns. *J. Advertising*, 30 (4), 23-39.

[vi] Weinstein, N.D. (1987) Unrealistic optimism about susceptibility of health problems: conclusions from a community-wide sample. *J. Behavioral Medicine*, 10, 481-500.

[vii] Weinstein, N.D. (1989) Optimistic biases about personal risks. *Science*, 246, 1232-1233.

[viii] Hansen, W.B., Raynor, A.W., & Wolkenstein, B.H. (1991) Perceived personal immunity to the consequences of drinking alcohol: the relationship between behavior and perceptions. *J. Behavioral Medicine*, 14, 205-224

[ix] Klein, C. T. F., & Helweg-Larsen, M. (2002). Perceived control and the optimistic bias: A meta-analytic review. *Psychology and Health*, *17*, 437-446.

[x] Gruenewald, P.J., Mitchell, P.R., & Treno, A.J. (1996) Drinking and driving: Drinking patterns and driving problems. *Addiction*, 91(11), 1637-1649.

[xi] Suls, J. Green, P. (2003) Pluralistic ignorance and college student perceptions of gender-specific alcohol norms. *Health Psychology*, 22(5) 479-486.

[xii] Fishbein, M. & Cappella, J. (2006) The role of theory in developing effective health communications. *J. Communication*, 56 (S), S1-S17.

[xiii] Janz, N.K. & Becker, M.H. (1984) The Health Belief Model: A decade later. *Health Education Quarterly*, 11, 1-47.

[xiv] Glanz, K., Rimer, B.K. & Viswanath, V. (2008) Health behavior and health education: Theory research and practice. San Francisco: Jossey-Bass.

[xv] Fishbein, M. & Azjen, I. (1975) *Belief, attitude, intention and behavior: An introduction to theory and research.* Boston: Addison-Wesley.

[xvi] Azjen, I. & Fishbein, M. (2005) The influence of attitudes on behavior. In Albarracin, D., Johson, B.T., & Zanna (M.P. (eds). *The handbook of attitudes.* Mahwah, N.J.: Lawrence Erlbaum Associates.

[xvii] Bandura, A. (1986) *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.

[xviii] Janz, N.K. & Becker, M.H. (1984) (Marshall Becker) The Health Belief Model: A decade later. *Health Education Quarterly*, 11, 1-47.

[xix] Weinstein, N.D. (1987) Unrealistic optimism about susceptibility of health problems: conclusions from a community-wide sample. *J. Behavioral Medicine*, 10, 481-500.

[xx] Weinstein, N.D. (1989) Perceptions of personal susceptibility to harm. In Mays, V.M., Albee, G.W., & Schneider, S.F. (eds) *Primary Prevention of AIDS*, Sage: Newbury Park, CA, pp 142-167.

[xxi] Innocorp. (2009) *Instructor's Guide: The Fatal Vision Goggles Program*. Verona, WI: Innocorp.

[xxii] Jewell, J. (2004) The effectiveness of Fatal Vision Goggles: disentangling experiential vs. onlooker effects. *J Alcohol & Drug Education*, 48, 63-84.

[xxiii] Jewell, Jeremy and Hupp, Stephen D.A. (2005). Examining the Effects of Fatal Vision Goggles on Changing Attitudes and Behaviors Related to Drinking and Driving. *The Journal of Primary Prevention*, 26, 553- 565.

[xxiv] Hennessy, Dwight. A.; Lanni-Manley, Elizabeth; and Maiorana, Nicole. (2006). The Effects of Fatal Vision Goggles on Drinking and Driving Intentions in College Students. *The Journal of Drug Education*, 36, 59-72.

[xxv] Weinstein, N. D. (1980). Unrealistic optimism about future life events. *Journal of Personality and Social Psychology*, *39*, 806-820.

[xxvi] Baum, S. (1999) Self-reported drink driving and deterrence. *Australian & New Zealand J Criminology*, 32(3), 247-261.

[xxvii] Iverson, H., & Rundmo, T. (2004). Attitudes towards traffic safety, driving behavior, and accident involvement among the Norwegian public. *Ergonomics, 47,* 555-572.
[xxviii] National Highway Traffic Safety Administration, U.S. Department of Transportation. (2010, Aug.) National survey of drinking and driving attitudes and behaviors. *Traffic Tech: Technology Transfer Series.* Retrieved from: http://www.nhtsa.gov/staticfiles/traffic_tech/tt392.pdf
[xxix] Rhoads, K. V. L., & Cialdini, R. B. (2002). The business of influence: Principles that lead to success in commercial settings. In J. P. Dillard & M. Pfau (Eds.) *The persuasion handbook: Developments in theory and practice* (pp. 513-542). Thousand Oaks, CA: Sage Publications.
[xxx] Festinger, C. (1957). A theory of cognitive dissonance.
[xxxi] Aronson, E., Fried, C., & Stone, J. (1991). Overcoming denial and increasing the intention to use condoms through the induction of hypocrisy. American Journal of Public Health, 81, 1636-1638.
[xxxii] Miller, W. R. (1983). Motivational interviewing with problem drinkers. *Behavioral Psychotherapy, 11,* 147-172.
[xxxiii] Miller, G. A. 1956. "The magic number seven, plus or minus two." Psychological Review 63 (2):81-97.
[xxxiv] Gilbert, D. T., & Osborne, R. E. 1989. "Thinking backward: Some curable and incurable consequences of cognitive busyness." Journal of Personality and Social Psychology 57 (6):940-9.