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# MADD MESSAGE EFFECTS: A TWELVE-YEAR RANDOMIZED TRIAL

Una E. Medina

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**MADD MESSAGE EFFECTS:  
A TWELVE-YEAR RANDOMIZED TRIAL**

**BY**

**UNA MEDINA**

B.A., Communication, The University of New Mexico, 2002  
M. A., Communication, The University of New Mexico, 2004

DISSERTATION

Submitted in Partial Fulfillment of the  
Requirements for the Degree of

**Doctor of Philosophy  
Communication**

The University of New Mexico  
Albuquerque, New Mexico

**December, 2009**

## DEDICATION

This dissertation is dedicated to our beloved friend and mentor Dr. Everett M. Rogers, who taught us to ask questions about not only what and who is included, but to also ask questions about who and what have been excluded, and why? Another question Dr. Rogers loved to ask was, “Where did you get that idea?” He led me to realize that everything I am, every idea and work of scholarship has grown from the fertile soil of the innovations of others.

For Ev, and through you

To all teachers, mentors, scholars

From the vantage of your shoulders

We, blessed, stand on tiptoes

Peering over the mountain of mundane

We see destiny,

Our Mandala

The vast blue canopy of the sky

## ACKNOWLEDGMENTS

MADD VIP groups were found to have lower moods following MADD VIP presentations than before the MADD VIP (Woodall, Delaney, Rogers, & Wheeler, 2007). Dr. W. Gill Woodall asked “why?” He discovered in the 2-year follow-up that MADD VIP, participants’ recidivism rates were 30% higher than their DWI School comparison group, trending toward significance at  $p = .0583$ . Probing the meaning of these findings, Dr. Woodall conceived of the possibility that there may be a message effect operating within the MADD VIP audiences, and he suggested this dissertation study. I thank Dr. Woodall for encouraging me to engage in this dissertation topic and his support over the two years spent on this study. He has shared his data and opened his archive files. Dr. Woodall generously purchased 12 years of DWI recidivism traffic safety data used in this dissertation. His professional and mentoring style will remain with me as I continue my career.

I thank my committee members, Dr. Janice Schuetz, Dr. Mario Rivera, Dr. Virginia McDermott, and Dr. Harold Delaney, and earlier committee member Dr. Ken Frandsen, for their recommendations in this study and support of my professional development.

Dr. Janice Schuetz, in conversation with Dr. Woodall and me, suggested Brehm’s (1966) theory on reactance to explain the MADD VIP message effect. She has deeply influenced this dissertation and the development of my scholarship. She thoughtfully guided the structure of the literature review, suggesting its organization by types of reactance variables. Her advice and editing on this dissertation, her leadership in my comprehensive examination and her constant support has filled the sails of my scholarship with gentle and steady breezes. Dr. Schuetz introduced me to grounded theory method, which I used in both my M.A. thesis and this dissertation. She invited me to journey into the rich and rewarding seas of qualitative analysis. She supplied me with the tools to discover theoretical relationships among constructs, and to believe I could develop theory.

Dr. Mario Rivera has propelled my professional development from our first meeting on April 24, 2002 at Dr. Everett Rogers’ Distinguished Lecturer Award ceremony. Dr. Rivera encouraged me to write with Dr. Rogers on the relationships between complex adaptive systems theory and diffusion of innovations theory, a writing project that became my debut publication in *The Innovation Journal*. Since then Dr. Rivera has been a dear mentor and an insightful and thorough co-author in three more peer-reviewed journal publications. During this dissertation process, Dr. Rivera has engaged me in long discussions about the articulation of my work and probed my conceptualizations. He has generously spent many hours, beyond what any candidate could hope, advising me and teaching me how to improve the quality of writing within this manuscript.

Dr. Ken Frandsen, who began on the committee and then retired to Colorado, introduced me to the concept of a “committee” in 2001 when we met in my early stages of my undergraduate McNair Fellowship. He offered to serve on my committee and I was such a greenhorn scholar that I had to ask someone, “What is a committee?” Dr. Rogers’ parting words included the advice to “listen to Ken.” Did he somehow guess that Dr.

Frandsen would open doors to innovative research? After Dr. Rogers' passing, Dr. Frandsen's mentorship led to my receipt of a scholarship to attend the New England Complex Systems Institute at MIT and later earn a graduate certificate in computer modeling of complex systems. Systems thinking, a nonlinear approach to data analysis influenced some of the unique problem-solving approaches that led to breakthroughs in this dissertation. When Dr. Frandsen chose me to assist him in developing group activities for "Introduction to Communication" little did I realize that exercise would develop skills that later would be exercised again in an invited textbook proposal at Sage Publications. He taught me how to analyze student response metrics on computerized tests, and shared his extremely useful and standardized method for grading student papers. Dr. Frandsen served on the prospectus committee and, upon retirement, suggested Dr. Virginia McDermott as his replacement on this dissertation committee.

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I owe a debt of gratitude to Dr. Harold Delaney, statistician and author of "Designing Experiments and Analyzing Data: A Model Comparison Perspective," which he co-authored with Scott Maxwell. Dr. Delaney taught me advanced ANOVA procedures in his litmus-test course for the University of New Mexico Psychology Ph.D. program. He taught me how to calculate many types of ANOVA by hand, and when to apply considerations for ANOVA contrasts. Because of Dr. Delaney's course, I can calculate an unequal  $n$  ANOVA by hand, using, in the case of this study, a weighted grand mean, which was useful in determining that I did not have to conduct a hierarchical linear model analysis. This method was critical for weighting means to verify equal distribution of DWI predictor characteristics between groups for age and number of prior arrests. He gave me the tools to conduct a contrast using  $\psi$  to contrast two low reactance-inducing VIP Groups against eleven other high-reactance VIP Groups. This calculation enabled me to justify my categorizing the VIP groups into low and high-reactance groups, enabling me explore whether a change in reactance levels was consistent with a change in DWI recidivism. Dr. Delaney was a weekly statistical sounding board. He and Dr. Woodall closely supervised the methods and results sections.

Eric Erhardt, Ph.D. Candidate in statistics and 2008 Statistics Lab Director, consulted on data transformation considerations, proportional hazard assumption tests and considerations, the meaning of a time-dependent covariate, and the realization that if time-dependence is not detected in a variable then its effect may be interpreted as continuous (not diminishing or increasing) over time. Time dependence is a very important test for message effects studies that is seldom, if ever, used.

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through Cox Proportional Hazards (survival analysis) and loglinear logit regression. He met with me during the 2009 months of analysis twice per week. I am grateful to his commitment in seeing me through the process of choosing rationales, ruling out alternative approaches, and seconding my decisions. He applied his sea of knowledge in a broad range of statistics, satisfying my quest to find the best methods and most accurate and clear interpretations given the complexity of the data structure.

Zoe Johnson of University of New Mexico ITS loaded SAS on my computer and pointed me to the online procedure manuals. Robert Hudson at PNM (Public Service Company of New Mexico) helped with the translating of the SPSS and Excel files of an early version of the dissertation data into SAS. He worked with me on the replication of SPSS results in the SAS environment. He co-wrote the SAS code with me on an early process of COX repeated measures procedure PHREG (Proportional Hazards Regression) that offered output not available in SPSS. Those analyses must be reconducted on the final dissertation data and as such are reserved for a future research project. During that SAS process, I learned much about the best way to prepare and read files into SAS and how to configure PHREG arguments to attain conversion. This will be useful when I return to SAS to conduct more analysis. SAS is the preferred statistical package used by Dr. Hongwei Zhao, who consulted on the survival analysis.

Dr. Hongwei Zhao, Department of Epidemiology and Biostatistics, Texas A&M Health Science Center, a specialist in survival analysis and longitudinal data analysis, consulted on the survival analysis procedures. She lent her expertise in survival analysis based on her experience with the data set through which she has coauthored several publications with Dr. Woodall and Dr. Delaney on DWI prediction, prevention, and intervention in New Mexico (Delaney, H. D., Kunitz, S.J., Zhao, H., Woodall, W.G., Westerberg, V., Rogers, E. & Wheeler, D.R., 2005; Kunitz, S. J., Woodall, W. G., Zhao, H., Wheeler, D. R., Lillis, R., & Rogers, E., 2002; Kunitz, S.J., Zhao, H., Wheeler, D.R., & Woodall, W.G., 2006; Woodall, W.G., Delaney, H.D., Kunitz, S.J., Westerberg, V.S. & Zhao, H., 2007; Woodall, W.G., Kunitz, S.J., Zhao, H., Wheeler, D.R., Westerberg, V. & Davis, J., 2004). Her generous collegial assistance in this dissertation has impressed and warmed my heart.

The data used in this study were complex to derive. A number of researchers and professionals provided data and helped link MADD VIP exposure to subsequent recidivism records. I extend my gratitude to UNM CASAA for providing the videotapes, transcripts, dates, and list of offender participants in the MADD VIP presentations. Thanks are expressed to James W. Davis, Associate Director of UNM Division of Government Research, Institute for Applied Research Services, for procuring and matching DWI recidivism data to MADD VIP participants.

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Eight graduate scholars worked diligently as MADD VIP transcript message-quality coders in this project. Phase 1 coders each coded 433 statements in 12 documents: Laura Burton, Ph. D. student, Santhosh Chandrashekar, Ph.D. student, Haibin Dong, Ph.D. Candidate, Yen Dong, M.A. student, Doris Fields, Ph.D., Lissa Knudsen, Ph.D. Candidate, Taura Mangone, Ph.D. Candidate, and Keena Neal, M.A. Taura Mangone and Keena Neal, due to their consistent judgments, earned the highest interrater reliability<sup>1</sup> ( $kappa = .90$ ) of all eight coders in phase 1. In Phase 2, Mangone and Neal then generously recoded all 2,021 VIP statements with a degree of accuracy that is considered strong agreement ( $weighted\ kappa = .83$ ), improving the reliability of the analysis and the reliability of the operationalizations and measurements of reactance theory constructs as independent variables in this message effects research.

Mia Logan, Ph.D. of Ltd. Unlimited coached me, cheering me onwards during the most critical three months of the data analysis process. She supported my cancellation of intervening activities, appointments, and distractions. She and her business partner Charlotte Hendrix, Ph.D. hosted a Dissertation Boot Camp during which I was able to make tremendous progress for seventy hours during six days with no distractions. This “boot camp” enabled me to focus in depth. It enabled me to identify and correct bad data, and see possibilities in the data segmentation and analysis that would not have been evident without such focused and uninterrupted thought.

I thank my friends, Taura Mangone, Christina Shapiro, Radoslava Simeonova, and Spence Shaw who kept the vigil throughout my dissertation process with camaraderie and support. Christina Shapiro, Spencer Shaw, and my cousin Michelle Maestes read the entire manuscript and identified terms that should be defined. Greg Mechels offered explanations to untangle early and mystifying results, muscled fifty-pound data storage boxes into numeric order, and seconded an investigation of hard copies, validating the electronic database against the original study documents. Your gift of time is always remembered and appreciated. Monica Maasin double-checked citations against references with meticulous care, uncovering instances where cascading revisions had resulted in inconsistencies in citations and a need to update the reference section.

To my children Jean-Philippe Medina Senart, Rex Addison Davis, and Eleanor Marie Davis, who offered immeasurable incentive and inspiration over the years, thank you for sharing this journey. I look forward to attending your dissertation defenses.

Finally, to my husband John Davies Olmsted, thank you for encouraging and making this academic journey possible. Our marriage is continually renewed, a string of moments, pearls strung together in one shared life: patience, devotion, and faith.

---

<sup>1</sup> *Interrater reliability* is the degree to which two or more analysts agree upon the ratings they assign to elements within a body of data. The higher the *interrater* agreement, or agreement between raters, the greater is the reliability of their merged scores.

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**ABSTRACT**

One out of three Americans undergoes drunk-driving crashes; 23% result in death. To deter DWIs (Driving While under Influence), MADD (Mothers Against Drunk Drivers) created VIPs (Victim Impact Panels) where victims impact offenders with gory stories, photos, and threats of punishments and loss of freedom, hoping this message will deter DWIs. It is remarkable that although the VIP message is considered a primary DWI intervention, yet no studies have investigated VIP message effects.

VIP message effects, their persistence and decay, are chronicled here over the course of 12 years. This study extends an empirical investigation of VIPs, conducted by Woodall, Delaney, Rogers, and Wheeler (2007) ( $n = 833$ ) during 1994-1996. At 2 years, these researchers found MADD VIP participants' recidivism rates were 30% higher than their DWI School comparison group, trending toward significance at  $p = .0583$ . This study supports those results as significant at 12 years. As an extension, it investigates whether reactance theory explains VIP message effects failure. *Reactance theory* research, a subset of message effects research, explains how emotional, confrontational,

and threatening messages induce psychological reactance in the mind of the message receiver, who then seeks to preserve his or her sense of freedom by behaving contrarily (Brehm, 1966). Hierarchically intensifying effects of these theoretical *reactance antecedents* are studied here in an unusual manner, as they occur *in vivo*, in real life.

The same intervention was observed to have different effects depending on prior conditions and demographics. The emotional high-threat, high-confrontation MADD VIP message coincided with significantly shorter *time to recidivism* ( $p = .009$ ,  $d = 1.64$ ) and significantly higher *number of subsequent arrests* ( $p < .0001$ ,  $d = 1.64$ ) among recent *prior* offenders, and those with *no priors* under age 30 ( $p = .01$ ,  $d = 0.35$ ). Younger offenders may be associated with more iconoclastic<sup>2</sup> behavior than older offenders (Beirness & Simpson, 1997; Greenberg, 2005; NHTSA, 2008), partially explaining the under-30 *age* effect.

This study furthers persuasive message design as a science and suggests a message-based approach to intervention analysis. There was no effect when MADD VIP was analyzed simply as an intervention. However, there were highly significant effect sizes when the same MADD VIP intervention was analyzed as a message. This study concludes by offering MADD VIP best practice recommendations.

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<sup>2</sup> *Icon* is a symbol that stands for something else. *Clastic* means shattering or smashing. Thus *iconoclastic* refers to a propensity to tear down, destroy, or at the very least disregard conventional symbols, practices, and mores.

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## PREFACE

I am drawn to this research both personally and professionally. I am personally drawn to this research because my brother-in-law died a victim of a drunk driver. Further, my father died of alcoholism after four DWIs. I understand the strong undertow that alcoholism can have on recidivism and the effects upon both the victim and the offender.

I am professionally drawn to this project because, after a marketing career practicing persuasive communication, I now have the rare opportunity to analyze message effects in a randomized experimental context.

I base my study on data collected in an original experiment designed by Rogers, Woodall, Rao, Polacsek, and Milan (1994) ( $n = 833$ ). This is the first study to examine MADD VIP in terms of message effects. It is the first study to conduct content analysis of the MADD VIP presentation messages. It is also the first study to link VIP message effects variables to long-range outcomes. The data collected on MADD VIP messages and the experimental design by Woodall et al. offer a rare opportunity to study 12-year post recidivism data MADD VIP participants. Such hard outcome data is rarely if ever available to test message effects. Further, the randomized design provides a rare opportunity to study message effects on recidivism regardless of the degree of alcoholism in the offender. The study design controls for participant level of alcoholism through random assignment to group conditions.

## CHAPTER 1: INTRODUCTION

Will a heavy drinker, having a good time out on the town, get into his car and drive drunk? Alternatively, will he remember a gory slide show featuring drunk-driving victims that he saw at a Mothers Against Drunk Driving (MADD) Victim Impact Panel (VIP)? Will his memory of DWI (driving while impaired) victims' angst and emotional admonitions stop him from driving drunk?

During a MADD VIP intervention, which is a one-time and typically a one-hour-long intervention, victims of drunk drivers and their families project photos of accidents, gore, and before and after photos disabled or dead loved ones. Victims, often crying, share their tragic stories and plead with DWI offenders to stop drinking and driving. MADD hopes the DWI offender remembers the MADD VIP experience, and hopes that he or she, when drinking, asks a sober person for a ride. Judges rely on MADD VIP efficacy. Judges have thus been mandating thousands of DWI offenders to MADD VIP interventions each week for the past 26 years<sup>3</sup>. Judges hope that MADD VIPs will reduce drunk driving. But research on efficacy of MADD VIP interventions is mixed and inconclusive. Results are inconclusive due to their quasi-experimental nature. There is a need for empirical studies on MADD VIP message effects, conclusive studies where DWI offenders are randomized to intervention and control groups.

This dissertation comprises a twelve-year continuation and expansion of a randomized study (n = 833) conducted by Woodall, Delaney, Rogers, and Wheeler (2007). The purpose of this investigation is to extend the Woodall et al. study by

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<sup>3</sup> Number of participants in MADD VIPs is not known. The absence of a centralized MADD data system results in research notes that data is "not readily available" (NHTSA, 2008).

conducting the first MADD VIP message effects study. What is the effect of the MADD VIP message and what observations are associated with that effect?

This study investigates whether psychological *reactance*, a state of anger and negative cognitions (Quick & Stephenson, 2007), explains the contrary behavior of higher DWI *recidivism*<sup>4</sup> (Delaney, Kunitz, Zhao, Woodall, Westerberg, Rogers, & Wheeler, 2005) among drunk drivers who were exposed to the MADD VIP message. *Reactance* is a mediating state between the act of receiving a message and contrary behavior. Reactance research is a subcategory of message effects research. *Reactance antecedents* are those precursors, such as reactance-inducing statements, that precede a state of psychological reactance. Reactance antecedents have been hypothesized and observed (Brehm, 1966) as producing a state of psychological reactance, a causal influence, upon the message effect: a negative reactance behavior. The state of psychological reactance is therefore an intermediating state between any number of reactance antecedents, as defined by Brehm, and the negative contrary behavior.

The present study measures the latent variable, intermediating reactance, as a quantity of the relationship between *intensity of reactance-inducing statements* for 15 VIPs and levels of negative outcome behavior as measured by *recidivisms* among participants who attended those 15 VIPs. *Intensity of reactance antecedents* is operationalized<sup>5</sup> as message attributes that reside within VIP messages. This research

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<sup>4</sup> *Recidivism* is the return to a previous behavior, in this case the return to driving drunk.

<sup>5</sup> Theoretical constructs are defined through the operations that scientists use to measure their instances in the observable world. Percy Williams Bridgman articulated *operationalization* as the method of translating abstract theoretical constructs into variables that can be measured, quantified, and analyzed. A scientist should explain how (s)he is operationalizing theory into variables. One's verbal acuity in operationalizing constructs into variables should be sufficiently transparent, logical, and repeatable by others (Everett M. Rogers, personal communication, August 27, 2001).

investigates the relationship between *levels of intensity of reactance antecedents*<sup>6</sup> (levels of mild to strong threat and anger in the VIP message) and *levels of negative outcomes* (levels of recidivism among receivers of the VIP message). These variables were suggested by Janice Schuetz and Gill Woodall (personal communication, April 18, 2007) and previous researchers who designed and analyzed the original MADD VIP study (Delaney, Kunitz, Zhao, Woodall, Westerberg, Rogers, & Wheeler, 2005; Kunitz, Zhao, Wheeler, & Woodall, 2006). In the present study the earlier researchers' suggestions for future research, VIP messages as antecedents and recidivism as their outcomes, are observed and quantified. The outcome quantifications of 15 VIP interventions, each VIP's participant levels of DWI recidivism over a 12-year period, are regressed upon levels of reactance antecedents present in those same 15 VIPs.

According to reactance theory, a message receiver's *level of reactance* is measured in terms of the degree to which they react through contrary behavioral outcomes: how contrary are their outcome behaviors in relation to the message they have received? Reactance theory explains why VIP audiences might behave contrary to the anti-drinking-driving messages they have received. If a message receiver believes (1) that he or she has the freedom to drive drunk, and (2) that this freedom to drink and drive is threatened by public censure and threats of legal and social punishment during MADD VIPs, then (3) the message receiver will drink and drive more often after receiving the MADD VIP message. If VIPs prompt increased reactance, then those who exercise the freedom to drive drunk more often should have received higher doses of VIP *reactance-inducing statements*. If higher levels of reactance outcomes (shorter *time to recidivism*

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<sup>6</sup> Antecedents are precursors, which come before, and in some instances can be predicted as causal of an outcome.

and greater *numbers of rearrests*) are observed within the MADD VIP plus DWI School intervention group versus lower levels of reactance outcomes within the DWI School Only comparison group, then an increase in *levels of reactance-inducing statements* and increases in drunk driving behavior are related.

This first chapter of the dissertation (1) presents the problem statement and provides background information on the import and context of the MADD VIP efficacy problem. (2) The purpose and rationale section discusses how the present experimental design is the best approach to research the problem. (3) The theoretical import, framework and scope section discusses this study's theoretical implications for reactance theory.

*Problem Statement: Background of the MADD VIP Message Effects Problem*

The *efficacy* of an intervention refers to its capacity to produce a desired result, such as rehabilitation or deterrence of future instances of the undesired behavior. The standard for measuring efficacy of an intervention is measurement of a treatment and control group, contrasting the two, where the only difference between groups is the intervention. The assumption is that all members of the treatment group receive the same intervention. The validity of such an assumption is questioned in this study. This study investigates whether the interventions received by MADD VIP participants were of the same quality. Such a qualitative measure depends upon analysis of the intervention at a finer level of scale—the components within the intervention. Within the intervention, the present study investigates the intervention message to determine whether all instances of the VIP are the same type of intervention. Are all VIPs actually delivering the same uniform message? If significantly different types of intervention messages were

administered to people in the treatment group, then these differences might confound the determination of the intervention's efficacy. The intervention treatment, not being uniform, would have different effects that should not be measured together as if they were the same effect.

Clearly, instances of interventions need to be analyzed to determine whether their messages are uniform or not. This question has never been addressed with regard to MADD VIP interventions. This particular deficit in the research may partially explain why MADD VIP efficacy research has been mixed and inconclusive.

There may be another explanation for why MADD VIP efficacy research has been mixed and inconclusive. As indicated earlier in this chapter, quasi-experimental studies of MADD VIP efficacy cannot yield clear results because they do not employ the treatment/control design or participants are not randomly assigned to groups. There is no comparison group, or the groups could contain different types of people. Quasi-experimental designs present a problem: one cannot draw a reliable conclusion. The unreliable nature of quasi-experimental studies may explain why some find support for the efficacy of MADD VIPs, and others do not.

Despite a lack of evidence on MADD VIP efficacy, public policymakers, judges, and many public health workers have expressed confidence that MADD VIPs are effective. Traffic safety experts have published reports advocating confidence that MADD VIPs are effective. Is confidence in MADD VIP efficacy warranted?

If MADD VIPs have no effect or worse, if MADD VIPs increase drunk driving, then they increase an array of related expensive and devastating social problems (C' de Baca, Lapham, Liang, & Skipper, 2001). In New Mexico, social programs that care for

drunk driving victims, combined with other programs that attempt to mitigate the far-reaching effects of drunk driving, drain state revenues at the rate of \$600 per year for every man, woman, and child in the state. It is remarkable that MADD VIPs have not been studied in terms of their message effects. Without a message effects study of MADD VIPs, public policy makers and courts cannot determine whether sentencing DWI offenders to MADD VIPs increases or decreases drunk driving, or whether MADD VIPs have any effect at all.

*Prevalence and significance of the repeat drunk-driving problem*

Statistics from the National Highway Traffic Safety Administration (NHTSA, 2001) indicate, “30% of Americans will be involved in an alcohol-related crash at some point in their lives” (NHTSA, 1999; NTSA, 2001a, 2001b, 2005, 2007; Rojek, Coverdill, & Stuart, 2003). In 2002, 41% of U.S. fatal crashes involved a drunk driver (Brunson & Knighten, 2004). Significantly, drunk drivers do not usually consider the impact of their behavior upon others. In fact, drunk drivers are more likely to exhibit antisocial behaviors. They exhibit poor interpersonal relationships and aggression, both when preparing to drive drunk and when behind the wheel (Beirness & Simpson, 1997; Eby, 1995; Snow, 1996a, 1996b; Veneziano & Veneziano, 1992

As discussed in the review of literature, substance abusers demonstrate high levels of sociopathy or anti-social behavior, and this population is highly reactive to confrontational interventions. Confrontation induces substance abusers to react negatively to appeals to stop drinking and driving, according to Miller (2000), and Miller, Benefield, and Tonigan (1993). According to Brehm (1966), substance abusers perceive “anti-substance-abuse messages” as threatening to their freedom to perform pleasurable

self-serving acts. Instead of reducing a substance abuse behavior, an anti-substance-abuse message is more likely to increase abuse, a reactance behavior. Brehm would categorize MADD's message "MADDER than hell" (Mac, 1996; MADD, 2002) as a threatening and reactance inducing message. Reactance theory may explain the seemingly negative reactance to MADD's message by members of "DAMM: Drunks Against Mad Mothers," who wear t-shirts bearing that message. One interpretation of the anti-MADD t-shirt wearing behavior is that it could be a sign of anti-MADD negative reactance among drinkers, a "pushing back" message directed at MADD that reinforces drinkers' sense of personal freedom to drink (Room, 1989).



**Figure 1-1: DAMM: Drunks Against Mad Mothers t-shirt.** Brehm (1966), author of reactance theory, would explain the wearing of the DAMM t-shirt as an expression of negative reactance to the MADD campaign to reduce drunk driving.

*Repeat* drunk drivers are 4.5 times more likely to be involved in a fatal crash than intoxicated drivers with *no priors* (no prior DWI arrests). Repeat drunk drivers cause 30-80% of alcohol-related fatal crashes (Brunson & Knighten, 2004; Fell, 1995; Jones &

Lacey, 2000; NHTSA, 1992, 2006; Peck, Arstein-Kerslake, & Helander, 1994).

Researchers in the state of Louisiana determined that once a driver has one DWI they are 50% more likely to be involved in any kind of crash, alcohol related or not (Gould & Gould, 1992).

Punishing repeat offenders with sanctions that revoke or suspend driver licenses appears to have little or no effect. At the time of their arrest, half of repeat offenders are discovered driving with no license, a revoked license, or a suspended license (Beirness & Simpson, 1997; Eby, 1995; Snow, 1996a, 1996b; Veneziano & Veneziano, 1992). The likelihood of driving with a suspended license increases as number of arrests increase. In one study, 32% of offenders with 2 priors and 61% of offenders with 3 priors who were cited for traffic violations were found to be driving with suspended licenses (Brunson & Knighten, 2004). Repeat offenders voluntarily report that they are not affected by sanctions such as license suspension (Freeman et al., 2006). Since sanctions do not change their behavior, why would threats of sanctions at MAD VIPs change their drunk driving behavior? Are MADD VIP messages, messages that rely heavily on appeals to offender altruism and threats of sanctions, effective in deterring repeat DWI offenders?

#### *Economic impact of drunk-driving behavior*

Drunk driving exacts a high death and injury cost on New Mexico. Alcohol abuse accounts for 40% of vehicle deaths in New Mexico (National Highway Traffic Safety Administration, 2002, 2004, 2005). The total economic impact for drunk driving in New Mexico is roughly \$1.2 billion annually.

Each year, alcohol-related crashes in the United States cost between \$45-51 billion (Blincoe et al., 2002; Polacsek et al., 2001). Alcohol-related crashes cost

employers \$55 billion in 1994 (Network of Employers for Traffic Safety, 1994). The United States economy shoulders the cost of an estimated \$166 billion annually because of the costs of alcohol dependence (US Health and Human Services, 2007). New Zealand researchers estimated the cost of drunk driving to society equals \$0.75 for each drink consumed yet typically DWI offenders pay for only half the costs of their crashes (Miller & Blewden, 2001). The balance of the DWI debt lands upon government. Because of the weighty economic impact on public and private resources, the public has called for stronger sanctions against repeat DWI offenders.

*Courts mandate thousands to MADD VIPs without evidence of efficacy*

Trusting a prevailing belief that MADD VIPs are effective, judges mandate drunk drivers to attend MADD VIPs. Judges believe that VIPs will deter future DWI offenses (C' de Baca, Lapham, Paine, & Skipper, 2000). MADD considers the VIP a "healing opportunity" for offenders (Mercer, Lorden & Haris Lord, 1999). According to MADD (Fell & Voas, 2006). MADD considers VIPs successful if they attain the following goals (Lord, 1990):

The goal of the VIP is to influence DWI offenders on an emotional level to change their attitudes about drunk driving, thus reducing the likelihood of recidivism. This is accomplished in four ways, by: (1) exposing offenders to the consequences of drinking and driving; (2) helping offenders move beyond focusing on their own "bad luck"; (3) serving as a first step in breaking down the denial of alcoholics/drug addicts; and (4) imprinting images of real people in the offenders' minds that may replay when he or she considers drinking and driving. (p. 1421)

Implied in the goal of the VIP is that offenders will switch their orientation from self-centered pleasure and freedom-seeking to being “other-centered” after exposure to a dosage of MADD confrontations. Also implied in the goal of the VIP is that rational thinking occurs in the mind of a drunk.

However, according to researchers Wiliszowski, Murphy, Jones, and Lacey (1996), it is not valid to assume, as MADD does, that drunk drivers are rational. Repeat offenders ( $n = 182$ ) from Arizona, Colorado, and Pennsylvania, participated in a study at approximately the same time period as the present study. Wiliszowski et al. report that these drunk drivers demonstrated lack of forethought and lack of rationality surrounding their decision to drive drunk:

<b>Reasons For Driving After Drinking</b>	<b>% of Responses</b>
Thought he/she was OK to drive	32.2
Just did not think about it	21.0
Lacks control over him/herself after drinking	18.6
No one available to drive for him/her	14.4
Would be OK if careful (to avoid accident/arrest)	13.8

Another study found a negative correlation between drunk drivers’ attitudes and safe behaviors such as calling a friend for a ride or taking a taxi (Turrisi & Jaccard, 1992). Repeat offenders are usually arrested after a drinking episode at a restaurant or bar, often justifying their drunk driving behavior as a matter of convenience, or “just not thinking about it” (Beirness & Simpson, 1997; Eby, 1995; Snow, 1996a, 1996b;

Veneziano & Veneziano, 1992). Drunk drivers' reasons for driving drunk demonstrate a lack of judgment, lack of forethought, and impulsiveness that researchers have referred to as *alcohol myopia* (Steele & Josephs, 1990). Not surprisingly, repeat DWI offenders typically share the following characteristics. They demonstrate relatively irresponsible, impulsive, and sensation seeking behavior (MacDonald, Zanna, & Fong, 1966; Mayhew & Simpson, 1991; McMillen, Pang, Wells-Parker, & Anderson, 1992; McMillen, Adams, Wells-Parker, Pang & Anderson, 1992). Cavaiola, Strohmets, Wolf, and Lavender (2003) found that DWI offenders scored significantly higher on the K, Psychopathic Deviate (Pd) Scale, Over-Controlled Hostility (O-H) Scale, and MacAndrews Alcoholism Scale—Revised (MAC-R) than a non-offender comparison group. Multiple offenders scored significantly higher than first offenders, and both scored significantly higher than the nonoffenders.

Given these characteristics, the repeat offender is not likely to respond responsibly to moral appeals to curb their sensation seeking or impulsiveness. Their *alcohol myopia* would, in terms of the MADD perspective, translate into a *moral myopia*. According to reactance theory, the repeat offender is not likely to respond rationally to fear appeals if those fear appeals are threatening or confrontational, two antecedents of reactance. In fact, if reactance is induced through threat or confrontation then reactance theory predicts that the repeat offender is more likely to increase drunk driving (Brehm, 1966; USA Today, 1992). Given the foregoing, it is unlikely that repeat offenders will respond to appeals to be more responsible to society. Instead, to drown out MADD's imprinting of victim images in their minds, they are more likely to react by drinking more.

MADD considers its confrontation and threats successful if it imprints images of DWI victims in the offenders' minds. MADD believes this victim imprint will stop drunks from driving by increasing their awareness of probability of being in an accident and hurting a victim after choosing to drive drunk. MADD's reasoning assumes the drunk has a sense of responsibility, full reasoning capacity, thinks about risk of having an accident or being caught, and values safety of unknown other people over sensation seeking and the personal convenience of driving drunk. However, research on attitudes of drunk drivers indicates that drunk drivers' perceptions of their risk of arrest, and their perceptions of the probability of an accident while driving drunk, only persist for a short time following an educational message about the risk and negative outcomes of drunk driving (Turrisi & Jaccard, 1992).

Do MADD VIPs succeed in their goals of reducing drunk driving? Research is inconclusive. Some researchers have found evidence that MADD VIPs do work (Badovinac, 1994; Fors and Rojeck, 1999; O'Laughlin, 1990; Rojek, Coverdill, & Fors, 2003; Sprang, 1997). Other researchers have found evidence against the efficacy of MADD VIPs (C'de Baca, Lapham, Liang, & Skipper, 2001; C'deBaca, Lapham, Paine, & Skipper, 2000; Marin and Marin, 1991; Theriot, 2006; Woodall, Delaney, Rogers, Wheeler, Rao, Polascek, & May, 2008). Shinar and Compton (1995) found mixed results within the same study. VIPs appeared to have an impact in one panel but not in another. To date there is no conclusive evidence on the effectiveness of MADD VIP messages. This is remarkable since, believing MADD VIPs are effective, courts mandate thousands of DWI offenders to MADD VIP interventions each year.

### *Methodological problems involving previous research*

There has been no direct research on MADD VIP message effects that regresses message effects onto message content, or that determines whether all VIPs deliver the same type of intervention message. Additionally, researchers have not evaluated MADD VIP messages for presence of *antecedents to reactance*. This study evaluates MADD VIP messages for presence of antecedents to reactance. This study's measurement of presence and levels of antecedents to reactance, the causal precursors of contrary behavior as explained by reactance theory, enables a theoretical framework, a framework of reactance theory that undergirds this study. Reactance antecedents present in MADD VIP content might explain cases where MADD VIPs *increased* drunk driving levels among participants, as Woodall et al. 2-year follow-up study has suggested.

There have been other serious problems with previous MADD research. Other than the Woodall research, previous MADD VIP researchers have limited their research to quasi-experimental designs, as discussed previously. How quasi-experimental designs fail to meet assumptions of statistical tests is discussed more closely here. In quasi-experimental designs the differences in the outcome variable cannot be attributed to a causal variable. Random assignment, which results in normal and equal distribution of traits among groups, is necessary to meet important statistical test criteria. Random assignment to group condition, and inclusion of a control group, are assumptions that must be met in order for statistical tests to draw logical and compelling inferences from the data (Maxwell & Delaney, 2004).

For example, because in past research offenders have not been randomly assigned to group condition, the demographics of those who are mandated to VIPs versus other

interventions have a certain probability of being skewed. As a case in point, C‘de Baca et al. (2001) found that judges were least likely to refer low-educated minority men to MADD VIPs. Judges were more likely to refer unmarried white offenders. Drinking cultures may be different for different demographics, thereby further skewing any quasi-experimental results. C‘de Baca et al. (2001) also found that MADD VIP referral —did not increase recidivism rates but lowered them marginally or not at all” (p. 1420). Was this marginal or neutral effect an effect of the drinking culture of unmarried white offenders, rather than an effect of MADD VIP? C‘de Baca conceded that her finding might be a result of judges‘ biased group assignment. She and her coauthors stressed the need for an experimental, randomized design, such as this study, to measure MADD VIP efficacy.

Of particular interest in the present research is whether the VIP message is consistent in its level of intensity and strength. If the MADD message consists of varying levels of intensity and strength, then do those levels make a difference in how the VIP message works and how it should be analyzed? Are differences in message strength statistically significant? Is the VIP indeed only one type of intervention or do VIPs vary in the type of intervention they administer? Does analyzing the VIP as a message-based intervention offer insights on whether VIPs are one or many types of intervention and can a message-based analysis determine VIP efficacy?

#### *Purpose and Rationale*

The purpose of the present study is to analyze MADD VIP message effects to determine MADD VIP intervention efficacy. This study also proposes to test the appropriateness of reactance theory in explaining MADD VIP message effects. It

evaluates whether insights gained from this study can contribute to the body of reactance literature, a subset of message effects literature. This study researches whether reactance can at least partially explain MADD VIP participants' trend toward increased recidivism in the Woodall 2-year post study.

At the intervention level of scale, this study examines whether at twelve-years post the original study (Rogers, Woodall, Rao, Polacsek, & Milan, 1994), the MADD VIP participants display significantly more DWI recidivisms than their DWI School comparison group. The research questions presented at the end of chapter 2 specify the details of this investigation, but painting with a broad-brush stroke, the aims of this study are as follows:

- To investigate whether antecedents to *reactance* are present in the VIP messages.
- To identify levels of message reactance –dosages” for each VIP.
- To regress twelve years of VIP participants' and controls' DWI recidivism records onto VIP message dosages.
- To investigate whether reactance theory can explain the anti-VIP effect, which trended toward significance in the Woodall et al. (2007) study at 2-years post intervention.

The present experimental design, because it is a randomized trial, offers the best possible problem space for concluding whether MADD messages have a positive or negative effect on drunk driver recidivism.

*Theoretical import, framework, and scope*

*Theoretical import*

This study contributes to message effects theory by operationalizing theoretical message effects constructs, *reactance antecedents* (Brehm, 1966), as specific message types, while considering the relationship between mean message type and hard behavioral outcome data. This study's hard outcome data approach contrasts with use of less reliable soft outcome measures, often participant self-report data, employed in some DWI studies to test theoretical constructs in the DWI literature (Gosling, John, Craik, & Robins, 1998).

The theoretical literature on message effects lacks empirical support from research designs that test specific message types (Brashers & Jackson, 1999; Jackson, 1992). Previous research has not clearly set forth the operationalization of theoretical constructs as variables or specific message types. Thus, previous research has not linked theoretical message effects constructs to *in vivo* (real world) messages, provided taxonomy of reactance message types, or linked message types and levels of message strength to real world behavioral outcomes. This study provides operationalization of reactance constructs as variables with each reactance construct represented by an archetypal *in vivo* message, provides a taxonomy of reactance message types, and links these message types and their levels of message strength, or *intensity*, to real world behavioral outcomes.

The VIP efficacy literature may be characterized as lacking reliably operationalized message effects constructs, and generally lacking in reliable outcome measures. In this study, the operationalization of reactance theory constructs are articulated and validated via two methods, both methods offering a high level of

empirical reliability with corroboration between both methods of operationalization. These methods are overviewed in the next section on theoretical framework.

### *Theoretical framework*

The present study draws its theoretical framework from the foundational message effects research of Shannon and Weaver (1963). Shannon and Weavers' sender-message-receiver constructs are drawn upon to organize message variables into three main categories: 1) message sender variables, 2) message-related variables, and 3) message receiver variables. Nested within those three general variable categories, the reactance antecedent constructs of reactance theory (Brehm, 1966) are distributed. Reactance antecedent constructs are clustered according to whether they are sender, message, or receiver constructs. Within Shannon and Weavers' categories the study operationalizes and tests accuracy of operationalization of reactance theory constructs. This study uses two methods to operationalize and test operationalization of reactance theory constructs.

In the first method of operationalization of theoretical constructs into variables, the reactance antecedent constructs are operationalized by translating their theoretical definitions into a message type variable. The message type variable consisted of categories of message types into which *in vivo*, real world, messages were assigned, by independent coders. The coders' highly consistent identification of the face value of VIP messages in terms of reactance theory-defined categories was validated by a high level of inter-rater reliability. The high level of inter-rater reliability among independent coders, who employed coding definitions designed from reactance theory constructs, validated the consistency of the operationalization of reactance theory constructs in terms of VIP message types.

In the second method of operationalization of reactance theory constructs into VIP message types, VIP message types were matched with laboratory-created messages (Brehm & Cohen, 1962; Brehm & Cole, 1966; Brehm, 1966, 1972; Buller et al., 2000; Campo & Cameron, 2006; Dillard & Shen, 2005; Dillard & Shen, 2005; Dillard and Shen, 2005; Engs & Hanson, 1989; Festinger & Carlsmith, 1959; Festinger, 1957; Freedman, 1965; Goranson & Berkowitz, 1966; Hollander, 1971; Hong & Faeda, 1996; Miller et al., 2006; Quick & Stephenson, 2004; Quick & Stephenson, 2007; Quick, 2003). These laboratory-tested messages had been empirically tested for their levels of reactance inducement. The laboratory messages had also been designed to operationalize theoretical definitions of reactance antecedents with message types. Both VIP operationalizations and laboratory operationalizations of message types matched each other, and the laboratory message types had been empirically validated as operationalizations of reactance theory constructs. The present findings determined that *in vivo* archetypes of these laboratory messages that had been created to match reactance theory constructs, again induced the levels of reactance that the theory predicted.

The process of testing accuracy of operationalization of the reactance theory constructs is complex. The process is complex due to the progression of tests of the data against theoretical constructs at three different levels of scale. At each level of scale, the data are tested to insure that the only difference between variables in the final test, at the final level of scale, is indeed the level of presence and level of intensity of reactance constructs. Thus, the accuracy at which the theoretical constructs were operationalized into VIP message variables is determined in an articulated three-step process, each step

executed at a different level of scale for the data. This multiscale operationalization process is described in chapter 3: Methodology.

### *Theoretical scope*

Reactance theory, disaggregated into its 8 component reactance antecedent constructs, is the main theory tested in this dissertation. Additionally, the dissertation refers to supporting theories that inform and deepen the understanding of general message theory constructs and specific reactance theory constructs. These supporting theories illuminate a discussion of the theoretical implications of the results in Chapter 5. In addition to reactance theory (Brehm, 1966), the following theories provide additional theoretical scope to this investigation: cognitive dissonance theory (Festinger, 1957; Festinger & Carlsmith, 1959), message-context theories (Miller, 2002; vanDijk, 2008), grounded theory (Strauss & Corbin, 1990; Thomas & James, 2006), message function theory (Jeong, 2004), theories about influences of message intensity (Aristotle, 2006; Dillard & Shen, 2005), theories about how audience pathos reduces reactance (Aristotle, 2006; Burke, 1965; Corbett, 1984), and the theory of reasoned action (Fishbein & Ajzen, 1975).

### *Chapter 1 Summary*

Drunk driving incidents, including crashes, are self-reported at least once for every licensed driver in the U.S. Concerning crashes alone, one out of every three adults will be involved in a drunk driving crash during their lifetime. Of those drunk driving crashes, one out of four will result in death. New Mexico spends \$600 every year for every man, woman, and child in the state to cover the social costs of drunk driving. The drunk driving problem is both prevalent and significant in this state.

The question of whether MADD VIPs are effective then becomes an important question, not only from the standpoint of individual citizen safety but also from an economic standpoint. If MADD VIPs are effective, then the program should be encouraged. If MADD VIPs are ineffective, then society would be better served by redirecting DWI intervention resources to interventions that are more effective.

The primary purpose of this study is to analyze MADD VIP efficacy in a twelve-year randomized field study. This study will evaluate if MADD VIPs are effective and if not, why not, in order to inform future DWI intervention program designs. Does reactance theory explain MADD VIP message effects? What other persuasion theories can inform this study on MADD VIP message effects?

This study possesses the secondary goal of contributing to the literature on message effects studies. It contributes a real life application of empirical certainty to a body of theory and investigations that, according to analysts (Jackson, O'Keefe, Jacobs, & Brashers, 1989), is over laden with quasi-experimental and inconclusive designs, an underrepresentation of practical examples of specific message types and detailed analysis of under what conditions a message type is or is not persuasive.

This study offers insights into measuring treatment or intervention efficacy. In the literature, manipulation checks are sometimes employed, though not always, to check the researcher's expectation of the accuracy of an operationalization against the subject's perception of the meaning of the operationalization. Manipulation checks can work to identify subgroups that would respond differently and even oppositely to the same treatment or manipulation. Researchers use manipulation checks not only to check the

accuracy of their operationalizations, or parameter checks, but also to determine whether their sample has come from the same or different populations.

Sometimes, however, a manipulation check is not possible. In the collection of *in vivo* field data, such as the MADD VIP data collection process, the researcher does not manipulate the message source. The message source delivers the message in a natural manner. Whereas field research is valuable because the environment is natural, yet it is often considered that manipulation checks of field variables are not possible. Where field experiment results are generalizable to natural situations in the real world, yet because the field is difficult to isolate from confound influences, often a laboratory-generated experiment with controls and manipulation checks, despite limited generalizability, is considered to be a cleaner science. This study advances a method to conduct manipulation checks on field research involving message variables. It offers a useful message check procedure, introduced here.

Like any type of experiment, field research is a test of a theory and needs some type of check for accuracy of theoretical construct operationalizations. A limitation of field experiments is that operationalization of constructs into variables, where variables contain data from natural sources, may be confounded by different levels of treatment (different theoretical constructs operating) through different sources. In this case, a message analysis, if the treatment is message-dependent, is useful to determine whether all message sources are delivering the same treatment (and same theoretical operationalization) or different treatments and operationalizations. This may be accomplished by assigning levels of the variable strength, including zero strength where a trait or treatment is absent. This method is used in genetic trait analysis with datasets

containing missing data, a method adapted for the present study from Kelly and Di Marzo Serugendo (2009). The method is discussed more fully in chapter 3, Methodology.

Communication scholars specialize in message analysis and can offer a significant contribution to increase accuracy of theoretical operationalization and “manipulation checks” in field studies where the treatment channel is a message. Researchers in disciplines other than communication may find benefit in including a communication scholar in their research team when they have message-related variables in their study design. A communication scholar may thus assist social researchers in avoiding a Type II error. For example, previous field research in the DWI literature has found low or no treatment effect for *in vivo* data sets. The absence of detection of an *in vivo* effect might occur due to lack of intervention message analysis, as this study demonstrates. Thus, this study makes a contribution to the practice of field research across disciplines in the social sciences. It demonstrates the usefulness of communication analysis in avoiding a Type II error in field studies.

## CHAPTER 2: REVIEW OF RELATED LITERATURE

The determination of efficacy of drunk driving interventions on a national level is stymied by lack of coordination between states. Differences in arrest and court procedures and data firewalls between states lead to discontinuous and relatively unreliable data. This is true especially in the case of data concerning repeat DWI offenders.

Data between states are fire-walled: one state's driver records usually will not include arrests a driver received in another state. Data between states are discontinuous: each state has different definitions of what constitutes drunkenness, different numbers of years for which arrest records are available, different laws, and different norms for practices such as record purging and plea bargaining. A plea bargain usually changes a repeat DWI offender's number of prior offenses to zero when in fact they may have three to six or more priors. Some states only track prior offenses for three years, others for ten years. Different states have different blood alcohol content cutoff points that determine whether a driver is drunk or not (Streff, Spradlin, & Eby, 2001). These differences make it difficult to confidently compare results of research conducted in different states (Jones & Lacey, 2000; Breer, 1998; Yu & Williford, 1991).

When it comes to DWI data and particularly DWI data for repeat offenders, state differences skew the accuracy of data on the national level. Researchers often consider national statistics to be relatively accurate, but in actuality national aggregate data is only as accurate as state reporting. As considered previously, state reporting is inaccurate, so it follows that national data aggregated from state reports is also inaccurate. This inaccuracy on the state and national reporting level influences the accuracy of meta-

analysis on DWI interventions. The inaccuracy of the underlying data and of state and national reports, and the challenge of comparing different metrics from different states, is often overlooked in meta-analyses. The meta-analytical method compares studies based on methodological rigor and offers integrated research finding summaries, syntheses, and comparisons.

With these considerations in mind, the following discussion addresses two related questions. These questions concern the efficacy of drunk-driving interventions and the rigor of methods used to assess their efficacy. The pros and cons of previous research are examined based on their methodologies, without probing the inaccuracies of underlying data, which is beyond the scope of the present study.

Other than the Woodall research, previous MADD VIP researchers have worked with quasi-experimental designs, reporting mixed and inconclusive results. Some studies found MADD VIPs effective (Badovinac, 1994; Fors and Rojeck, 1999; O'Laughlin, 1990; Rojek, Coverdill, & Fors, 2003; Sprang, 1997). Other studies found no evidence of MADD VIP efficacy (C'de Baca, Lapham, Liang, & Skipper, 2001; Marin & Marin, 1991; Shinar & Compton, 1995; Theriot, 2006). At two years post intervention Woodall, Delaney, Rogers, Wheeler, Rao, Polascek, and May (2008) found that MADD VIP participants' recidivism rates were 30% higher than their control group, trending toward significance at  $p = .0583$ . All of these studies are discussed in more detail in this chapter. This chapter also covers literature on DWI intervention effect sizes, components of the most effective DWI interventions, research on general message effects variables, and research on reactance theory variables. It concludes with a section highlighting

ethnographic field notes from a MADD VIP session that contain field observations of reactance antecedents.

*Evidence that MADD VIPs Work*

Badovinac (1994) found that 62 imprisoned DWI offenders displayed a significantly greater number of plans to use designated drivers or taxis because of their MADD VIP experience than did their imprisoned controls ( $n = 46$ ). Sprang (1997) found that MADD VIP participants ( $n = 103$ ) displayed an intent not to drive drunk that was significantly different from their control group ( $n = 75$ ). Further, Sprang found two times as much recidivism for controls than MADD VIP participants during the 12-month period following the previous arrest. Fors and Rojeck (1999) reproduced Sprang's study and found similar conclusions: during the post 12-month period following a previous DWI, Controls ( $n = 431$ ) displayed significantly more arrests than MADD VIP intervention participants ( $n = 404$ ).

Rojeck, Coverdill, and Fors (2003) reported at the five-year follow-up ( $n = 404$ ) that "VIPs are associated with a 55.7% overall decrease in the hazard of recidivism; the VIP effect is strong in the first two years." O'Laughlin (1990) found similar results. However, the demographics of these population samples may have limited their MADD VIP outcome conclusions. Rojeck et al. conducted their experiments in Clarke County, Georgia, a community without a significant Hispanic population. Fors and Rojeck (1999) analyzed the same data, obtaining significant results only with white men, ages 26-35 years old, who had only one prior DWI arrest. For nonwhite men, older men, and those with multiple priors there was no effect. Their results were inconclusive as ethnicity, age, and number of priors were not manipulated variables. The design was not empirical and

causal inferences cannot be derived. Rojek et al. (2003) discussed the possibility that different VIP styles and different audience cultures may cause different VIP efficacy rates. Their results point to the possibility that culture may explain differences in participant responses to the same intervention.

Whether or not culture or racial profiling may be responsible for these findings is considered in detail in chapter four, *The effect of ethnicity on survival* and in chapter four summary, *Demographic risk factors*, and in chapter five, *Do intervening factors bias DWI demographics*. In any case, as discussed previously, the above researchers cannot claim causal results because these studies employed quasi-experimental designs. In quasi-experimental designs, study outcomes cannot be conclusively stated to be a result of observed effects. Another possible reason for inconclusive results is the intervening factor of judge group assignment bias, a biased assignment of certain demographic cultural types to MADD VIPs (C'de Baca, Lapham, Liang, & Skipper, 2001), as discussed in the introduction.

A complication in existing research, as discussed in the introduction and again in this section, is that previous researchers, other than Woodall et al. (2008), did not conduct randomized designs. Additionally, none of the research designs controlled for all three important predictor covariates: gender, age, and number of prior arrests. The role of these three important predictor variables in DWI recidivism is discussed in detail later in this chapter.

#### *Evidence That MADD VIPs Do Not Work*

There is evidence that MADD VIPs do not work. Theriot (2006) found no significant correlation between MADD VIP attendance and recidivism ( $n = 247$ ). Shinar

and Compton (1995) studied Oregon and California DWI offenders ( $n = 2000$ ). They matched MADD VIP intervention and control groups on age and gender and found MADD VIP had no impact on recidivism.

C‘de Baca et al. (2000) found ~~there~~ “there was no evidence of a recidivism-reducing effect of the VIP” (p. 1425) for the VIP audiences in Bernalillo County, New Mexico, the majority of whom self-identified as of Hispanic ethnicity. However, they did not identify the message qualities or archetypal message types in the VIP presentation as a possible influence upon this failure. Instead, they discussed the possibility of confounding cultural causes, confusing culture with ethnicity. The present study considers whether VIP message design, as defined by message qualities, could have caused reactance, i.e., a negative and opposite reaction to the message than was desired by the MADD message designers.

C‘de Baca, Lapham, Liang, & Skipper (2001) found no statistical association between MADD VIPs and first-time offender recidivism. However, ~~female~~ “female repeat offenders referred to VIPs were significantly more likely to be re-arrested” (p. 615) compared to nonVIP controls. This finding suggests that *gender* and *number* of previous DWI arrests should be covariates in a MADD VIP study.

Woodall, Delaney, Rogers, and Wheeler (2007) and Wheeler, Rogers, Tonigan, and Woodall (2004) reported results from the only randomized study on MADD VIPs. They found mixed and conflicting results on MADD VIP efficacy, depending on the length of time between intervention and post measurement. In a *one*-year follow-up study, these researchers initially found evidence that MADD VIPs were effective in reaching their goal of changing offenders‘ attitudes and aims. Immediately after

completion of fifteen different VIPs, conducted in 1995 through 1996, most participants reported a raised awareness of the DWI problem and 26% stated they would never drink and drive again (Woodall et al.). The Wheeler et al. study compared the MADD VIP participant recidivism to an age and gender matched control group of drivers. Preliminary findings, based on self report data, were encouraging. However, a quasi-experimental study that similarly contrasted age-sex matched VIP attendees against VIP no-shows in California found no difference between the two groups, both of which shared the same *intent to treat*<sup>7</sup> MADD VIP court mandate (Shinar & Compton, 1995). The quasi-experimental Shinar Compton findings left room for doubt regarding the New Mexico findings, even though the New Mexico MADD VIP age-sex matched findings had been obtained from an empirical study.

Then a 2-year follow-up by Woodall, Delaney, Rogers, Wheeler, Rao, Polascek, and May (2006), based on recidivism data, found that length of follow-up made a difference in the results. After two years, MADD VIP participants' recidivism rates were 30% higher than their control group, trending toward significance at  $p = .0583$ . The 2-year follow-up findings from the empirical study, although not significant, continued to cast a doubt on the efficacy of MADD VIPs. Because the follow-up duration of the MADD VIP study appears to have influenced study results, and the self-reports differed from the arrest records, the present study entails a twelve-year follow-up that evaluates longer-duration DWI arrest outcomes for the same original participants studied by Woodall et al.

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<sup>7</sup> *Intent to treat* approach means that those who were assigned to VIP were treated as if they had attended, even if they did not show up (Gross & Fogg, 2004). This is a conservative approach, the ramifications of which are discussed in the methods section.

In summary, Woodall et al., in their singular randomized study of MADD VIPs, found contrary results with different lengths of follow-up time. Other researchers conducted quasi-experimental studies that supported either side of the MADD VIP efficacy argument. None of the quasi-experimental studies controlled for more than one of the three known covariates (gender, priors, and age) except C' de Bacet al. (2005), who controlled for two of the covariates: gender and priors. These flaws in research design limit the validity and generalizeability of previous results. In contrast, the present study segments data for all three known covariates: gender, age, and number of priors. The Woodall et al. original randomized design is used again in the present study; random assignment to group condition has the advantage of controlling for unknown confounds.

#### *Drunk Driving Interventions*

An ever-increasing array of interventions is aimed at reducing alcohol abuse, producing a large body of literature. Early reviewers (Foon, 1988; Institute of Medicine, 1990) could not determine DWI interventions' effect size. However, Wells-Parker, Bangert-Drowns, McMillen and Williams (1995) conducted a meta-analysis of 215 DWI interventions that included a study of DWI treatment effect sizes. The results of their meta-analysis are discussed in the following section.

#### *Intervention effect sizes*

Wells-Parker et al. (1995) found that individual effect sizes differed by offender categories. Low-risk (no prior arrests) and high-risk offenders (multiple prior arrests) did not respond to DWI intervention ( $t(19) = 0.68$ ;  $t(22) = 0.20$ , respectively,  $p > 0.05$ ). Moderate risk offenders, however, did respond to DWI intervention. "Average effect size for moderate risk offenders differed from zero ( $t(16) = 3.33$ ,  $p < 0.05$ )" (Wells-Parker,

Bangert-Drowns, McMillen & Williams, 1995, p. 917). The difference between the low + high and the moderate risk groups was not statistically significant ( $t(58) = 1.6; p = 0.06$ ).

Effect sizes for 200-day follow-ups were significantly more varied than for 1600-day follow-ups ( $p < 0.01$ ), but the mean effect sizes were nearly the same, roughly 0.09. Similarly, length in hours of intervention did not appear to make a difference in effect size between short-duration and long-duration interventions. Neither could the meta-analysts identify a pattern of increased outcomes as a result of level of severity of driver's license sanctions.

To improve accuracy of results and yet conserve power (Cohen, 1988), the present study divides DWI offenders into three databases: *recent prior* offenders and those with *no priors*. Those with *no prior* DWI arrests are subdivided into 2 *age* categories (*under/over* age 30). Separate tests for intervention effects are conducted on these three categories because preliminary data screening indicated that offenders in these three categories reacted differently to the same intervention conditions.

#### *Most effective interventions*

Among 71 studies with better designs and methods, where 37 studies adhered to random assignment, and another 34 studies used controls, —mean effect sizes ranged between 0.08 and 0.10” (Wells-Parker, Bangert-Drowns, McMillen & Williams, 1995, p. 913). Although Wells-Parker et al. considered data insufficient to determine the most effective intervention of individual offenders, in general treatments that combine education, therapy, and monitoring (intensive supervision) were the most effective (Cavaiola & Wuth, 2002; DeYoung, 1997; Lapham, Kapitula, C‘de Baca, & McMillan, 2006; National Institute on Alcohol Abuse and Alcoholism, 2000; Wells-Parker et al.,

1995; Wells-Parker & Williams, 2002). The Wells-Parker et al. meta-analysts noted that previous researchers probably underestimated treatment effects because of an over-representation of education or informational interventions. Informational interventions, such as the usual and customary ‘DWI school’ employed as the comparison condition in the present study, were the most commonly evaluated type of intervention, and were considered the least effective, as measured by standard methods (mean effect size 0.04). Mann, Wingillis, Leigh, Anglin, and Blefgen (1986) and Sheppard and Stoveken (1993) reported that DUI or DWI schools had no effect on changing attitudes about whether to drink and drive. DWI Schools may increase knowledge (remedial education was found to increase levels of knowledge on the effects of alcohol on driving), but researchers found, using standard methods, that stand-alone educational treatments do not appear to result in reduced recidivism (Golden 1979).

However, education, when used with another intervention method, had a larger effect size (mean effect size 0.12). The most effective intervention modalities combined education with psychotherapy counseling (mean effect size 0.17). The three-way combination of education, psychotherapy counseling, and contact-probation produced better results in a regression than any two of the methods together.

Interestingly, confrontational methods or methods that lingered on unhappy associations had the worst outcomes. Psychotherapy alone and AA alone had negative effect size values (-0.17, and -0.15 respectively). Differences between intervention and controls were less when controls had contact follow-ups. In fact, effect size decreased as control group follow-up contact increased. Was contact an unhappy DWI reminder?

MADD program designers claim that they do not use shame or guilt (related to the reactance antecedent *public censure*), or anger (also a reactance antecedent) in their messages (Lord, 1990; Mercer, Lorden & Harris Lord, 1999). Is this true? If MADD presenters use public censure to goad and chastise offenders with unhappy reminders, then is the VIP message persuasive? How does the VIP message function for the message receivers? Does it function to make them feel emotionally better or worse? Do message receivers experience an opposite message function than the message senders? Or does attendance at emotion-laden MADD VIP panels function as a therapy for the receivers the same as it does for the message senders? Eventually the question is, “what is the MADD VIP message effect on the audience? Does the MADD VIP message decrease or increase DWI recidivism or make no difference? Does it have different effects on different categories of offenders?”

#### *General Variables in DWI Research*

The questionnaire, discussed in the methods section, asked participants to report numbers of drinks per drinking session and number of drinking and driving (DWI days) per month. During planning of the present research design, the *number of self-reported drinks per month* was considered as a covariate. However, participants’ self-reported drinking data proved unreliable. Three hundred and nine participants (38.5%) reported that they never drank and drove, which cannot be true since police officers arrested them for drunk driving. Thirty-one participants did not answer the question. DWI offenders have been known to underreport their illegal behaviors. Change and Lapham (1996) found that 65% of DWI offenders underreported their prior arrests.

There are, however, other more reliable predictors of DWI recidivism than self report. This section discusses three general variables in DWI research that have been found, in varying degrees, to contribute to DWI recidivism. They are age, gender, and number of prior DWI arrests. The sources of these data, namely court and arrest records, are more reliable than self-reports.

### *Age*

Age of the DWI offender is an important covariate in DWI research because age affects probability of DWI recidivism. According to the NHTSA (National Highway Traffic Safety Administration, 2008), “Fatal crash data has consistently shown drivers 21 to 24 years old have the highest level of involvement in alcohol-impaired driving fatalities, compared to drivers of all other ages...making them the most over-involved age group for alcohol-impaired drivers.” “Drivers between 21 and 24 years old had the highest rates of intoxication (28%), followed by those between 25 and 39 years old (25%)” (NHTSA, 2001b). Age will function as a covariate in the present study. Table 2-1 displays percentage of the population who are problem drinkers, broken out by age group.

**Table 2-1: *Drinking as a function of age.*** In a drinkers' career, the problem drinking hazard, with its corollary—the drunk driving hazard—is two to six times greater for drinkers between ages 18-24 than for any other age group. As the drinker, or prospective drinker, enters the 18-24 age group, drinking problem probability increases exponentially. Probability of a drinking problem decreases with same rapidity after the drinker ages out of the 18-24 age group.

Age Group	Percentage of Population Who Were Heavy Alcohol Users (1994-2002 Average)
Under age 5	0.0
Ages 5-17	2.7
Ages 18-24	12.8
Ages 25-34	7.6
Ages 35-44	5.7
Ages 45-64	3.8
Over age 64	2.2
Entire Population	4.9

*National Highway Traffic Safety Administration, USDOT (2008, p. 65)*

According to national statistics, repeat DWI offenders tend to be white males (Beirness & Simpson, 1997; Eby, 1995; Snow, 1996a, 1996b; Veneziano & Veneziano, 1992). More than 90% are under age 45, and 75% are under age 40 (Streff, Spradlin & Eby, 2001). Those under 35 demonstrate the highest prevalence (Beirness & Simpson, 1997; Eby, 1995; Snow, 1996a, 1996b; Veneziano & Veneziano, 1992). Covariates “age” and “gender” and their effects upon the likelihood of recidivism have been researched separately in previous DWI studies (Donovan et al., 1983; Hedlund, 1994; KeRo Corporation, 2006; Moskowitz et al., 1979; Riala et al., 2003; Shinar & Compton, 1995;

Simpson and Mayhew, 1991; Wells-Parker et al., 1995; Wells-Parker, Pang, Anderson, McMillen, & Miller, 1991) and may also affect results in the present study. The two covariates *age at enrollment* and *gender* were thus incorporated into the dataset.

### *Gender*

The *gender* of the DWI offender is considered an important covariate in DWI research because gender affects probability of recidivism. —Overall, male drivers involved in fatal crashes were twice as likely as female drivers to be drunk (20% and 10%, respectively)” (NHTSA, 2001b). Male and female drivers have demonstrated reduction in drunk driving at different rates. Table 2-2 from NHTSA (Table 39, p. 15, 2001b) shows an almost 10% difference in rate of drunk driving reduction. Between 1982 and 1998 the number of high-BAC females involved in fatal crashes was reduced by 47%, while, by comparison, that of males dropped by 38%.

Table 2-2: *Reduction in High-BAC (0.10+) Drivers in Fatal Crashes by Sex, 1982-1998.*

<b>Sex</b>	<b>% of Drivers with BAC 0.10+</b>		<b>% Reduction</b>
	<b>1982</b>	<b>1998</b>	<b>1982-1998</b>
Male	32	20	38
Female	19	10	47
All Drivers	30	18	40

*National Highway Traffic Safety Administration, USDOT (2001, p. 15)*

Shinar and Compton (1995) matched MADD VIP intervention and control groups ( $n = 2000$ ) on age and gender. C‘de Baca et al. (2001) found that —female repeat

offenders referred to VIPs were significantly more likely to be re-arrested” (p. 615) compared to nonVIP controls. This finding suggests that both *gender* and *number of prior arrests* (DWI arrests) should be covariates in a MADD VIP study. C’de Baca et al. (2005) controlled for two covariates: *gender* and *priors*. *Gender* and *number of prior arrests* function as covariates in the present study.

#### *Number of prior arrests*

*Number of prior arrests* is an important covariate in DWI research because number of prior arrests affects probability of DWI recidivism. Those with prior DWI arrests are 1.4 times more likely than those with no priors to have a repeat DWI offense (Jones & Lacey, 2000). Woodall et al. found the average MADD VIP study participant who was a first-time offender had a different recidivism outcome than the average MADD VIP participant who had one or more DWI arrests before the study. As discussed previously, Wells-Parker, Bangert-Drowns, McMillen and Williams (1995) found that individual DWI treatment effect sizes differed by offender categories. Low-risk (no prior arrests) and high-risk offenders (multiple prior arrests) did not respond to DWI intervention ( $t(19) = 0.68$ ;  $t(22) = 0.20$ , respectively,  $p > 0.05$ ). Moderate risk offenders, however, responded to DWI intervention. –Average effect size for moderate risk offenders differed from zero ( $t(16) = 3.33$ ,  $p < 0.05$ )” (p. 917). The difference in recidivism between the low, high, and moderate risk groups was not statistically significant ( $t(58) = 1.6$ ;  $p = 0.06$ ).

The *number of priors* was also found to have a contributing effect in a quasi-experimental study by C’de Baca et al. (2005). In order to conserve power (Cohen, 1988) the final data set used in the survival analysis portion of the study was two-tiered: those

with prior arrests and those with no priors. The stepwise regression model fitting in the Cox Regression survival analysis, discussed in the results section, demonstrated that each of these groups demonstrated a different covariate model.

In the present research, there is no distinction made between prior offenders who were high-risk drinkers who drive versus high-risk drivers who drink. Voas (2000) makes this distinction as a means to illustrate a broad continuum of different risk types who become repeat offenders. The present study does not subtype DWI offenders into clinical subpopulations. The small sample of recent prior offenders (n = 47) precludes such subdivision.

#### *General Variables in Message Effects Research*

Because behavioral health interventionists dispense all DWI interventions using language, photos, signs, or symbols, it may be argued that the most common independent measure in DWI intervention is the message. *Message* is defined as either verbally articulated language or a nonverbal sign, photo, or symbol sent by a message sender to a message receiver. As discussed previously in this chapter, education, a message-based intervention, was the most common independent measure in DWI intervention research.

Based on the work of Wells-Parker et al. (1995), coupling education with psychotherapy (both of which are message-based interventions), made for a successful combined intervention. Education, when combined with contact-probation and psychotherapy counseling—all message-based interventions—had the best effect of all. Thus, it is argued that the most successful interventions involved some type of message intervention. Therefore, the present study looks systematically into the *message* as an independent, or causal, variable.

Several theoretical constructs reappear often in the literature on message effects. These constructs are (1) context, (2) content (including deductive and inductive arguments), (3) function, and to a lesser extent (4) intensity, (5) frequency, and (6) pathos or the strength of emotional appeal elicited by the message.

### *Message context*

Linguists, communication scholars, and scholars engaged in discourse analysis define *message context* as the dimensions of setting and of the given roles, goals, plans, intentions, and *prior knowledge* of the participants (see the reactance antecedent *Forewarning*). A message researcher needs to examine the context for both the speaker and the listener when studying message meaning. A brief description of a VIP message context and the message content follows.

Typically, DWI offenders arrive at their court-mandated VIP and pay a \$20.00 cash fee to support the MADD organization. Afterwards they enter the auditorium. Once inside, DWI offenders sit and listen while victims and families of drunk driving victims present eight-foot high projections of photos of their dead or disfigured loved ones and of crash scenes. During delivery of their message, presenters describe their anguish and paint lurid pictures amid the loss-framed messages that highlight the social costs of drinking and driving. *Loss-framed* messages are designed to emphasize the disadvantages of offenders' failure to comply.

Message context influences function. Message context transfers meaning to a message and contexts vary according to the function served by the communication (Burlison, 1987; Greene & Raney, 2003). In other words, the same communication delivered in a different context may serve a different function. For example, if a peer

lovingly said to a drinker, “Don’t drive,” as opposed to a MADD VIP presenter aggressively demanding the same thing, then the difference between the two contexts might elicit different meanings—interpretations—and serve different functions. A peer message context is intimate and likely presented close in time to the driving decision, often near the car that will be driven. Such a peer message, because it occurs in an intimate setting, may function as a statement of caring and support. A MADD VIP message context is public, censorious, and refers to some future time and place of making the driving decision. From the perspective of functional linguistics (Leckie-Terry, 1995), which is concerned with the way that language functions, it is argued that for MADD VIP presenters, the VIP message functions as punishment and a statement of public censure; it is not intended to function as an expression of care and nurturing. *Public censure* is a construct in reactance theory identified as a variable in this literature review. Public censure is an emotionally intensive message context.

Several researchers (Dillard & Solomon, 2000; Solmsen, 1954) have studied message context and its persuasive influence on a message. Researchers have found context to be like a gate that can either open or close opportunities to persuade. For DWI offenders, the context of the MADD VIP message is one of punishment and public censure. This context may close opportunities to persuade, influencing the offender to be predisposed against, inattentive, and resistant to the MADD VIP message.

Context may also influence a drinker’s attention to an intervention message. At the moment when a drinker is deciding to drive, the context entails social approval that comes not from the MADD VIP presenters but from his drinking and driving peers. Therefore the context in which a person decides to drink and drive is different from the

MADD VIP intervention context. It is argued that popular culture, television, film, and print media, which tend to glamorize the free exercise of drinking behaviors, influence the context of the offender's decision to drink and drive. For example, some Southern Comfort whiskey television commercials highlight social conviviality amid surreal kaleidoscope visuals that reinforce the link between freedom of choice and intoxication. It is argued that the media (either wittingly or unwittingly) promotes drinking for pleasure and seldom if ever reinforces restraint in drinking and driving contexts.

Pragmatic conversational analysts, though they recognize context as a variable, often fail to consider context in their analyses of meanings (Geis, 1995). Context analysts pursue a suitable and accessible scholarly method for environmental analysis of a message meaning. *Context analysis* is a method of assessing meaning of a message from the environmental context in which it occurs. The environmental context may include body language as well as the physical environment, the chronological environment, and messages that preceded and followed the message of interest (Schefflen, cited in Wertz, 1973). These elements of context are interpreted and understood to create meaning in the course of their relationships to one other (Kendon, 1990). For example, in the present study the relationships between environmental context and other factors were considered in coding message meaning. The immediate context was a large room populated with DWI victims who were privileged to speak and who spoke in confrontational, emotional, and threatening tones and content. Court mandated attendance for offenders preceded the event and court order compliance followed the event. This was the larger chronology of the environment. The environment was also comprised of message receivers, namely DWI offenders. They were seated together in a group, beneath the raised dais of the VIP

speakers, and they were not privileged to tell their stories. The coders who coded the text of the VIP presentations knew these contexts. The coding consisted of matching presenter statements with downward codes such as “I am angry” and “You should change.” There was very little variance between coders and agreement was high in categorizing the meaning of the VIP statements from the perspective of the message receivers.

Hopper (1981) suggested that analysts make use of frame analysis (Goffman, 1974) when analyzing communication contexts. In the present study, the context and frame of reference is reactance theory and empirical reactance research. Jacobs and Jackson (1983) adapted the context analysis method of conversation analysis to consider context as a variable in speech acts. Variables in discourse analysis of context are sounds (intonation), gestures, rhetoric, meanings, speech acts, and turn taking as tactics to gain a strategic goal. These variables offer starting points for the constant comparison analysis of the MADD VIP messages. *Constant comparison* analysis is a process conducted within an inductive method known as the grounded theory method (Strauss, 1987).

In *grounded theory* applications, inductive research is conducted in reverse of the manner in which traditional deductive research occurs. While, at first glance, inductive and deductive methods may appear to be contradictory approaches (Clarke, 2005; Kelle, 2005), it will become apparent upon inspection and comparison that they are two sides of the same coin, that is, complementary avenues to knowledge acquisition.

In grounded theory applications, instead of beginning with a hypothesis, as in traditional science, the first step is to begin with an analysis of the data. These data may have been collected through a variety of data collection processes (Stebbins, 2001). After many re-reads of the data, a process that is referred to as *constant comparison*, key

themes are identified based on their frequency of occurrence and intensity of occurrence in the data. These data themes are conceptualized as codes (Charmaz, 2006; Glaser, 1992; Goulding, 2002; Mey & Mruck, 2007).

After researchers have compared and re-compared the codes to the data, and after engaging in some reflection, these same researchers determine whether the codes are *sufficient in number* and *parsimonious in number*. The researchers determine that the codes adequately describe the data. They determine that codes do not overlap and are not redundant—i.e., the codes must represent unique elements. This process of developing unique and sufficient numbers of codes involves a manipulation of codes. Some codes are merged; while others are split into two or more codes. When satisfied with the foregoing steps, researchers then group codes into similar or related concepts in order to ease manipulation.

From these concept groups, categories are formed. If appropriate, these categories are hierarchically arranged. In the present study, as will be discussed in the methodological design section, categories of archetypical message types were hierarchically ordered from least to most reactance-inducing messages. An archetypical message category was assigned a level of reactance-inducing intensity according to level at which *similar message types* had been found to induce reactance in germane empirical laboratory-conducted research. These previous empirical studies based their categorization of reactance message types upon theoretical reactance antecedents, such as *forewarning* or *anger*. Thus, theory played an important role in determining the labeling of message types, and the hierarchical relationships between message types were determined by previous empirical research.

At this point, it is useful to briefly consider how theory informs empirical research and how the grounded theory method, also referred to as *constant comparison analysis*, was employed in the present study. It was used in this study to identify reactance-inducing message types and their hierarchical order of reactance-inducing intensity. Theory is an explanation of phenomena through description of elements and their relationships. Relationships between elemental categories are discovered, through observations that become theoretical propositions, and through empirical testing of theoretical propositions. The grounded theory approach begins with interpretation of an undifferentiated ground of observations. It ends with an articulated theory about relationships and perhaps a hypothesis. This grounded theory process is the converse of the traditional research process, in which the researcher begins with a theory, forms a hypothesis, operationalizes theoretical constructs as variables, quantifies those operationalizations through frequency or level of occurrence in the data, conducts analysis, and ends with interpretation of the results. In grounded theory, the endpoint is development of theory based on interpretive analysis of raw data.

The two approaches, the traditional inductive method and the relatively newer grounded theory method may be considered as compliments to each other in the same manner that a coin is comprised of two complementary sides. In both inductive and deductive methods, the goal is knowledge acquisition and generation. In the service of knowledge acquisition, both methods are employed in the present study.

#### *Message content*

The present study analyzes *message content* as a distinct variable that contributes to a message's independent location on an ordinal hierarchy, a scale of levels of

*reactance-inducing statements*. Each message within a dataset of VIP messages is analyzed from the perspective of its content and the function that content serves for the message sender. This method has been tested in genetic trait analysis to overcome the limitations of message noise, or variance, and missing data (Kelly & Di Marzo Serugendo, 2009).

### *Message function*

The same message can vary in function, depending on whose perspective is being considered, whether the perspective is that of the message sender or that of the receiver. For example, in the VIP, variability in message function is demonstrated as follows. The MADD VIP message serves a cathartic mood-elevating function for presenters (Mercer, 1990), while lowering the mood for the receiver (Woodall, Delaney, Rogers, Wheeler, Rao, Polascek, & May, 2006). The present study investigates whether participants had significantly lowered mood levels following high-reactance VIPs where a high *proportion of reactance-inducing statements* were delivered.

### *Message intensity*

*Message intensity* is the degree to which the message sender's attitude deviates from neutrality (Bowers, 1963; Hamilton & Stewart, 1993). The intensity the message sender uses to deliver a message is important to persuasive message analysis; it can increase either positive or negative message effects in the message receiver (Buller, Borland, & Burgoon, 1998), depending on whether the message has a happy spin (positive valence) versus an angry spin (negative valence).<sup>8</sup>

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<sup>8</sup> A *valence* is a directional indicator. Valence is an adjective that indicates a noun's placement on a continuum from negative to positive. For example, if a message is negatively valenced then it has inherent qualities that place it in a negative context.

Degree of message intensity is related to the degree of emotion, the strength of aggression, and the opinionatedness displayed by the message sender (Burgoon, Pauls Denning, & Roberts, 2002). The degree of *aggression* expressed by the message sender is an intensity-related construct that has an influence on persuasion (Burgoon, 1989, 1990). In other words, the message sender's intensity of expression influences the persuasiveness of a message (Miller & Lobe, 1967).

Language intensity may have long-term treatment effects (Buller, Burgoon, Hall, Levine, Beach, Buller, & Melcher, 2000). For example, if the victim presenters in the MADD VIP presentations express their messages with highly emotional intensity and anger-evident aggressiveness, then they may induce a reciprocating strongly emotional effect on the DWI offender audience. Dillard and Shen (2005) studied the effect of message senders' language intensity on the outcome, as measured by message receivers' negative reactance. The researchers tested two different levels of message sender intensities: high threat and low threat. They found that the more intense high-threat messages<sup>9</sup> induced reactance, whereas the less intense low-threat messages did not.

A message receiver experiences message intensity differently depending on his stage of behavior change (Buller, Borland, & Burgoon, 1998, Rogers, 2003).<sup>10</sup> Buller et al. found people in the "contemplation" stage of behavior change are receptive to a dissonant message.<sup>11</sup> Highly graphic and intense messages positively influence these

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<sup>9</sup> A *high-threat message* is defined as a message that the receiver *perceives* as threatening, whether or not the message sender intends the message to convey a threat.

<sup>10</sup> *Stage of behavior change* refers to Prochaska and DiClemente (1984) stages of change model (this is the colloquial name for the model; Prochaska and DiClemente's official name for the model is the *transtheoretical model*).

<sup>11</sup> *Dissonance* is an uncomfortable state that occurs when one recognizes a discrepancy between one's beliefs about reality and a contrary observation.

contemplation-stage offenders. These contemplation-stage<sup>12</sup> drinkers' results equate to the Wells-Parker et al. (1991) "moderate" offenders. On the other hand, people who are not receptive to a message (career drinkers) view highly graphic and intense messages as cognitively dissonant (Festinger, 1957; Festinger & Carlsmith, 1959). *Dissonance* prompts nonreceptive offenders to consider a message as inappropriate. This dynamic may explain why career drinkers react negatively to the MADD VIP message. For nonreceptives, a graphic and emotionally intensive message induces psychological reactance.

#### *Message frequency*

Frequency is the number of times message content occurs (Straus & Corbin, 1990). In the methods section, procedures for quantifying the frequency of reactance-inducing statements are discussed, as well as the quantification of proportion of *reactance-inducing statements*. Dillard and Shen (1995) report the *proportion of reactance-inducing statements* as the frequency of *reactance-inducing statements* divided by the number of statements.

#### *Message frequency and intensity: a combination of metrics*

*Reactance-inducing statements* can be evaluated by a measure that combines level of intensity with frequency (Dillard & Shen, 1995; Strauss & Corbin, 1990). Strauss and Corbin recommend dual consideration of frequency and intensity because an infrequent message that is intense may deliver a strong affect. Dillard and Shen noted that intensity

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<sup>12</sup> According to the transtheoretical model, [delete "also known colloquially as the stages of change model,"] the *contemplation stage* is a stage in behavior change when the patient begins to consider changing their behavior (Prochaska & DiClemente, 1984).

of effect covaried with intensity of message. For example, an angry message was more reactance inducing than a pleasant message.

In the present study, both frequency and intensity of *reactance-inducing statements* were measured for 15 VIP intervention groups. The intervention groups were categorized into two levels, *low* versus *high reactance-inducing VIPs*, depending on the levels of *intensity* of *reactance-inducing statements* and *frequency* of *reactance-inducing statements*. A third comparison group that had not been exposed to the VIP reactance-inducing messages consisted of the control group, DWI School Only, from the original Woodall et al. (2007) study. DWI recidivism outcomes were then regressed onto these three groups: (1) no reactance-inducing VIP exposure (DWI School Only), (2) low reactance-inducing VIPs, and (3) high reactance-inducing VIPs. Support for the use of categorization to increase robustness of data from variance and noise, and to account for missing data as in the case of no treatment is found in the study of genetic trait analysis by Kelly and Di Marzo Serugendo (2009), discussed in detail in chapter 3, Methodology.

If there were no differences between any of these groups, then reactance-inducing statements would not make a difference in intervention outcomes, as measured by DWI recidivism. The categorization of groups into *no reactance*, *low reactance*, and *high reactance* dosages, and the regression of DWI recidivism outcomes onto these three levels of reactance-inducing dosages, enabled an evaluation of whether a change in reactance levels was consistent with a change in DWI recidivism.

#### *Message pathos*

*Pathos* is the strong emotional appeal in a message that a speaker uses to evoke emotion in a receiver. Strong emotional appeals typically incite high levels of arousal

(Kuhl, 1983) and can sometimes favorably influence social judgments (Bless, Bohner, Schwarz, & Strack, 1990; Bodenhausen, 1993). At other times, researchers (Baron, Inman, Kao & Logan, 1992; Janis & Feshbach, 1953; Jepson & Chaiken, 1990; Liberman & Chaiken, 1992) found strong that fear appeals (Rogers, 1983) incite a boomerang or backfire effect. A backfire occurs when the receiver is nonreceptive to the sender's intended effect. He or she discounts the message and behaves in a way that is contrary to the expectations of the source of the message. Fear appeals fail if they are too strong. If receivers feel threatened by a message they may become defensive, disagree with the message, lampoon it, and refuse to think rationally about the message. Through ridiculing and posturing, they exceed neutrality; they validate their oppositional behavior, even though they may base their behavior on an irrational interpretation of the message.

#### *Message decay rate*

*Message decay rate* describes the rate of continuous decline for a message effect, whether the message receiver is an individual offender or a system or group of individual offenders. Message decay is studied in terms of a message's *broadcast* strength and longevity. Decay of messages has been modeled employing artificial neural networks to predict radio field strength (Leros, Alexandridis, Dangakis, & Kostarakis, 1998). Message decay has been studied extensively in biological science as information loss, usually involving RNA transcription or message loss due to mRNA mutations (Nicholson, 2003). Message decay is also studied in computer science regarding the rate at which a message quality is lost due to the dropping of bits in a data packet (Borade, Nakiboglu, & Zheng, 2008), or when nonparametric data is converted into parametric data using genetic algorithms (Xiao, Goebel, & Eklund, 2006).

One of the more interesting features of message decay is that such decay might function to increase system fitness. Message decay, the modeling of which can sometimes involve use of genetic or decentralized algorithms, is thought to improve resilience and fitness of a system by replacing old information with newer information to increase accuracy and environmental sensitivity. In one such case, decay has been found to be useful in traffic simulations where the feedback from the environmental system to the individual is enhanced by message decay as discussed by Kelly and Di Marzo Serugendo (2007).

The Persistence parameter controls the period of influence of the message, once the time is past the message is removed entirely. Also older messages exert lesser influence than newer messages (a 28 second old message is inferior to a brand new arrival as the new arrival more correctly reflects prevailing conditions). (p. 9)

Message decay in communication research from 1949 to 1989 was limited to short time frames ranging from hours to seven weeks. Five weeks was the mean length of the research conducted on message decay during this period (Allen & Stiff, 1989). Since 1989 there has been extensive research on message decay by Pfau and colleagues (Pfau, 1991, 1992, 1997; Pfau & Burgoon, 1988; Pfau et al., 2001; Pfau et al., 2003; Pfau et al., 2004; Pfau et al., 2005; Pfau et al., 2006; Pfau, Kenski, Nitz, & Sorenson, 1990; Pfau & Van Bockern, 1994). Pfau and colleagues have studied message decay ranging from one to three weeks, at times in conjunction with the *inoculation effect*. Message inoculation works like a medical inoculation with a weakened virus. In message inoculation, a weak undesirable message is used to inoculate the receiver against being persuaded by subsequent stronger arguments. After inoculation against undesirable messages, the

intended message is more likely to persist and not decay as quickly. In fact, Pfau and colleagues found that weak refutational messages could inoculate the receiver against multiple attacks against the desired message. Inoculation with a weak undesirable refutational message has been found to protect a desired message from decay more effectively than messages that support and reinforce the desired message (Ivanov, Pfau, & Parker, 2009).

As an intervention message becomes less relevant to the receiver, it becomes old. Old information is allowed to decay, replaced by new, more relevant, information. The new information fits the message receiver's current interpretation of the environment. If the message receiver's interpretation of the environment is limited to sensation seeking, then the salient message is "drinking is pleasurable and driving is expedient." This new message is privileged, while the older MADD VIP message, "I should not drive drunk" is allowed to decay. Thus the rational MADD VIP message decays, and the reckless drinking and driving message in effect comes to replace it.

As discussed earlier, a decision to drive drunk, attractive because of its short-term expedience, is an example of alcohol myopia (Steele & Josephs, 1990). The drunk driver's cognitive field of vision, is constrained by alcohol myopia. The drunk driver chooses a short-term solution instead of considering the long-range evolutionary advantage of not driving drunk.

#### *Reactance Theory Variables Involving Message Senders*

Reactance theory defines four antecedents to the state of reactance that are related to the message sender. These antecedents to reactance are "strong intent to persuade,"

—forewarning,” —confrontation,” and —public censure” (Brehm, 1966). These four antecedents are described in this section.

### *Strong intent to persuade*

Festinger and Carlsmith (1959) found that the less inducement or strength used to achieve compliance, the more effective the message. Similarly, Brehm (1966) states that the stronger the assertion of a message used to achieve compliance the less effective the message. These two views support each other. They agree with the results of a complex systems study of strength of persuasive messages during a group persuasion process (Medina et al., 2005). The study found that a weak (i.e., low-inducement) persuasive message was more effective than a strong (i.e., high-inducement) message. Persuasive message strength in the model, when it replicated the data signature of the *in vivo* group, was found to be 1/37<sup>th</sup> the strength of the group member variance from the mean (Medina, et al., 2005).

A strong message is not necessarily qualified in the literature as a high-reactance high-threat message. In the literature, a *strong message* is more often referred to as a *strong argument*. The contradiction in definition of what constitutes a strong message has perplexed researchers and caused confusion in message effects literature. The definition of what constitutes a strong message has varied. Not only do researchers differ in the definition of what constitutes a strong message, but it also has been found through manipulation checks that study participants can respond differently to the same —strong message.” Thus, message effects studies tend to lack external validity, due to inconsistency with each other in the definition and operationalization of the theoretical construct —strong message.” When researchers fail to conduct a manipulation check to

determine whether all of their participants define “strong message” similarly, then internal validity suffers in those studies.

This internal and external validity problem in message effects research has produced confusion in the literature. For example, a *strong message* has been found to have no effect in some studies, while a *weak message* has demonstrated a strong message effect in other studies. The source of perplexity is in the inconsistent definition of what constitutes a *strong message* across studies, and inconsistency in what constitutes a *strong message* across study participants within the same study. As will be discussed next, what constitutes a *strong message* can vary according to participant *demographics*, participant *personality traits* (McMillen, Adams, Wells-Parker, Pang, & Anderson; 1992), and in the case of the present study, participant prior *conditions*.

Updegraff et al. (2007) found that a weak rather than strong message had greater influence on health behavior, although in the discussion of results the authors downplayed their perplexity about the counterintuitive results, explaining that results did not confirm their theoretical perspective. In puzzling over their outcome they made a call for more future research. One possible reason for their counter-attitudinal finding may be that researchers assumed their participants would regard a journal article as a stronger argument than anecdotal evidence. However, this assumption was not tested in a manipulation check.

In a related study, Freedman (1965) studied the strength of message (high/low threat) and the resulting compliance level among boys from the second, third, and fourth grades. He found that those who complied had heard a mild message, consistent with a

weak intent to persuade. Those who did not comply were more likely to have heard a strong message, consistent with a message source's strong intent to persuade.

Brehm and Cohen (1962) researched the variable "strong/weak intent to persuade" with an essay-writing experiment. They used weak monetary incentives to impel undergraduates to write counter-attitudinal essays.<sup>13</sup> Brehm and Cohen then gave an attitudinal evaluation questionnaire. They found that participants who received the lower (weaker) monetary incentives were more favorably disposed to changing their opinions. This finding supported Festinger and Carlsmith's (1959) research on cognitive dissonance: a person is likely to change their attitude when the reward for making a counter-attitudinal statement is low, especially if the topic is of low import to them. This phenomenon is termed insufficient justification. *Insufficient justification* explains how actors cannot justify changing their mind for a low reward. A low-value reward causes a state of dissonance. Their beliefs are disconfirmed by their own actions. *Insufficient justification* describes their reasoning that they must have wanted to change their beliefs anyway, and so they do.

The current literature (Ziegler, von Schwichow & Diehl, 2005; Updegraff, 2007) often equates a strong message with a strong argument and operationalizes a strong argument as an expert argument. Investigators who are academics often use a journal article as an exemplar of a strong argument. For instance, experiments are often conducted using college students as participants, and researchers typically expect that student subjects will privilege a journal article as expert and as making a stronger argument than anecdotal evidence. In fact, Ziegler, von Schwichow, and Diehl (2005, p.

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<sup>13</sup> A *counter-attitudinal message* disconfirms a person's current attitudes. It opposes the beliefs upon which those attitudes are based.

648) found in a manipulation check that ~~the~~ majority of students were estimated to rate the product more positively given the attractive source ( $M = 4.83$ ;  $SD = 1.37$ ) as compared to the expert source ( $M = 4.25$ ;  $SD = 1.42$ ).” This finding contradicts the assumption that the college students find the journal article as an expert source and a stronger argument, and points to a threat to internal validity. Thus, when evaluating results of experiments on strong/weak messages a researcher might consider whether operationalization assumptions could be incorrect. Such threats to internal validity in the experimental design may be avoided by incorporating a manipulation check if it is an experimental design, or a post-hoc message analysis in the case of an *in vivo* field study.

*Affect* is a term used in psychology that is synonymous with *emotion*. In a study where a strong message was claimed to have a significant and positive effect, the message that was tested was not a persuasive message designed to elicit attitude change. Ziegler, von Schwichow, and Diehl (2005, p. 649) tested opinions on shower lotion in an experiment in which the strong argument for a low self-monitor was a journal article. The strong argument for a high self-monitor was an attractive person. The researchers found ~~a~~ significant effect of the strong-weak message contrast,  $b = .35$  ( $SE = .12$ ),  $t(137) = 2.91$ ,  $p < .01$ . Strong arguments ( $M = 4.82$ ;  $SD = 1.06$ ) led to more agreement than weak arguments ( $M = 4.12$ ;  $SD = 1.35$ ). The fact that no other effect involving this predictor variable was found indicates that this was the case regardless of whether these arguments were presented by the expert source or the attractive source and regardless of recipients’ level of self-monitoring.” It must be noted, however, that the strong arguments, regardless of source and function for the message receiver, were not counter attitudinal as is usually the case in health behavior change messages. It might be argued

that an opinion elicited on shower lotion is not representative in face value to a counter attitudinal attitude or behavior change, and this is a flaw of the shower lotion study design.

The effect of message strength may depend on the context of the message. Mitchell, Brown, Morris-Villagran, and Villagran (2001) found that “message strength was positively correlated with attitude, intention and behavior, but was negatively correlated with negative thoughts, and counter arguments.” This study may explain why researchers find that high message strength increases likelihood of attitude and behavior change in some cases, while in other cases involving counter attitudinal behavior change a strong message decreases compliance.

A drawback to the current literature on message strength is that the messages were created and manipulated in the artificial environment of a laboratory setting. The authors equivocated in their discussion sections, proposing that results (which had not achieved significance) could have been caused by researchers’ choice of message content and how the message was manipulated in the experimental design. Their nonsignificant results could also be a function of use of self-reports to obtain behavioral outcome data. Further, the experimenters had created messages that they themselves had judged should be strong or weak. Whether researchers correctly judged what constituted a strong message was not tested through an experimental manipulation check. Nor did the researchers conduct a content analysis using independent coders. Independent coders are coders who code the same texts independent of consulting each other; they must consistently agree on operationalizations of what constitutes a strong/weak message.

Coding, or content analysis of messages, is a common method of analysis in communication message effects studies. Another common method of categorizing messages in message effects studies is the operationalization of theoretical constructs where a message is constructed by the researcher to represent theoretical traits at the message face value. The present study hybridizes these two approaches in such a way as to create an approach that is neither one nor the other. The advancement is something new, with qualities, limitations, and benefits of both qualitative (where continuity and dependence are salient) and quantitative epistemologies (where discretion and independence of elements are salient).

The resulting method belongs to neither paradigm because it is paradoxically both continuous (wavelike) and discrete (particular). In its wave form, data are analyzed as continuous. Yet proximal continuity threatens alpha inflation. Alpha is the probability of perceiving a relationship between data that extreme or greater, given the data, and given one flip of the coin. If the data are viewed (analyzed) more than once, then the coin is flipped more than once. Data are viewed from more than one perspective and chances of perceiving relationships increase. Alpha is the probability that a singular analysis, a singular flip of the coin, will observe relationships between data. Threat of alpha inflation occurs because the greater the number of times that the same data points are perceived from different analytical perspectives, the higher the probability of interdependence of analytical observations. This logic, taken farther, suggests that when data are continuous, as number of analyses increase, the probability of unrelated observations decrease and probability of cross-observational or dependent relationships increase. As the probability of seeing interdependent *relationships* increases, the discretion of the alpha, the singular

view, is compromised. The integrity of the alpha is dependent upon independence of observations and a singular roll of the die to find a relationship between those observations. Paradoxically, accurate analysis of continuous data is threatened by a continuous view. The view must be singular, discrete.

Paradoxically at the other extreme, accurate analysis of discrete data requires continual repetitive views of the units of analysis. These repetitive reanalysis' are encouraged. The process is to flip the coin many times and increase the probability of seeing interdependent relationships. This continuous process of analyzing discrete units is referred to as *constant comparison analysis* (Straus, 1987; Straus & Corbin, 1990). The integrity of constant comparison analyses of discrete data is threatened by a singular view. The view must be constant and continuous.

It is interesting to consider how each paradigm's identity is strengthened by adopting paradigm of its opposite for its form of analysis. The correct approach to analysis of quantitative continuous data analysis is discrete. The correct approach to analysis of qualitative discrete units of data is continuous. Each methodological paradigm embraces its opposite as a means to reflect upon and make meaning out of itself.

Each epistemology employs its opposite for reflection. It is therefore no great leap to understand that a viable approach to analysis of data can be simultaneously both continuous (quantitative) and discrete (qualitative). This study considers the fruit of a cross-epistemological confluence of qualitative and quantitative analyses. The delta region of confluence between paradigms, where boundaries fruitfully mix and overlap has been termed a *heterogenous zone* (Rogers, Medina, Rivera & Wiley, 2004). Historically, economically, linguistically, and scientifically (such as the dawning

observation that light is paradoxically both a particle and a wave) where differences conflate, scientific innovation is likely to occur and the frontiers of science are pushed outwards into new and previously unconsidered perspectives (Kuhn, 1996).

In Kuhn's spirit of scientific evolution (1996), the researcher conducted a qualitative analysis informed by quantitative analysis. Quantitative researchers had previously operationalized reactance theory constructs as message types with face values tested in terms of continuous dependent values. The present researcher employed those previously-established theoretically defined reactance-inducing message types to unitize the continuous VIP transcripts into units of analysis. The researcher constantly reread and compared the VIP transcripts to identify a consistent definition of a unit of analysis, qualify definitions, and inductively abstracted exemplars of VIP presenter statements that became operationalizations of reactance theory constructs. The researcher organized VIP reactance theory message exemplars into a hierarchical order of increasing levels of *reactance inducing statements* per previous laboratory research, creating a code book.

Independent coders self-trained, using the code book, and separately conducted a content analysis. Coders independently assigned VIP messages to code book categories. The coders independently and consistently agreed on operationalizations of what constituted a strong/weak reactance-inducing VIP message. The researcher

This study advances message effects science by analyzing message strength *in vivo*, in a real life context. The advantage of *in vivo* message effects research is that the messages are created and studied within a naturally occurring context. Message effects research based on naturally occurring messages is more generalizable and useful to message designers than messages that have been created and manipulated in an artificial

laboratory environment. Another advantage offered by the present study is the certainty under which the message effect has been evaluated. An outcome behavior is a more certain measure of message effectiveness than a self-report, which can be biased by a participant's desire to please the researcher or represent themselves in a more positive light than was actually the case. In other words, subjective and unverifiable self-reports are less likely to be accurate than objective measures that accurately document a behavior.

The present study employs an objective measure of outcome behavior, documented subsequent DWI arrest records, as the source for outcome data. Such an objective behavioral outcome measure is called hard end-point data. The designation of message strength, whether a particular type of message was strong or weak, was not a speculation by the researcher, but was derived from two independent and successive phases of content analysis by independent coders.

The following section anticipates the methods section. It discusses how results of experiments on message strength may be more reliable when the operationalizations of levels of message strength have been based on ratings produced by multiple independent coders. In this dissertation, measurement of message strength began with a qualitative analysis that was directly tied to reactance theory, followed by multiple types of quantitative analysis

The methods section is foreshadowed here in order to contrast the present study with previous message effects research. In the present study, data were captured in a real life situation where recurring *reactance-inducing statement* themes and their message strength were recorded and transcribed. During qualitative constant comparison analysis,

these statements were compared with archetypical statements that had been empirically tested and results reported in the literature on reactance theory. The outcomes were a system of archetypical message themes that were hierarchically ordered by level of reactance-inducing intensity as reported in the literature. Qualitative analysis outcomes were next synthesized and parsimoniously refined to narrow the themes into eight hierarchical reactance codes, ordered by their level of reactance-inducing intensity. Definitions and archetypical exemplars were developed for each code.

The next methodological step consisted of content analysis, a quantitative method. During this step, eight phase 1 coders would have their agreements measured by a probabilistic interrater reliability measure. The coders redundantly analyzed overlapping text samples from VIPs. They then matched archetypical message types to statements occurring in the VIP text samples. Because the archetypical message types were arranged in order of level of reactance-inducing intensity, as reported by previous research, the result of this operation was to code VIP statements by level of reactance-inducing intensity.

The intensity level of a message, as determined by coders' placement of the message on the hierarchical reactance-inducing intensity scale, enabled assignment of a numerical ordinal value to each VIP message. See a detailed exposition of the reactance-inducing intensity scale in Table 3-4, with coding examples illustrated in Table 3-2. As a result, each message was coded by a code from 1-8. A code of 1 signified a non-reactance-inducing statement. A code of 8 signified a highly reactance-inducing statement. [insert paragraph break here]

The frequency of occurrences of different intensity levels for reactance-inducing messages within a VIP were summed for each VIP. For example, the level of reactance-inducement for a VIP with 8 instances of level 1 (happy) message types and 20 instances of level 8 (angry) message types would be divided by number of statements in order to calculate the average reactance-inducing intensity for that VIP. This would be calculated as follows:  $((8 * 1) + (20 * 8)) / 28 = (8 + 160) / 28 = 168 / 28 = 6$ . The average reactance-inducing intensity of this VIP would be 6, corresponding to a high-reactance-inducing intensity, on the average, for that VIP.

The following would be an example of a low-reactance-inducing VIP. A VIP with 20 instances of level 1 (happy) message types and 8 instances of level 8 (angry) message types would be divided by the number of statements in that VIP. This would be calculated as follows:  $((20 * 1) + (8 * 8)) / 28 = (20 + 64) / 28 = 84 / 28 = 3$ . The average reactance-inducing intensity of this VIP would be 3, corresponding to a low reactance-inducing intensity, on the average, for that VIP. The interrater reliability for phase 1 coders was calculated and, though adequate, the variance and the marginals indicated that more reliable measurement of average levels of reactance-inducing statements for the VIPs could be obtained by increasing the attentiveness and focus of the coders.

In phase 2 of the content analysis, two coders from phase 1, the two most attentive, focused, and consistent coders, the two coders who scored the highest interrater reliability during phase 1, were asked to each recode the entire data set of 2,021 VIP messages. These two coders consented to perform the task. They each recoded the entire data set for reactance-inducing message frequency and intensity, with a high level of interrater reliability. Thus, a measure of VIP message strength was independently

quantified through coder agreement on intensity of VIP reactance-inducing statements. This quantification of message strength was more objective than would have been the case should the researcher have guessed at whether an average message in a VIP was strong or weak, of strong or weak reactance-inducing intensity.

*Forewarning* is an alert that another or different message is coming. Forewarning can be a positively valenced communication behavior, such as when a speaker outlines a speech in advance to help the audience better prepare to receive the content that is coming. This is called “sign posting.” Sign posting for a receptive audience is positively valenced. However, in the context of reactance theory, forewarning is a type of sign posting that is negatively valenced. Petty and Cacioppo (1977) found participants’ reactance increased if researchers forewarned them they were going to receive a counter-attitudinal message. Brehm’s reactance theory (1966) accords with Petty and Cacioppo’s finding. Forewarning is a transitional statement, indicating a change in the direction of the conversation is about to occur.

Sparks (1991) controlled for forewarning by measuring arousal and the emotional affects of distress and delight. He found no interaction effect between forewarning and gender of the participants. In another study, Sparks (1989) studied the interaction between high/low levels of *forewarning* (his manipulated independent variable), and *preferred coping style* (a preexisting trait). He assessed *preferred coping style* using the Monitor Blunter Style Scale, a scale that assesses information-seeking and avoidance-coping styles. Sparks found that *high self-monitors* preferred forewarning at *high* levels while low self-monitors preferred forewarning at *low* levels. Low self-monitors reacted negatively if forewarned.

In the MADD context, a message sender's forewarning is a cue to an audience they are going to receive a negative message intended to "reduce behavioral freedom" (Brehm, 1966) to drink and drive. Forewarning, that an undesirable message is coming, is operationalized with statements such as, "I am going to tell you about how a drunk driver ruined my life." Another typical MADD VIP forewarning statement that signals a transition from opening pleasantries to a down-to-business confrontational tone is, "That was before a drunk driver ran into her and stopped her life." In the present study, forewarning is defined as a transitional statement that indicates that the next message is going to be sad, unwelcome, or confrontational.

### *Confrontation*

*Confrontation* is a type of counter-attitudinal message. A speaker uses confrontation with the intention of reversing the listener's beliefs and attitudes. However, strong confrontation is bound to invoke a negative response. Miller (2000) and Miller, Benefield and Tonigan (1993) found that reactance increased when the persuader's language was confrontational. This finding suggests that an explanation for increased drunk driving among MADD VIP audiences might be found in the confrontational nature of the MADD message.

Strong confrontational messages invoke a defensive response as a listener's countermeasure. Drunk drivers have been known to be defensive, demonstrate avoidance, and they have been known to minimize the value of the counter-attitudinal VIP message. Evidence of drinkers' minimalization and ridicule of MADD is presented in the discussion section of this dissertation. These reactions to MADD may operate as a

countermeasure, serving to validate the drinking culture and insulate drinkers from the discomfort they experience from MADD's confrontational message.

Is MADD's message confrontational? MADD spokesperson Lord (1990) advocates the following tactics for VIPs:

- (1) Exposing offenders to the consequences of drinking and driving
- (2) Helping offenders move beyond focusing on their own "bad luck"
- (3) Serving as a first step in breaking down the denial of alcoholics/drug addicts

Miller, Benefield, and Tonigan (1993, p. 455), define MADD's tactics as confrontational because MADD advocates "a hard-hitting, directive, exhortational style intended to overwhelm robust defensive mechanisms" of the DWI offender. As just suggested, it is often the case that confrontation, of which there are many levels, is an antecedent to reactance (Brehm, 1966).

Confrontation may take many forms. A confrontational message may threaten a loss or invoke fear. Messages that frame a behavioral consequence in terms of loss are called *loss frame messages*. A loss frame message may point out that the message receiver will lose a cherished freedom, such as the freedom to drive legally. A loss frame message may point out that the message receiver will suffer incarceration, which is again associated with loss of freedom, obviously a negative outcome.

Fears of loss and negative outcomes are inflamed by messages that appeal to, or target, those very fears. Messages that appeal to a listener's fears are called *fear appeals*. A fear appeal may target any fear. During MADD VIPs, presenters target audience members' fears that they might lose their freedom to drive legally, or their freedom to move about freely, by virtue of incarceration. MADD's loss frame messages and fear

appeals threaten loss of freedom, and in this instance *loss of freedom* is a reactance antecedent (Brehm, 1966).

Both loss frame messages and fear appeals have been studied extensively by Witte and colleagues (Witte & Allen, 2000). Witte and colleagues have found in general that fear messages are denied, ignored, or rationalized as irrelevant when the message receiver does not possess the ability to avoid the feared event. If a message receiver does not feel efficacious<sup>14</sup> in controlling their circumstances to avoid the feared loss, then they rationalize that the message is unimportant or does not pertain to them. The rationalization “this message does not apply to me,” is a form of *fear control*. While in a state of *fear control*, the message receiver may dismiss or deny the probability that the feared event will occur.

Fear is uncomfortable. Fear control may take the form of seeking comfort, especially the comfort provided by the associated undesirable behavior. Therefore, undesirable behaviors may be unwittingly reinforced by fear appeals. For example, a DWI offender, fearing incarceration, and feeling unable to control the drinking behavior, may seek comfort by increased drinking. Drinking more, increasing likelihood of increased drunk driving, may be the only effective way a drinker knows to control fear.

*Fear control* may be an intervening state between the fear appeal or loss frame message and the reactance behavior. The literature on *fear control*, *fear appeals*, and their interaction with *loss frame messages* is noted here, but will not be further considered because the body of fear appeal and loss frame literature overlaps with only one of seven reactance antecedents discussed in the present study, *confrontation*. Further, the literature

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<sup>14</sup> *Efficacy* is a person's believe that he or she has the ability to avoid or control an event.

on fear appeals and loss frame messages offer a narrower in scope of explanation of the MADD VIP message effect than does reactance theory. The fear appeal literature explains why a message receiver might feel defeated and make *no change* in behavior. Reactance theory explains why a message receiver would *increase* practice of the undesired behavior following confrontation, loss frame messages, and fear appeals.

### *Public censure*

*Public censure* is a kind of public scolding. It is a face threat that often includes the possibility of continued public shunning, penalties, and sanctions. *Public censure* is experienced when one's public image is assailed in a public forum. A *face threat* is experienced when one feels intimidated or embarrassed in front of others.

The confrontational nature of public censure is likely to invoke the typical reaction to confrontational messages: denial, rationalization, and a desire to seek comfort and avoid compliance. Face threats are confrontational. High face threat, or a high degree of public censure such as occurs in MADD VIPs, makes for low compliance and increases the likelihood of reactance (Brehm, 1966).

Threat of public censure may be a confounding variable to “strong/weak intent to persuade.” If an authority (representing public norms) is involved in the experiment, a strong intent to persuade demonstrated by the authority offering more money (\$20) to tell a lie is more effective than a weak intent (\$1) from the same person. Perhaps the subject complies more under strong inducement to please the authority and avoid public censure.

It may be that an interaction between authority (invoking a subject's desire to avoid public censure by that authority) and level of inducement (high or low) depends

upon the level of subject's self esteem and whether, or by what degree, they feel vulnerable to public censure.

In a replication of Brehm and Cohen's (1962) essay-writing experiment, Worchel and Brehm (1970) found the greatest degree of attitude change occurred for college student participants who were paid the largest amount of money. An authority, a college professor, paying large amounts of money, may be construed by the students as indicating a strong intent to persuade, and they may comply simply to avoid censure.

In an interesting convolution of circumstances, Worchel and Brehm (1970) found that larger payments of money invoked greater degrees of attitude change. This contradicted Brehm and Cohen's (1962) earlier findings that lower payments evoked the greater attitude change. What factors explain the difference in these results, obtained by the same researcher (Brehm) after an eight-year lag?

Contradiction between the two sets of findings must first be considered by examining the differences in the researchers' experimental designs. Experimental bias, in this case the influence of the researcher upon participants, was controlled in Worchel and Brehm's (1970) design. The researcher who evaluated participants did not know whether the person being evaluated had received a large or small payment. Because the evaluator had no way of identifying which participants would confirm the evaluator's personal expectations, the evaluator could not unwittingly influence evaluation results. An evaluator who does not know to which group a participant has been assigned and cannot unwittingly bias evaluations to confirm their own subjective expectations conducts a "blind evaluation." This type of study design is referred to as a blind study.

In Brehm and Cohen's eight-year earlier study (1962), the evaluation process was not blind. The evaluator knew which participants had received the smaller sums of money, and the evaluator expected that smaller sums (weak inducement) would evoke the most change. It cannot be ruled out that the researcher's bias toward expecting that smaller rewards would invoke bigger change,<sup>15</sup> resulted in evaluations that the lower-paid participants changed the most. The highest payment evoked the most attitude change when the attitudinal evaluator did not know which payment (large or small) the participant had received.

Compliance with an authority figure (researcher/persuader/high-ranking professor/evaluator) may be a result of the subject's wish to avoid public censure, coupled with with the amount of money (\$20 versus \$1) that the experimenter offered as an inducement. Worchel and Brehm (1970) explained that the reason their results conflicted with the Brehm and Cohen (1962) results could be due to the confounding effect of "communicator influence" upon "message content" (Hollander, 1971). *Communicator influence* might be interpreted as authoritative influence, or fear of public censure from that individual. In other words, Worchel and Brehm believed that Brehm and Cohen's study suffered from evaluator bias and was thus an inappropriately designed experiment.

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<sup>15</sup> Festinger and Carlsmith's (1959) well-known experiment from three years earlier supported the argument that *insufficient justification* for a behavior change would cause dissonance result in greatest compliance. Festinger and Carlsmith interpreted their low-inducement/greater-compliance results solely in terms of their manipulated variable, "level of monetary inducement \$1 vs. \$20." However, a confounding influence, unknown at the time, was that the inducement came from an authority figure. Later research, particularly Stanley Milgram's (1961, 1963, 1969, 1970, 1974, 1976, 1977) series of studies on the greater compliance obtained from a combination of high authority and low inducement, clarified the cause of the effect. Low monetary inducement, lacking a social element in the Brehm and Cohen experiment, is a different type of inducement than a highly-influential authority/social norm interacting with a low-level monetary inducement.

There is further explanation supporting the argument that fear of public censure or face threat accounts for Brehm and Cohen's (1962) results. Rosenberg (1965) argued that participants might have changed their opinions in the Brehm and Cohen experiment because they experienced evaluation apprehension. They may have feared negative evaluation of their choice of a weak reward more than they desired the high reward (Crano & Messe, 1970). Thus, fear of negative evaluation by an authoritative public figure, may be a version of fear of public censure. Public censure may be investigated as a mediating variable in the effect of a strong/weak message (O'Keefe, 2003).

Authoritativeness can have different effects in different situations on different types of people. The aforementioned studies were conducted on college students, usually freshmen, who may be reasonably expected to be less depressed and more resilient than DWI offenders in the MADD VIP audience. In the case of the present study, when one considers the context of loss frame messages, fear appeals, and confrontation during the VIP, it may be more apparent why DWI offenders reacted negatively and, as it were perversely, to the MADD VIP speakers. The discomfort felt during actual VIP public censure (not the hypothetical public censure of Worchel and Brehm's college freshmen), coupled with a high-reactance high-threat VIP message, may have invoked a state of reactance in message receivers.

#### *Reactance Variables Involving Message Receivers*

Message receivers display reactance by behaving contrarily to a request.

Reactance can produce a "boomerang effect" (Hollander, 1971)<sup>16</sup> where the negative

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<sup>16</sup> A boomerang is a curved aboriginal weapon that, when thrown upwards into the sky, returns to the thrower.

force of the message returns and impacts the speaker negatively. MADD presenters who induce increased drunk driving among their audience could be considered to be invoking a boomerang effect. Empirical evidence points to the cause of reactance as a receiver's view that another person is threatening his freedom (Brehm & Cole, 1966; Goranson & Berkowitz, 1966). Reactance, induced after exposure to a *loss frame message*, a message that threatens incarceration and loss of freedom, offers one explanation of why a *loss frame message* would wreak an effect opposite from the desired upon the message receiver.

Reactance has a higher likelihood of occurring if certain aggravators are present. These aggravators co-vary with reactance in a positive correlation. Higher the levels of these covariates, are correlated with higher the reactance outcomes (Brehm, 1966). The following covariates increase reactance:

1. High levels of confidence that one has a right to freedoms being censured/threatened correlate with a high level of reactance.
2. High levels of import of behavioral freedoms being threatened increase reactance.
3. High levels of threat to an important freedom increase reactance.
4. If a speaker states that the listener's other related freedoms are threatened, this statement increases reactance.

A measure is that is available to test reactance is the Hong Psychological Reactance Scale (Hong & Faedda, 1996). These covariates of reactance are now discussed from the perspective of the MADD VIP participant. The original study Rogers, Woodall, Rao, Polacsek, & Milan (1994) did not consider reactance as a variable.

Therefore, the original researchers did not collect data regarding reactance antecedents from the message receiver's point-of-view. However, for the sake of completeness, message-receiver reactance antecedents are included in the present study, as delineated in the sections that follow.

*Message receiver's confidence he possesses freedom to comply or not*

*Confidence in a freedom* arises from previous expression of that freedom. In order for a threat to freedom to induce reaction, a participant must believe, with some degree of confidence, that he or she possesses that freedom. A person is confident he or she has a freedom if either of the two following propositions is true: (a) He or she has experienced a prior personal expression of that freedom, or (b) he or she has witnessed similar others expressing that freedom and therefore expects to be able to behave in the same way. Past exercise of the freedom to drink and drive reinforces a DWI offender's belief that he or she continues to possess the freedom to drink and drive. If the participant has observed peers exercise their freedom to drink and drive with impunity, then these observations reinforce a drinking and driving behavioral norm and reinforces the drunk driving behavior.

Brock (1968) studied the correlation between levels of choice (freedom) and levels of dissonance (reactance). He found the best way to measure the variable "volition" or freedom of choice, was on a continuum, rather than as a discrete variable that measures presence or absence. Brock found that as belief in rights to a freedom increased, levels of dissonance increased if that freedom was threatened.

*Message receiver's perceived import of freedom*

A freedom gains more importance when it is reinforced by one's repeated behavior, the repeated behavior of one's significant others, and the repeated behavior of generalized others in one's social group. The *belief* in the *import* of the freedom to drink and drive is influential on the *behavior* of drinking and driving (Fishbein & Ajzen, 1975).

If the message receivers of the 1994-1996 study perceived the MADD VIP as a threat to their freedom to drink and drive, then according to Brehm (1966) they would react by increasing the exercise of that freedom. They would therefore incur more DWIs following the MADD VIP intervention.

One reason for reactance behavior is the perceived attractiveness of risk-taking and rebellious behavior. Researchers have found that young drinking-driving populations are likely to engage in high-risk driving (McMillen, Pang, Wells-Parker, & Anderson, 1992). Pechmann, Zhao, Goldberg, & Reibling (2003) found that:

Among youths who felt immune to health risks, higher perceived health risk severity was associated with stronger intentions to smoke. In other words, in the context of low perceived vulnerability, stressing health risks could increase smoking's symbolic value as a risk-seeking, rebellious, and thus attractive behavior. (p. 11).

This type of risk-taking profile has been associated with disenfranchised youth who revel in the role of anti-hero. They are susceptible to aspirations of destructive heroism, called the *Herostratos Syndrome* after the Greek iconoclastic youth who sought immortality through destruction (Borowitz, 2005; Cooper, 1977; Harmon, 2000; Stern, cited in Greenberg, 2005; Stohl, 1988; Wright, 1985). Such youth are easily aroused by

risk-taking and antisocial behavior (Burke, 2003; Harmon, 2000; Hoffman cited in Greenberg, 2005; Stern cited in Greenberg; 2005).

*Sign of perceived threat*

*Perceived threat* is the message receiver's recognition that a loss is imminent; perceived threat to freedom can induce reactance. Festinger (1957) operationalized perceived threat to freedom as "the magnitude of dissonance accompanying forced compliance" (p. 92). He found that, as an attitude object increased in importance, the dissonance and psychological reactance increased when possession of that attitude object was threatened. A threat to possession of the attitude object was perceived in a request for counter-attitudinal compliance. The more important the attitude object, such as drinking and driving, the greater the message receiver's perceived threat to freedom on hearing a counter-attitudinal message pertaining to the devastation caused by drunk driving. Brehm (1966) found that when a participant realized the message source had a strong intent to persuade, he or she felt cornered. As the perceived threat to freedom increased, the likelihood of reactance increased.

As discussed regarding the previous variable *strong intent to persuade*, a high-threat correlates with low compliance (Freedman, 1965). Similarly, Brock (1968) found that a higher perceived threat to freedom to perform an action (such as driving while drunk), coincided with higher reactance (increased drunk driving). Brock measured reactance as dissonance and found that when high levels of perceived freedom were present, there were also present higher degrees of dissonance and reactance upon perception of a counter-attitudinal message.

*Message receiver's belief that MADD threatens other freedoms*

The MADD VIP message receiver, upon hearing that MADD is threatening his freedom to drink and drive, may deduce that MADD is also threatening related freedoms. For example, if MADD says one cannot drink and drive, and one drives to favorite drinking places, then MADD is reducing one's freedom to drive in general. Typically, drinkers drive to several drinking locations during one drinking episode. The MADD VIP anti-drunk-driving message threatens the freedoms to drive, to drink, and to both drink and drive.

According to Brehm (1966) an offender's belief that a MADD speaker threatens related freedoms would increase that offender's reactance. For example, MADD VIP audiences would have a high degree of reactance if they were confident that they possessed the freedom to drink and drive without consequence. They would have a high degree of reactance if they had been arrested (freedom threatened) when they exercised their freedom to drink and drive in the past. They would have a high degree of reactance when they had observed others in their social network also exercising freedom to drink and drive without confidence.

It is reasonable to propose that DWI offenders could have a high degree of reactance if they think a MADD presenter threatens their freedom to drink and drive through warnings of car impounds, sanctions, incarceration, loss-framed messages, and fear appeals. Such would be the case when, as often occurs during the VIP, a MADD presenter warns that drunk drivers will lose their drivers' licenses. They will respond with a high degree of reactance if reactance aggravators are present: (a) A MADD presenter forewarns that a negative, counter-attitudinal message directed to dissuading offenders

from drinking and driving is imminent; (b) listeners sense that the MADD presenters have a strong intent to dissuade them from drinking and driving; (c) the MADD presentation takes place in a public context where MADD presenters portray DWI offenders as villains in public presentations—invoking face threat; and (d), the MADD presenters exhibit a confrontational approach to alcohol use and abuse.

DWI offenders may present reactance if Brehm's four reactance antecedents are present: (a) DWI offenders have a high degree of confidence in their freedom to drink and drive. (b) DWI offenders place an import on the freedom to drink and drive. (c) DWI offenders believe MADD presenters threaten other freedoms. (d) DWI offenders believe that MADD presenters imply that courts may reduce related freedoms, such as the legal right to drive. Considering VIPs from the viewpoint of DWI offenders helps explain how VIPs can introduce and inflame reactance that increases drunk driving.

Reactance theory explains why VIP audiences engaged in more drinking and driving following and in spite of the MADD VIP anti-DWI messages (Woodall, Delaney, Rogers, Wheeler, Rao, Polascek & May, 2006). This trend, though nonsignificant, pointed toward MADD VIP intervention failure. Reactance theory may explain the failure of the intervention from the perspective of a communication message effect, as discussed below.

Researchers use reactance theory to explain the negative outcomes of intervention campaigns. Dillard and Shen (2005) discussed how reactance explained the failures of health campaigns. They also discussed how to measure reactance. Dillard and Shen found that "reactance can be operationalized as a composite of self-report indices of anger and negative cognitions" (p. 144). A message receiver who is reacting negatively to an

intervention message will report significantly lowered mood state. Reactance causes lowered moods (Hong & Faedda, 1996). Rogers, Woodall, Rao, Polascek, and Milan (1994) and Woodall, Delaney, Rogers, Wheeler, Rao, Polascek, and May (2006) measured a negative mood change among MADD VIP participants following receipt of a strong MADD message to stop drinking and driving. The present study examines whether the *level of reactance-inducing statements* and *proportion of reactance-inducing statements* predict a pre/post direction of mood change. In other words, will reactance antecedents, as present in VIPs, presage a change in a negative direction on an *emotional change score*, where the emotions measured are anger and negative cognitions?

Negative cognitions, such as thoughts of negative outcomes that can result from antisocial behavior, can exacerbate a sociopath's pathology. When threatened with loss of freedoms, sociopaths have been known to increase socially undesirable behaviors. For example, if threatened with consequences of driving drunk, then they may drive drunk more often to assert their freedom to do so. If the VIP message receivers, in the 1994-1996 original study, believed that VIPs threatened their freedom to behave as they chose, then reactance theory (Brehm, 1966), would explain why they would drive drunk more often. According to reactance theory, offenders would drink and drive *more* to deny threat of loss of freedoms and to demonstrate their immunity to loss of driving and other cherished freedoms. The freedom to drive drunk is just one of several related freedoms that a drunk driver enjoys. Other related freedoms are the freedom to possess and use a driver's license, freedom from incarceration, freedom to enjoy job security, and freedom to enjoy societal approval. Reactance theory explains why threatening loss of driving and other related freedoms would increase a drunk driver's frequency of driving drunk.

*Reactance Theory's Usefulness in Explaining MADD Message Effects*

Burgoon, Alvaro, Grandpre, and Voulodakis (2002) employed reactance theory to explain message effect failures. They found resistance (reactance) to health communication messages was high in subpopulations, such as adolescents, who have a high need to express their freedom. Subpopulations who demonstrated high-reactance behaviors displayed the following characteristics: (a) Reactance-prone subpopulations have a high need for self-determination; (b) reactance-prone subpopulations believe that interveners are attacking their behaviors; (c) reactance-prone subpopulations have a high degree of confidence in their right and freedom to perform the contrary behavior; and (d) reactance-prone subpopulations have a high degree of subjective certainty that they know more on the topic than the message source. Reactance theory can account for the failure of health communication interventions conducted upon subpopulations that have resistance characteristics. As suggested previously, the present study similarly finds resistance characteristics among MADD message receivers.

Reactance theory, a theory that offers a message effects perspective on persuasive communications, can help to explain intervention failures. According to reactance theory, when VIP presenters *forewarn* DWI offenders that they will *confront* them about the negative outcomes to drinking and driving, and warn them about *threats to their freedoms*, then this type of message would likely induce reactance and result in increasing drunk driving. If VIP presenters demonstrate a strong intent to persuade, then this also is a reactance antecedent than can result in increased drunk driving. Presence of reactance antecedents such as *forewarning*, *confrontation*, *threats to freedoms*, and *strong intent to persuade* may account for failure of the VIP intervention.

### *Anti-abuse Messages Induce Reactance*

Just as certain subpopulations can be more susceptible to reactance, certain types of messages can increase susceptibility to reactance. Several teams of researchers have used reactance theory to explain health communication campaign failures (Buller, Burgoon, Hall, Levine, Taylor, Beach, Buller, & Melcher, 2000; Campo & Cameron, 2006; Engs & Hanson, 1989; Miller, Burgoon, Grandpre, & Alvaro, 2006; Quick, 2003). They found that certain types of persuasion messages aroused high levels of reactance:

1. Anti-smoking messages (Miller et al., 2006)
2. Anti-alcohol abuse messages (Engs & Hanson, 1989)
3. Anti-drug abuse messages (Campo & Cameron, 2006; Quick, 2003)
4. Anti-high-risk behavior messages (Quick & Stephenson, 2004)
5. Anti-cancer behavior messages (Buller, et al., 2000)

Results from these studies confirm that reactance theory may account for the failure of antismoking, antialcohol abuse, antidrug abuse, and anti-high-risk behavior messages in health communication interventions. The reason, according to Brehm (1966), Miller (2000), and Miller, Benfield, and Tonigan (1993), is that substance users sensed these “anti-messages” as threatening their freedom to perform these acts. Users assert their own reactive and contrary high-risk behaviors. As discussed in the previous section, aggravators of reactance include confrontational interventions (Miller, 1995; Miller, Benfield, & Tonigan, 1993), a strong intent to persuade, forewarning (Brehm, 1966; Petty & Cacioppo, 1977), and public censure (Brehm 1966).

### *Confrontational Messages Induce Reactance*

Researchers credit increased alcohol consumption as a factor in reactance to confrontational style alcohol interventions (Miller, 1995; Miller, Benefield, & Tonigan, 1993). This research leads one to consider whether MADD VIP alcohol interventions are, in fact, confrontational and reactance-inducing. Confrontational interventions, similar in message content to MADD VIPs, demonstrate three previously described coincident aggravators that correlate with reactance: *forewarning*, *strong intent to persuade*, and *public censure*.

In an earlier section of this chapter labeled “Role of Message Intensity in Message Effects Research,” the effect of message intensity was discussed. Message intensity, as it is discussed here, is not a well-researched variable in message effect research. Message effects researchers characteristically discuss message strength but they view message strength as synonymous with logical argument strength. They usually define a strong message as a strong logical argument, a message from an expert, such as the author of a peer reviewed journal article. In contrast, the discussion of message intensity here is synonymous with high-reactance high-threat reactance-inducing messages.

Message effect theories usually explain the relationships of theoretic elements concerned with fear, efficacy, or gain and loss frames. While focusing on these topics, message effects researchers have largely neglected to examine message intensity. The present study researches message intensity as a message effect.

The present study does not make the same assumption about audience attentiveness and willingness to centrally process, cognitively elaborate (Petty & Cacioppo, 1986). Other message effects studies have assumed audience attentiveness and

cognitive elaboration of the message. For example, “gain and loss frames *assume that audiences are attentive to message content*” (Capella, 2006, p. S270). On the contrary, according to extensive empirical research conducted by Petty and Cacioppo (1986), audiences may not be attentive to message content. In the transcripts analyzed in the present study, some MADD VIP speakers actually commented publicly during the VIP about the disinterest in their audience. MADD VIP presenters’ observations on audience disinterest raise a doubt about the MADD assumption that VIP audiences are attentive.

Receivers are not always attentive to message content, particularly substance abuse audiences such as DWI offenders. Offenders approach their perception of the VIP message through the colored lenses of certain predispositions (beliefs, attitudes, and behaviors) that favor offenders’ rights to practice substance abuse. Substance abusers are not attentive to counter attitudinal messages that threaten their freedom to abuse substances. Threats concerning the negative outcomes of substance abuse can arouse reactance (Buller, Burgoon, Hall, Levine, Taylor, Beach, Buller, & Melcher, 2000; Campo & Cameron, 2006; Engs & Hanson, 1989; Miller, Burgoon, Grandpre, & Alvaro, 2006; Quick, 2003).

Drug use has been known to impede cognitive processing of counter-attitudinal anti-drug-abuse messages (Fishbein & Ajzen, 1975). Pleasurable attachment to a drug can cloud an abuser’s ability to consider the arguments of an intervention message.

*Reactance* coincides with rejection of a message, such as an anti-abuse message.

Reactance explains why DWI offenders may indulge in increased substance abuse after hearing an anti-abuse message.

Story forms of persuasive messages, such as those employed in MADD VIPs, are effective in capturing the attention of low-motivation audiences (Green, 2006). However, high-reactance high-threat stories, such as the VIP statement —“The drunk driver who killed my daughter is in jail for the rest of his life,” may simultaneously capture attention, arouse a negative affect, and invoke a high level of reactance. *Reactance* to such a message is more likely than *acceptance* because of the message’s strong negative valence and counter-attitudinal effect.

Reactance explains why the *number of prior arrests* often predicts the *number of recidivisms*. Arrest is more likely for those DWI offenders with the greatest investment in their freedom to drink and drive. This study researches the main theoretical structure of reactance theory, with its nine reactance antecedent variables, in the context of MADD message effects. In a pilot observational study, these nine aggravators of reactance were observed as likely to be present in MADD VIP presentations.

Employing reactance antecedents in message analysis offers a unique means to measure the probability of whether reactance may account for DWI behavior that is contrary to the intent of the MADD VIP message. Dillard and Shen (2005) found that “reactance can be operationalized as a composite of self-report indices of anger and negative cognitions” (p. 144). A negative intervention message typically lowers subjects’ mood and leads to reactance (Hong and Faedda, 1996). Rogers, Woodall, Rao, Polascek, and Milan (1994) and Woodall, Delaney, Rogers, Wheeler, Rao, Polascek, and May (2006) found a lowered mood among VIP participants following MADD VIPs’ negative intervention that authoritatively demanded that they stop drinking and driving.

*Field Notes from a MADD VIP Participant Observation Pilot Study*

The author watched from a balcony as an eyewitness to a MADD VIP presentation. Analysis of field notes suggested a relationship between content of the MADD VIP presentation and the following reactance theory antecedents: strong intent to persuade, forewarning, confrontation and public censure, and signs of perceived threats.

Confrontational intensity increased as each victim impact story built upon its predecessor a stronger message about how drunk driving leads to misfortune and carnage. Presenters described drunk drivers as thoughtless and selfish for driving while drunk without a care for their victims. The style of delivery of the stories was confrontational. Confrontational alcohol interventions can irritate and increase reactance, leading to higher alcohol use (Miller, 1995; Miller, Benefield, & Tonigan, 1993).

*Strong intent to persuade* was observed. Each presenter ended the presentation with a strong plea to the DWI offenders to stop drinking and driving. Some of these pleas suggested a low face threat (Dillard & Shen, 2005). A low face threat message was, "All I am asking you to do is consider calling a taxi for a free ride home." Many of the VIP speakers' pleas, however, presented a high face threat, such as when the presenter said, "I am angry about what happened to me. People like you who drink should not get into the driver's seat." A presenter's strong intent to persuade likely annoys and increases receivers' reactance and incites them to contrary behavior (Brehm, 1966).

*Forewarning* occurred before the presentations. Courts forewarned DWI offenders that they would be listening to victim impact stories and viewing graphic photos of crashes resulting from drunk driving. The MADD host of ceremonies forewarned DWI offenders they would be hearing victim impact stories and that some

photos would be graphic. Forewarning is an aggravator that increases reactance (Petty & Cacioppo, 1977)

*Confrontation and public censure* (face threat) was likely experienced by the audience in response to anti-offender bias in MADD VIP stories: DWI offenders were cast as the villains who caused preventable misfortunes to the presenters and their loved ones. The presenters publicly censured drunk drivers. Public censure (face threat) is an aggravator that increases reactance (Brehm, 1966).

*Signs of perceived threat* to drunk driving behavior may explain why, as the presentations continued, an increasing number of DWI offenders leaned far backwards, away from the VIP speakers. Their angle of repose was roughly ten degrees backwards from an upright position. Offenders increasingly crossed their arms. It must be noted that crossed arms alone do not signal a sign of defense against threat. An observer of a crossed-arm posture may interpret that body language as defensive. Observers rated people with closed arms as rejecting a speaker's message (Machotka, 1965). However, the reason a person crosses his or her arms can vary on a continuum from positive affect –“this is comfortable” to negative affect, –“disagree.”

While arm crossing can signify different meanings to the observer versus the single motivation of the arm-crossing person, researchers have found that leaning away from the speaker signals disagreement, and discomfort with the message content or the speaker (Bukhari, 2006). The farther an audience leans backwards, the less they like the speaker. According to Mehrabian and Friar (1969) –“The mean angle of backward lean with liked addressees (1.4°) is less than the mean angle with disliked addressees (9.3°).” It is argued here that a ten-degree backward lean suggests negative reaction and implies a

sign of perceived threat to DWI offenders' identity or beliefs. This observation, correlated with the arms-crossing observation, increases likelihood that VIP audience members' increasing arms-crossing behavior signified increasing defensiveness to perceived threat. Perceived threat increases reactance (Brehm, 1966).

Field notes suggest that as the MADD VIP presentations continued, the DWI offender audience became increasingly provoked or threatened, as measured by the degree of backwards lean in the audience. This assessment is corroborated by observations from VIP presenters. One of the MADD VIP presenters remarked to the audience that he sensed their hostility. Hostility is present before and during reactance. MADD VIP message content contained antecedents that have been known to invoke reactance: presenters' *strong intent to persuade, confrontational presentations, and public censure* of drunk drivers. Reactance may account for the failure of the MADD VIP intervention for some types of DWI offender demographics.

### *Chapter 2 Summary*

#### *Need to test message effects of the MADD VIP*

Due to the high societal and personal costs of DWIs, there is a need for courts to evaluate what is the best intervention message design that will deter future DWIs among known offenders. In order to properly evaluate intervention message designs, specific messages need to be tested against each other (O'Keefe, 1988). MADD VIPs offer an opportunity to study naturally occurring variations of the different message types and their effects. This design offers an important contribution to message effects research that has been called for by Jackson, O'Keefe, Jacobs, and Brashers (1989).

In this study, two interventions were evaluated against each other: the MADD VIP intervention was tested against the standard and customary DWI School. There is a need to evaluate the emotionally message-driven MADD VIP presentations for their possible influence on DWI recidivism. This is accomplished in the present study through employment of five general message effects variables in evaluation of the MADD VIP presentation. These five message variables are context, content, function, intensity and pathos or emotional appeal. The frequency and levels of intensity of these five message factors and quantification of their strength of association with degree of recidivism, via a regression test, would support the argument that *message reactance* influenced offenders' recidivism behaviors.

*Need to test reactance theory constructs and assumptions in context of MADD*

*Reactance theory constructs*

There is a body of literature on the role of reactance as a confound to intervention compliance and as an explanation for why health behavior change interventions fail. However, there is no literature that focuses on evaluating MADD VIP presentations for presence of reactance theory constructs. The acronym MADD suggests anger toward drunk drivers. Angry behavior change messages have been found to induce reactance and negative message effects. Thus, there is a need to evaluate MADD messages for *level of reactance-inducing statements*, coinciding with an empirical evaluation of MADD message effects outcomes.

If a message sender conveys a *strong intent to persuade* then he or she may irritate the message receiver. If the message sender *forewarns* the receiver of an imminent message of threat, *confronts* the message receiver, and *censures* the message receiver,

then according to reactance theory the message receiver would react oppositely from the desired behavior. If the message itself is stressful, unremitting, and delivered in a punishment context, it is likely to invoke defensiveness in the message receiver. If the message sender *censures, threatens, or publicly ridicules* a behavior that a listener believes he has the freedom to perform, then the receiver is likely to respond with reactance. The listener will likely reassert his freedom by increasing his practice of the censured behavior.

Reactors, such as drunk drivers reacting negatively to MADD VIPs, may go so far as to band together to perform their contempt of those who are censuring them. As reactance theory explains, message reactors are likely to increase and celebrate the practice the censured behavior to assert their freedom. This reactance behavior, as well as a collective reactance behavior, featuring the banding together of reactance practitioners, will be discussed in the chapter 5.

The present study considers five message-sender and message-related theoretical antecedents of reactance. This study evaluates whether message-sender and message-related reactance antecedents are present in the MADD VIP message. These antecedents are *confrontation, public censure, forewarning, and strong intent to persuade*. These constructs are operationalized as *level of reactance-inducing statements* in VIP presentations. They are also operationalized as *proportion of reactance-inducing statements*.

If there are strong “doses” of these five theoretical reactance antecedents in the MADD VIP intervention message, and if the level of reactance dosages predicts DWI recidivism (a shorter survival time until rearrest) (Delaney, Kunitz, Zhao, Woodall,

Westerberg, Rogers, & Wheeler, 2005), then reactance theory would offer an explanation for increased recidivism observed among MADD VIP participants. Reactance theory constructs are tested here as an explanation for specific message effects.

### *Research Questions*

The present study asks four types of research questions. First, are there reactance antecedents present in MADD VIP presentations? Second, if present, do MADD VIP reactance antecedents predict significant differences in DWI recidivism outcomes? Third, what are the demographic covariates, besides MADD VIP message effects, that account for effects in DWI recidivism among MADD VIP participants? Fourth, are MADD VIPs effective at reducing DWI recidivism?

1. *At what levels are reactance antecedents present in MADD VIP presentations?*
2. *Do the 15 different MADD VIP presentations have different reactance message dosages? If so, this difference will become a covariate that will be controlled for by nested regression, known as hierarchical linear modeling.*
3. *Does the reactance message dosage (level of reactance-inducing statements and proportion of reactance-inducing statements) predict direction of emotional change score in the MADD VIP plus DWI School intervention group?*
4. *Does the reactance message dosage predict survival time to first recidivism within the MADD VIP plus DWI School intervention group, while controlling for covariates age, gender, and number of priors?*

5. *Does the reactance message dosage predict number of subsequent arrests within group for the MADD VIP plus DWI School intervention group, while controlling for covariates age, gender, and number of priors?*
6. *Are there different predictor variables for recidivism for those study participants with DWI arrests before the study (who arguably believe they have the freedom, a reactance theory assumption, to drink and drive) versus those participants with no prior arrests?*
7. *What are the demographic covariates that predict positive or negative message effects of MADD VIPs?*
8. *Are MADD VIP messages effective in terms of lengthening time to recidivism and reducing number of subsequent arrests?*

### CHAPTER 3: METHODOLOGY

Researchers have identified a need for longitudinal<sup>17</sup> research that explores MADD VIP intervention message effects upon DWI recidivism over multiple years (Kunitz, Woodall, Zhao, Wheeler, Lillis, and Rogers, 2002). The present study researches the long-term impact of a MADD VIP intervention using a 12-year randomized research study designed by Woodall, Delaney, Rogers, and Wheeler (2007). The original research design was defined as a 2x5 mixed factorial design, an incremental design with two group conditions (VIP, no VIP) and five times of assessment including the current study assessment. Factorial designs, which study multiple effects (main effects and interaction effects simultaneously), have been considered more efficient than studying one factor at a time since 1926 when Sir Ronald A. Fisher introduced the term *factor* in his article titled “The Arrangement of Field Experiments” (Box, Hunter, & Hunter, 2005; Fisher, 1926, p. 511).

In the original study, the first group condition was a DWI School Only (no VIP) comparison group. The second group condition was a DWI School group that also received the MADD VIP intervention. Although the words *rehabilitation* and *intervention* have been used together to describe the VIP, the MADD VIP intervention is not a rehabilitation *treatment* in the medical sense. It does not treat or attempt to cure a psycho-pathology such as an addictive substance abuse behavior. The VIP program does not purport to rehabilitate the offender from drinking alcohol or using illegal drugs. It is a psycho-social intervention designed to increase deterrence of *driving* while intoxicated. The intervention is also referred to as a study condition that may be tested to determine

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<sup>17</sup> *Longitudinal* research consists of a study whose time period for data collection stretches over a long time frame. Historically researchers have referred to a one or two year study as a longitudinal study.

the level to which the intervention deters an unwanted behavior. This is a fine distinction, but one that is necessary in order to avoid the implication that the MADD VIP is a medically prescribed treatment to rehabilitate addicted substance abusers.

The original factorial study was designed to empirically investigate only two group conditions, MADD VIP plus DWI School compared to DWI School Only. The present study, an extension of the original study designed by Rogers, Woodall, Rao, Polacsek, & Milan (1994), observationally analyzed the original study's VIP presenter transcripts to determine whether reactance antecedents were present. Two levels of reactance antecedents (low versus high) were observed in post hoc analysis of the original study's VIP transcript data. Thus in the present study there are three levels of intervention condition, (1) DWI School Only, (2) DWI School plus low reactance-inducing VIP, and (3) DWI School plus high-reactance VIP. Kelly and Di Marzo Serugendo (2009) found that categorization of levels of traits, and inclusion of a zero trait level for those individuals for whom the trait/treatment/antecedent were missing, increased the robustness of the regression analysis to noise or variance.

Each missing observation for a trait is assigned a unique level of a dummy factor associated with that trait. Each missing observation can be assigned the same dummy value. The program accepts that value as a real observation. The result is that the program handles the analysis as if all traits were observed for each animal with records. In essence, what happens is that the residual element associated with the dummy observation is estimated to be zero. The algorithm to compute the asymptotic average information matrix uses those zeroes which add nothing to the AI matrix so that it is the same as if it was computed with a more complex

algorithm. Similarly,  $L|y$  also is the same as if it was computed with missing observations ignored. (p. 1)

The present study adapts the above approach and finds that categorization of the variables into levels in the case of message dosage levels serves to increase the sensitivity of the tests. The significant differences between low and high VIP message dosages, substantiated via ANOVA contrasts, are tested against absence of the VIP message dosage, where the non-VIP dosage is set as a zero level. Thus, as in the Kelly and Di Marzo Serugendo approach, the missing VIP dosage group members are all assigned the same zero value of VIP dosage. The loglinear logit regression handles the non-VIP group as if they were observed as receiving a VIP dosage level. This approach allows the intervention group, at two levels, to be compared with a third level of no intervention, and offers a tri-level quantification of the variable of interest, level of VIP message dosage. Three levels of VIP message dosage –observed” as such increases the sensitivity of the regression, allows for an increase in power through inclusion of more cases, and increases ability to detect a VIP message effect.

The design for the current study remains defined as a 2x5 mixed factorial design, however it may be thought of as a 2x5 mixed factorial design that evolved into a 3x5 mixed factorial observational design at the last time of assessment, the assessment conducted in the present study extension. The use of three groups in two different contexts (VIP, no VIP) helps to overcome the effect of context upon the message effects study. In single-context studies it cannot be known whether the message effect is confounded by the context. An advantage of the original researchers’ experimental design

(Rogers, Woodall, Rao, Polacsek, & Milan, 1994) is that there has been a control for confounds such as context.

This investigation is the first randomized design that tests communication reactance theory constructs by operationalizing them as specific message types (see *Quantifying reactance message constructs*). Message types, as associated with corresponding theoretical reactance antecedents, were hierarchically ordered during a qualitative analysis, according to their reactance-inducing intensity (see Table 4-2). This ordered scale was used to code 2,021 statements made during 15 sampled VIPs. After 2,021 individual VIP statements were coded according to their reactance-inducing intensity, the mean reactance-inducing intensity for each VIP was calculated. In this manner, the level of reactance-inducing intensity for each of 15 VIPs was obtained (see Figure 4-2 and Table 4-3).

It was found via Fishers LSD analysis that VIPs were not all of the same level of reactance-inducing intensity. VIPs could be categorized into two levels, high versus low reactance-inducing intensity. VIPs were subsequently categorized into *low reactance-inducing VIPs* versus *high reactance-inducing VIPs*. Thus, the VIPs were bifurcated into two different levels of reactance-inducing intensity.

Recidivism outcomes were regressed upon two levels of VIP categories according to their low/high reactance dosage, which was the frequency of occurrence of reactance-inducing statements weighted by their intensity (see *Figure 4-4: Effect of MADD VIP reactance-inducing levels upon categories of offenders*). In the above manner, reactance theory constructs were operationalized as specific messages types and tested for message effects.

This methods chapter begins with a traditional discussion of general population and study design characteristics, followed by a discussion of parametric methods assumptions. Next, the chapter describes the calculation and testing of variables of interest for violations of the assumptions of parametric statistics. The methods section ends with an explication of qualitative and quantitative methods employed in the present study, the data-structure rationales for why loglinear logit regression and Cox Proportional Hazards Regression were chosen in favor of other tests, their respective units of analysis, procedures, validity, and reliability.

### *Population and Sampling*

#### *Participants*

There were 833 DWI offenders in Bernalillo County, New Mexico, who participated in the original Woodall et al. (2006) study. There were 426 participants in the MADD VIP plus DWI School intervention group (6% had prior DWI arrests). There were 406 participants in the DWI School comparison group (5% had prior DWI arrests).

Seventy five percent of the participants were male. Three cases had missing values for gender. Males were more likely to be rearrested than females  $t(828) = -2.9, p = .004$ .

The mean ages of the intervention groups were relatively equal (DWI School comparison group: 31.2 years, MADD VIP plus DWI School intervention group: 31.4 years). The MADD VIP plus DWI School intervention group had 3% more young participants under age 30. The under age 30 group was more likely to be rearrested, which resulted in a necessity to stratify the no prior group by age.

The ethnic composition of the population sample was balanced between group conditions. No ethnic group was observed to be more frequent in one intervention condition or another. The study sample was 46% Hispanic, 36% Anglo, 12% Native American, 2% African-American, and 4% other ethnicity.

The present study under-identified those with prior DWI arrests. The original researchers (Rogers, Woodall, Rao, Polacsek, & Milan, 1994) enrolled the first participants in 1994. In 2007, Woodall, Delaney, Rogers, & Wheeler recorded the earliest prior arrest as occurring in 1972. With earliest prior arrest dating in 1972, they found 165 of the 833 participants had *prior* DWI offenses. The current study used an earliest prior arrest date of July 1995 and identified only 47 offenders with *prior* DWI offenses in the most recent weeks and months prior to the arrest that triggered enrollment among participants enrolled in the second year of the study. Thus, the current study is limited in its generalizability to those with prior arrests. The present study has worked with data that under-identified *prior* offenders and only included *recent prior* offenders in the prior offender category. Over 100 prior offenders, identified by Woodall, Delaney, Rogers, & Wheeler (2007) as *prior* offenders were categorized as *no priors* in the present study. A later analysis of the same participant pool with a start date for prior arrests at July 1984 found ten more, 175, *prior* offenders in the *no priors* group of the original study. Depending on how far in the past a researcher sets the search for prior arrests, a participant with one very distant prior arrest may fall into the *no prior* category. This is a consideration for future designs.

The prior offender start date limitation of the current study means that among one third of participants, those enrolled prior to July 1995, there could have been prior

offenders with DWI arrests in recent weeks and months. The discrepancy between the original study and the present study data sets, the under-identification of participants with prior DWIs, had the effect of reducing likelihood the present study would produce significant results because over 100 prior offenders included in the *no prior* group would likely bias results against finding significant differences between *prior* and *no prior* groups. The methods employed in the present study concerning prior offenders will necessitate replication with an earlier prior arrests date to validate result concerning the effects of MADD VIPs upon those with *priors* versus *no prior* DWI arrests. Because an earlier prior arrest index date will identify more prior offenders within the current sample population, the future analysis may find higher levels of significance and effect sizes between *priors* versus *no priors* than in the present study. However, no conclusions may be drawn regarding *priors* versus *no priors* until data are reanalyzed with an earlier prior arrest date. It may be fruitful to investigate three groups: no priors, no recent priors, and recent priors.

#### *Recruitment, consent, and non-adherence to condition*

In the original Woodall et al. study (2007), of which this study is an extension, participants were recruited with the help and support of the Metropolitan Court. After the court assigned offenders to DWI School but before the DWI School date, researchers used the court's DWI School roster to pre-randomize participants to one of two group conditions: DWI School Only versus DWI School plus MADD VIP.

It should be noted that the time lag between assignment to condition and attendance at condition increased the chance that offenders would not attend their pre-randomized condition. Participant freedom to not attend their condition increased the bias

against finding significant results in the analysis more so than would have been the case if the participants had been residents in a treatment center and attendance were under control of the researchers. This non-attendance occurred both in the intervention and control groups equally. The randomization of participants to group may have controlled for the unequal study attrition between groups but could not control for the non-inclusion of less-functional drunk drivers, those who did not function well enough to attend court mandated interventions despite the heavy penalty of having an arrest warrant issued as a result.

Only 80% of those mandated to DWI School arrived at class for their designated intervention. Non-attendance bore the penalty of an arrest warrant. Because of this heavy penalty for non-attendance, it may be speculated that those who were not present, 20% of the offenders during this period, might have been less functional than those who attended their court-assigned class. Because the participant sample excluded the less functional drunk drivers, the sample was biased toward obtaining treatment efficacy but this was equally true of both the intervention and control groups. Thus, the differences between intervention and control groups found in this study would only be representative of the more functional drunk drivers. In any case, the intervention and control groups would have been equally affected by this more-functional drunk driver bias.

For those participants who attended the DWI School, participant consent and enrollment was enacted at the end of the DWI School class. At the conclusion of DWI School, the study enrollment personnel read the consent form aloud to participants as they silently followed along, reading their personal copies. The consent form listed benefits of participation in the study. Benefits of participation in the study were specified

as (1) possible benefits to society from increased knowledge about DWI intervention efficacy, and (2) possible benefits related to improved DWI interventions for future DWI offenders. DWI School attendees who accepted the invitation to participate in the study signed consent forms.

Because the recruitment process made an appeal to prospective participant altruism, participants who signed the consent demonstrated a willingness to engage in an activity that would not benefit them personally but would benefit society and future offenders. The consent form specified that study participation was voluntary. Accordingly, not all offenders elected to altruistically participate in the study. Study recruitment ratio was 70% of those present at DWI school. Thus, only 70% of offenders were recruited out of the 80% who attended DWI school. These numbers further suggest that the DWI school recruitment pool may not have been 100% representative of all DWI first offenders.

Those who had been pre-randomized to DWI School Only condition were excused after signing their consent form as they had already met their condition by DWI School attendance. Researchers send to the Metropolitan Court a list of participants who had been randomized to DWI School Only. The court then sent excusal letters to DWI School Only group members to excuse them from attending a MADD VIP.

At the conclusion of DWI School and after signing consent forms, those who had been prior-randomized to the VIP plus DWI School condition were assigned to a VIP. The VIPs occurred at 30-90 days later after DWI School. Due to this time lag there was additional participant attrition.

Not all VIP-assigned participants attended VIP. The researchers elected to respond to this setback by employing the conservative *intent to treat* approach for data analysis. *Intent to treat* approach means that those who were assigned to VIP were treated as if they had attended, even if they did not show up. *Intent to treat* is a controversial approach, as some researchers have pointed out that including nonadherent participants increases probability of a Type II error, that is finding no effect when there was indeed an intervention effect (Fergusson, Aaron, Guyatt, & Hébert, 2002; Gross & Fogg, 2004; Michalak et al., 2002; Wert, 1995). Thus, the *intent to treat* approach is a most conservative approach to study design and analysis. Because it is more difficult to detect an effect using the *intent to treat* approach, if an effect is detected, then that effect must be strong to have overcome the bias against finding an effect.

DWI school is a first offender intervention and the original MADD VIP study recruited participants from DWI school because the original study designers (Rogers, Woodall, Rao, Polacsek, & Milan, 1994) intended to study only first offenders. However, study designers knew it was possible that prior offenders would be recruited at DWI school because of loopholes in the court system. Due to loopholes, some multiple DWI offenders are allowed to have their sentences reduced to first offense status. This is referred to in the court system as being “pled down.” A multiple offender who has been assigned first offender status is processed through the court system as if he or she is actually a first offender and is assigned to first offender remediation such as DWI School and MADD VIP. Knowing this misallocation of offender status was possible, the original investigators obtained court arrest records for all participants. They identified participants who were *prior* DWI offenders. *Prior* offenders were identified in the study database as

prior offenders but retained in the study and otherwise were treated the same as first offender participants.

#### *Random assignment*

Prior to DWI School, the original Woodall et al. researchers used the court DWI School roster to randomize participants to one of two study conditions. 1) The intervention condition consisted of a MADD VIP and DWI school intervention. Intervention participants took part in a state-mandated DWI school designed for first-time offenders, and attended a Victim Impact Panel organized by MADD for Bernalillo County residents. 2) The comparison condition consisted of DWI School Only. State of New Mexico law requires all first-time DWI offenders are to attend DWI school. The DWI school condition thus represents a usual and customary treatment for first-time DWI offenders.

#### *Design, Methods, and Procedures*

##### *2x5 Mixed Factorial Design*

The study, including the original Woodall et al. studies, was a randomized 2 x 5 mixed factorial design. There were two groups, intervention and comparison. Both intervention and comparison groups received a normal and customary DWI school. The only difference between the two group conditions was whether or not the participants received a MADD VIP intervention. There were five times of assessment for the MADD VIP plus DWI School intervention group and four assessments of the DWI School Only comparison group. The design was a mixed design employing both within-subjects and between-subjects factors.

A within-subjects factor means that the design tested each group both pre and post intervention. All subjects were given a pre-test and a post-test, and these two within-group tests serve as a within-subjects factor. Participants were also divided into two groups. One group was the experimental group of interest (the VIP plus DWI school group) and the other group was a comparison group. The two-group design serves as the between-subjects factor. Table 3-1 lists the sequence of assessments for the 2x5 mixed factorial study design.

***Table 3-1: 2x5 Mixed Factorial Design***

<b>Time of Assessment</b>	<b>MADD VIP + DWI School Intervention Group</b>	<b>DWI School Only Comparison Group</b>
Pre-MADD VIP	Pretest 1 Questionnaire on enrollment day at DWI School	Pretest 1 Questionnaire on enrollment day at DWI School
MADD VIP	Yes	No
MADD VIP Post (same day)	MADD VIP Pre and Post-test 2 Questionnaire	No
1-Year Follow-up	Post-test 3 Questionnaire	Post-test 2 Questionnaire
2-Year Follow-up	Post-test 4 Questionnaire, Traffic Safety Data	Post-test 3 Questionnaire, Traffic Safety Data
12-Year Follow-up (this study)	Post-test 5 Traffic Safety Data	Post-test 4 Traffic Safety Data

*Operationalization of reactance theory constructs into variables*

Reactance theory, in order to test whether it explains the MADD VIP outcomes, must be operationalized. Its abstract theoretical constructs must be translated into variables whose definitions describe instances of the theoretical constructs in the observable world, the study data. Whether or not reactance theory explains MADD VIP outcomes depends not only on whether theoretical constructs are operationalized but upon the accuracy of that operationalization. A scientist, when testing theory, must therefore take care to explain the process of the operationalization and how the operationalization(s) were tested for accuracy.

The process for testing accuracy of operationalization of the reactance theory constructs in the present study is complex. The process is necessarily complex due to the need to establish the causal progression from statements made by VIP presenters, their reactance dosage, the mean reactance dosage of each VIP sampled, whether the sampled VIPs were equal or different intervention treatments. If VIPs are not uniform in treatment dosages, then they must be treated carefully—different levels of dosages must be considered as different levels in the treatment dosage variable. Only when dosages are accurately measured and levels established could the effects of reactance antecedent levels in VIP interventions be accurately measured against DWI recidivism, the behavioral outcome of interest.

A series of operationalization processes, each a successive layer of scale, are described here. Tests of the data against theoretical constructs were conducted at three different levels of scale. At each level of scale, the data are tested to insure that the only

difference between variables in the final test, at the final level of scale, is indeed the level of presence and level of intensity of reactance constructs. Thus, the accuracy at which the theoretical constructs were operationalized into VIP message variables is determined in an articulated three-step process, each step executed at a different level of scale for the data. This multiscale operationalization process is described in chapter 3: Methodology.

The analysis multiscale analysis begins with a set of raw data, the transcribed text of 15 VIP presentations. The raw data consists of words, sentences, and ideas conveyed by a varied combination of 57 VIP presenters at 15 different VIP presentation occasions. It is considered that each VIP occasion delivered a “dosage” of theoretical reactance constructs, where the dosage could range from a reactance theory dosage of zero (no reactance theory constructs present, such as a happy statement) to a reactance theory dosage of level 8 (the highest-intensity reactance-inducing antecedent, “anger directed at the listener”). One would like to obtain the theoretical reactance dosage for each VIP. However, to obtain the theoretical reactance dosage of a individual VIP occasion, the theoretical reactance dosage of each statement made during that VIP must be measured. After the theoretical reactance dosage of each statement within a VIP is measured, then the theoretical reactance dosage of all statements within a VIP may be summed and averaged.

First, analysis of the raw data is conducted at the scale of the individual message where each message “act” is unitized as a unique statement. Each statement is a unique instance of an expression of an idea, whether that idea is expressed in one or many sentences. Contents of one unit begin with statement of a new idea and end before a new

idea is introduced. The researcher thus unitized all VIP statements into 1,021 idea units, or message acts.

Independent coders assigned each of these message units to a *message type* ranging from *happy* to *angry*. The coders assigned message types while using a coding system of eight message types that both discriminated between message types and ordered message types according to a continuum of increasing confrontational intensity. The ordering according to confrontational intensity was determined in two ways: (1) qualitative verification of VIP message types by agreement between independent coders and (2) quantitative verification via matching VIP message types with laboratory-created message types whose location on a continuum of increasing reactance-inducing intensity had been empirically established. A VIP's mean *level of reactance-inducing statements* was determined by averaging each VIP's frequency of reactance-inducing message types, weighted by the intensity at which these message types had been known to induce reactance. This was the level of analysis carried out by coders and verified by previous research on the frequency and intensity of VIP messages, on the individual message level of scale.

Coders' decisions were based on text of the VIP statements. They did not hear audio or see video of the statements being presented by VIP presenters. Coders were blind to the demographics, the time and place of the statements, and all factors that would identify types of persons making the VIP statements that could possibly bias the coders in their assignment of message types on a continuum of intensity.

Second, analysis is conducted at the scale of the VIP where each VIP presentation, presented to a unique group of DWI offenders, is a unit of analysis, an

independent variable category in ANOVA. In ANOVA, the value of the dependent variable was set at the VIP's mean *level of reactance-inducing statements*. Variance of VIP's mean *level of reactance-inducing statements* is analyzed to discover whether all VIPs in the sample offered the same type of intervention, or whether VIP interventions varied in type. VIP interventions were found to vary in type. Two distinct types of VIPs emerged from the analysis: *high-reactance-inducing VIPs* versus *low-reactance-inducing VIPs*. *High-reactance-inducing VIPs* dosed their participants with a significantly different mean *level of reactance-inducing statements* than *low-reactance-inducing VIPs*. The sampled 15 VIP interventions were bifurcated into their two constituent intervention types: *low reactance-inducing VIPs* and *high reactance-inducing VIPs* such that VIP message effects could be analyzed separately for each type of VIP.

Third, analysis is conducted at the scale of *type* of intervention. The type of VIP was the unit of analysis. The message effect of the *high-reactance VIP* intervention type was tested as one level of treatment versus the message effect of the *low-reactance VIPs*. Both are regressed upon DWI offender recidivism.

#### *How literature informed the study design; Study's contribution to literature*

The following discussion is presented in outline form to clarify the arguments and their supporting sub points. This discussion articulates in which ways the bodies of literature, from thematic analysis, message effects and reactance message effects research, inform the present study and in which ways the present study contributes to message effects research. It further discusses the interaction between qualitative and quantitative analysis, how they informed each other in this methodological symbiosis.

### *How the literature informs methods chosen for the design*

Thematic analysis research informs methods chosen for the design of the present study. *Thematic analysis* is a means to induce meaning by organizing observations by frequency or strength of themes that occur within observations. Observations, in the present study, were obtained through the reading of texts. These texts had been transcribed from VIP presentations that had occurred *in vivo*. *In vivo* is a Latin term that signifies *in real life*. *In vivo analysis* is a qualitative method particularly suited for analyzing observations derived from real life. Real life observations are different from observations derived from artificial laboratory-created environments and so require different methods of analysis. The different sources of these data, *in vivo* versus artificial sources, produce data with different qualities and data structures.

Qualities of laboratory data are a function of the empirical design paradigm. Empirical design requires structures that pre-assign variables, the data structures or containers of the data, the buckets in which one contains the data. The data, even before they are collected, are predestined to fit into these pre-designed variable categories. The pigeonholes into which they will be relegated are by necessity unique and isolated.

Isolation between discrete data categories is a convention for studies where statistics will be used to analyze differences between categorical data. Each category must serve as an individual with independent probability of being observed, unaffected by neighboring statements. Independence of categories is a necessary consideration because the probabilistic foundations of classical statistics formulas depend upon independent probability of occurrences of each data point that is observed, and the normal distribution of those occurrences (Kelton, Sandowski, & Sturrock, 2004). The

identification and import of independent probabilities is often explained with the familiar example of a flip of a coin.

Data that are collected and stored within non-overlapping variables are not allowed to merge across variables, morph, grow, or change in any way. As independence of observations is a necessity, in the present study the data are assigned predetermined and non-overlapping qualities low, medium and high levels of the variable of interest, the level of VIP message dosage. Without categorization, the noise or variance of the data within each category would contribute to a case of overlapping or probabilistic dependence of observations upon each other. For example, one statement is related to the next statement in a conversation or VIP presentation. These relationships between statement types would undermine independence of observation assumptions of classical statistics, were such statements to be presented on a continuum of real number values. Any one message's meaning and effect could probabilistically overlap or depend upon another.

In other words, if the data were regressed in its continuous form then data points would be assumed to reside on a continuum with qualities ranging from *least* to *most*. Their variance or elasticity due to their relationships to each other could result in dependence noise. In such a case of dependent data neighborhoods, their proximity would increase probability of their relational states. Relationships, or interdependence, would be salient characteristics of the data set. Interactive relationships between message sequences would serve to increase data volatility and increase overlapping of states of interdependent probabilities, decreasing data point independence and decreasing data suitability for statistical tests.

Thus, categorization, when the argument for categorization is supported by an ANOVA that substantiates sufficient and significant difference between categories, reinterprets data point probabilities of observations as non-overlapping independent categories. Since all individuals within the same category are assigned the same value, and since those three categorical values are clearly discrete and independent of each other, the categorization of otherwise noisy data can enhance the power and sensitivity of a regression. For such a case where both the independent and dependent variables are categorical, a loglinear logit regression is appropriate. For these reasons the present study categorized message types to reduce data noise, increase independence of observations, and increase power to detect an effect. The more independent are the categories of the variable of interest, the more power is enabled in statistical tests.

The present study defined independent categorical variables that were operationalized from theory informed by previous empirical research. The present study employed findings of previous research to classify message types into an ordinal hierarchy. Each level in the ordinal hierarchy of VIP message types possessed an independent non-overlapping probability of observation, empirically supported by reactance-inducing message archetypes established in previous research.

The procedure of identifying and defining independent observational categories of reactance-inducing message types, and the scientifically defined reactance message types that informed this hierarchy of reactance-inducing message categories, is described in detail in the procedures section of chapter 3: Methodology. Using the procedure that will be describe later in more detail, the preestablished variable categories were defined for coders, where each stepped categorical level in the ordinal hierarchy of reactance

message types possessed an independent and increased level of probability of being a reactance inducing statement type.

Once preestablished message type levels of the reactance-inducing message variable levels were defined as independent, and once VIP messages were coded and binned with these, then tests of different message effects of the different message categories could begin. The data within categories were tested against each other to discover whether their relationships supported the theoretical relationships predicted by the theory being tested. Did increased levels of reactance-inducing dosages correspond with increased reactance behavior in the form of increased drunk driving?

In the present study, the process of preorganizing data, procedures, and methods to test pre-determined theory is grounded in the foundation of traditional scientific research. This tradition is known as the quantitative scientific paradigm. The quantitative paradigm is used in the present study to test whether data collected from MAD VIP presentations, and their relationships, support the theoretical relationships predicted by reactance theory.

In order to transform naturally occurring text, text that was not preassigned variables or categories by the researcher. This approach diverges from previous reactance theory research. In previous laboratory research, the researcher assigned reactance-inducing message archetypes as having different levels of reactance inducement, then tested those levels using most often a self-report measure such as a questionnaire. The present study began used *in vivo* real life analysis of data to observe weather messages that occurred in real life interventions could be categorized into independent (non-overlapping) probabilistic categories. Those independent qualitative categories might

subsequently be employed in quantitative analysis to test applicability of reactance theory to MADD VIP interventions. *In vivo* analysis can thus be employed as a precursor and pre-processing procedure to prepare qualitative field data for statistical analysis.

Strauss & Corbin are pioneers of *in vivo* analysis. Strauss and Corbin suggest that when quantifying the influence of a theme, influence should be measured by two variables: both frequency and intensity. *Frequency* is a numerical count whose face value is naturally quantifiable. However, the procedure for measuring theme *intensity* requires qualitative judgment because “theme intensity” does not immediately present a quantifiable face value, that is, unless there is empirical evidence upon which to base those judgments. In the present study, *intensity* was judged based on empirical results from previous research on *levels of reactance* induced by different message types. While developing the themes from the VIP texts, the researcher continually considered, “what are the recurring message types and how do they relate to empirical research on reactance antecedents and *levels of reactance inducement*, if at all?”

Message effects research informs methods in the present study. Message effects researchers have applied various operationalizations to meet the challenge of quantifying “message intensity” because they have recognized the role message intensity plays as a variable in message effects research. Message intensity has been operationalized and quantified by different message effects researchers in the following different ways:

- A. Message effects researchers consider the intensity of a message as a variable of interest that may influence a persuasive effect. Message effects researchers commonly refer to message intensity as “message strength.” However, there is no standard definition for message strength in message effects research.

Because the lack of a standard definition for “message strength” has not been previously addressed in the literature, there is a brief discussion here of different definitions and operationalizations for this variable “message strength.”

1. Some researchers have operationalized message strength as level of source authoritativeness, a quality of the message sender. Other message effects researchers evaluate a message as stronger if it is delivered with more emotion, a quality of the mode of message delivery.
2. Some researchers evaluate a message as stronger if the message source is more authoritative. In most cases, the researchers *assign* the level of authoritativeness of a message. For example, some researchers designate a message as authoritative if the message source is an academic expert or a peer reviewed journal article.
3. Other researchers do not assign level of authoritativeness of a message. They do not assume the authoritativeness of a message source to be constant upon all types of message receivers. These researchers consider whether the same message source can represent different levels of authority to different types of message receivers. These researchers may conduct manipulation checks to determine which source a study participant considers more authoritative. These researchers may disaggregate the data, creating subpopulations based on different participant traits. They have found that different personality types, such as internal versus external monitors, attribute authoritativeness differently.

B. Reactance message effects research informs methods in the present study.

Reactance theory researchers have typically operationalized message strength differently than “level of message source authoritativeness.” Generally, reactance theory researchers consider message strength as associated with the emotional intensity with which the source delivers the message.

1. Reactance theory assigns more weight to more intense message themes.
  - a. Higher intensity levels of *reactance-inducing statements* in message delivery increase reactance to that message,
  - b. Higher intensity levels of threat in a message increase reactance to that message,
  - c. Higher intensity levels of confrontation in a message increase reactance to that message, and
  - d. Higher intensity levels of loss frames in a message increase reactance to that message.
2. Reactance researchers have noted that the level of reactance inducement increases with increased levels of these antecedents. For example, reactance increases with increase in message source anger or confrontation.
3. In consonance with reactance theory and reactance research, in the present study message strength was operationalized as level of emotional intensity with which a message is delivered. It organizes emotional intensity in an ordinal scale that is comprised of escalating intensity of theoretical reactance antecedents. For example, source anger has been found to

induce the strongest reactance. Therefore on the ordinal scale in the present study “I am angry with you” is a message type that is assigned the highest level of reactance inducement on the ordinal scale of message types that induce reactance. The position of each message type on the ordinal scale of *level of reactance-inducing statements* is discussed in the context of Tables 3-2 and 3-4. The rationale for assignment of message types to their position on the ordinal scale is based upon:

- a. The definition and definition scope of reactance antecedents in reactance theory literature,
- b. The scope of reactance antecedents as they are operationalized in empirical research on reactance-inducing message types,
- c. The degree of matching of the *in vivo* message types to those messages created and manipulated in laboratory settings, and
- d. The empirical findings on which message types induce stronger reactance than others.

#### *How the present study extends message effects research methods*

Previous reactance researchers *created* reactance-inducing messages and then they *manipulated* these messages in an artificial laboratory environment. The present study is informed by these studies, but it neither creates nor manipulates reactance-inducing methods, rather it observes naturally occurring reactance-inducing messages in real life, *in vivo*, and observes different levels of reactance associated with exposure to different dosages of reactance-inducing messages.

This study's definitions, operationalizations, and quantification methods are informed by previous empirical findings on levels of emotional intensity. Previous findings are employed in organization of observed reactance-inducing statements into an ordinal scale. The present study methods are different from and contribute to the message effects literature in the following ways:

- A. Reactance-inducing messages in the present study were not created by the researchers, but rather observed *in vivo, in life*, in a natural environment,
- B. In the present study naturally occurring messages have been thematically coded for both reactance-inducing statement frequency and intensity, the designation of level of intensity guided by previous reactance theory empirical research,
- C. Naturally occurring reactance-inducing messages were categorized by archetypal qualities and ordered in an ordinal scale from lowest to highest level of reactance-inducing strength.
- D. Where one value for a reactance-inducing message represented both its frequency and intensity,
- E. Where the frequency and intensity of all reactance-inducing messages occurring within a *dosage* of an exposure were aggregated to sum a total *reactance-inducing message dosage* that occurred in one time and space.

In the present study, multiple message sources 57 VIP presenters contributed to a total *reactance-inducing message dosage*. It may be argued that a *message dosage* derived from an aggregate of multiple sources, where each message source has different characteristics such as age, gender, appearance, is a more accurate representation of a

reactance message influence than a message dosage derived from one-message source. This argument has been made in message effects literature by Jackson, O'Keefe, Jacobs, and Brashers (1989).

For example, many messages categorized into archetypal categories create a stronger and more representative data point than one message. And also, multiple messages collected from multiple sources and categorized into archetypal categories create a stronger and more representative data point than messages collected from just one person. If one source has certain age, gender, appearance, then it cannot be known whether those variables are influencing reactance inducement more or less than the level emotion with which the message is delivered, or whether age, gender, or appearance variables are interacting with the emotion level variable to affect the level of reactance inducement. However, if multiple sources representing different age, gender, and appearance are all exhibiting similar high levels of emotion, then a measure of their aggregate emotional intensity and frequency of reactance-inducing message is less susceptible to bias due to the age, gender, or appearance of any one of the sources.

F. In the present study, independent coders, in this case communication scholars, blindly coded messages from an ordinal scale of increasing reactance inducement. Coders were not conversant in reactance theory. They coded statements based on category definitions and examples that did not refer to these statements' level of reactance inducement. The ordinal scale use by coders was represented to them as a scale of increasing emotional intensity in a message.

*How the interaction between qualitative and quantitative analysis informed each other in this methodological symbiosis.*

In the present methodology, results from two complimentary forms of analysis, qualitative and quantitative were employed symbiotically in a beneficial methodological feedback loop. The outputs from empirical studies in the literature contributed to the inputs for the qualitative analysis. The outputs from the qualitative analysis informed inputs, in terms of independent variable values, for the quantitative analysis. Each form of analysis contributed to the depth and accuracy of the other.

Identification of qualitative themes was informed by empirical reactance antecedent research. For example, the message type, “I am angry” had been found in empirical studies to induce reactance. The analyst was sensitized to recognize anger messages during the constant comparison analysis. Because anger messages were frequent and intense they were qualitatively assigned their own category.

Further, findings from empirical research on reactance message types and their intensity relative to each other influenced the qualitative arrangement of naturally occurring message types into hierarchical relationships. For example, researchers had found that “please change” was not reactance inducing, and therefore neutral, while the slightly different message “you should change” was reactance inducing. Further, an angry statement such as, “I am angry about what you did” had been found to induce more reactance than the first two statements. Thus in the hierarchy of *levels of reactance-inducing statements*, the message type “please change” was ordered as least reactance-inducing of these three examples. “I am angry about what you did” was a message

category that was arranged hierarchically as most reactance inducing, relative to the other two examples.

Quantification and assignment of high/low levels of intensity was facilitated by the hierarchical arrangement of increasingly influential *levels of reactance-inducing statements*. This hierarchical ordering yielded an ordinal scale of message types according to their expected effect. The findings from the statistical analysis supported the choice of the ordinal positions of messages on the scale. The qualitative analysis provided the quantitative analysis with operationalizations of the independent variable *levels of reactance-inducing statements*, offering a *frequency + intensity* quantification that deeply supported the face validity of the values assigned to *levels of reactance-inducing statements*. Due to the qualitative analysis the operationalizations and levels of the independent variable were richly supported.

### *Methods*

The methods section discusses how both qualitative and quantitative methods were employed to answer research questions. The use of these two methodological approaches represents employment of two different investigative paradigms. These two methodological approaches provide different sources of knowledge, different lenses of examination, for this study. Each of these paradigms subscribes to a distinctive epistemology. *Epistemology* is a theory that defines the scope of what is included and excluded as knowledge. An epistemology defines what knowledge is, where it comes from, how it is acquired, and types of reasoning that can be applied to existing knowledge to create new knowledge.

These two epistemologies need not be at odds. The present study joins the growing body of literature that employs both qualitative and quantitative approaches to investigation. This dual-epistemological approach to scientific investigation is referred to as *triangulation*, a multifaceted approach that involves more than one method or data set. Proponents of triangulated mixed-methods consider this approach to result in a balanced and rich understanding of the data.

#### *Qualitative method*

In this section, the qualitative method used to investigate themes in the VIP transcripts is described. This section discusses considerations made in the qualitative analysis process due to unique factors in the transcripts and the rationale for the choice of unit of analysis. This section concludes with a general discussion about how validity and reliability apply to qualitative analyses.

#### *Constant-comparison analysis*

Constant-comparison analysis is also known as grounded theory method (Strauss & Corbin, 1990). *Constant-comparison analysis* is a systematic research methodology that operates in a reverse direction compared to the scientific method. Textual data are approached without a prior theoretical framework and themes are extracted, identified as codes, and used to classify sections of text according to the preconceived unit of analysis. Codes are developed, grouped into categories, modified, split, merged, and may be hierarchically ordered or nested. Relationships are observed between categories that may give rise to theory. Another name for this method is the grounded theory method. The constant-comparison method is a process of refinement and redefinition of key themes. In this manner, the structure and relationship among key concepts in the data emerges from

the data rather than the data being fit into preconceived categories. This avoidance of preconceived categories allows for generation of new knowledge from the researcher's interaction with the text. Constant comparison analysis method is useful when it is desirable to explore a textual data set to discover new knowledge.

**Unit of Analysis.** The minimum unit of analysis used in the present study was one line of text in the QSR N6 software. QSR N6 software is described in the next subsection –Software and its Use.” The one-line unit of analysis was used because it allowed for the most flexibility in analysis of the data. In cases where a coded theme ran beyond one line of text, all the relevant lines of text were selected. In such a case, the QSR N6 program counts that multi-line coded text as one instance or unit.

In QSR N6 any one line of text can be coded with multiple codes. Codes can overlap yet still be counted individually. This flexibility reflects the rich and overlapping nuances that occur in natural language and ensures the highest fidelity in transfer from textual meanings to quantified instances.

**Validity and Reliability.** In qualitative analysis, the reliability and validity of results are determined by how well the analysis fits the data. This fit depends upon the logical arguments of the analyst. One proof of fit is that independent coders found the eight reactance intensity codes sufficient to describe all 2,021 MADD VIP statements. Validity emerges from the cogency of the analyst's arguments derived from examples in the data. In qualitative analysis, the observer's standpoint is considered valid if it is explained clearly to the reader.

### *Quantitative methods*

This section discusses the quantitative methods employed in answering research questions: content analysis,

*Content analysis method.* Content analysis is a quantitative method of textual analysis. This method controls for researcher bias by training coders to independently and objectively analyze the data in a text.

**Units of Analysis.** The units of analysis and coding of the VIP presentation, being qualitative, is necessarily crude. However, previous reactance research findings and scholarly literature informed the choice of codes and units of analysis. The considerations for code identification are discussed later in this chapter. The consideration of choice of unit of analysis is discussed here. One consideration in choice of the unit of analysis concerns sampling. In the words of Jackson (1992, p. 22), “As a practical fact, we cannot apply random sampling procedures to message classes, as we can to human populations.” The message classes in this content analysis were not sampled. The messages used in the analysis comprised 100% of each VIP presentation. The VIP presentations themselves represented 100% of those MADD VIPs conducted during the original study period of 1994-1996 (Rogers, Woodall, Rao, Polacsek, & Milan, 1994).

The content in the MADD VIP presentations were analyzed with the unit of analysis being a complete message. The message itself was the unit, whether that message was in the form of a single sentence or paragraph. Paragraph breaks were made when the scene or perspective changed. Kenneth Burke (1945), in his dramatic pentad, defines the scene as the context in which the message content occurs. Therefore, units of analysis for coding content were based on units of scenes. In the present study, text-

coding breaks occur between scenes. For example, Table 3-2 shows coding of five three different scenes that were observed to occur in the same MADD VIP narrative.

**Table 3-2: Example of Units of Analysis Coding from Codebook**

<b>Reactance-Inducing Intensity</b>	<b>Scene Code</b>	<b>Text</b>
2	you & I are the same (pathos)	We know that you don't want to be here, and we don't want to be here either.
3	forewarned: a sad message is coming	It's difficult even to know where to start, when you talk about the loss of a child. Even a child that's grown.
2	you & I are the same (pathos)	If you're as lucky as I, when your children are grown, they become your best friends, and you still work and play together and they're such an important part of your life.
3	forewarned: a sad message is coming	That you don't know how to get along without them, when they're jerked away so suddenly.
1	a happy and hopeful message	On a Monday in August my son Kevin had a wonderful day, he uh, played hooky from work. I know because he worked for me. But we had a big project the next day, and he really wanted to get things cleaned up. Um, although he had his own apartment for eight years, he still loved coming back to the house. Um, that's where he kept his motorcycle, that's where he kept his drums. Anything that made too much noise for his apartment building was left at our house.

*Omnibus ANOVA for Unequal n.* Results from the content analysis were used to conduct an ANOVA. The independent variable was *VIP group*. The dependent variable

was VIP *levels of reactance-inducing statements* (first column in Table 3-2), a continuous variable whose individual values were derived from a mean of two values assigned to that statement by phase 2 coders who scored the highest interrater reliability. The means for each VIP group's *level of reactance-inducing statements* were used for the full model. The full model assumed the alternative hypothesis was true, that there was group difference. Assuming no difference between groups, the restricted model used weighted group means to calculate a weighted grand mean for unequal  $n$ . An omnibus  $F$  was calculated to test whether there was a significant difference between message dosage levels for fifteen *MADD VIP plus DWI School* intervention groups. For more detail on the procedure for calculating ANOVA for unequal  $n$ , see *nonorthogonal designs* (Maxwell & Delaney, 2004, p. 320).

**Unit of analysis.** The unit of analysis was the individual statement score. An individual statement score was the reactance-inducing intensity number for that statement arrived at by averaging the scores assigned to that statement from two coders who scored the highest interrater reliability and who each scored the entire data set. For example, if a statement was coded at reactance-inducing *level 3* by coder A and at *level 2* by coder B, then the average score for that statement was 2.5.

**Hierarchical Linear Modeling Method.** If the above omnibus ANOVA comparing the 15 MADD VIPs shows significantly different scores for the independent variables, VIP *level of reactance-inducing statements* and VIP *proportion of reactance-inducing statements*, then a hierarchical linear regression model will regress DWI arrests on individual participants' message dosages, nested within their 15 MADD VIP groups. Hierarchical linear modeling allows for an improved estimation of individual effects

when different groups are receiving similar but different interventions. Hierarchical linear modeling can evaluate how exposure to different messages can have different message effects, depending on the MADD VIP group. Further, hierarchical linear modeling can draw on “the estimation of variance and covariance components with unbalanced, nested data” (Bryk & Raudenbush, 1992, p. 7). If messages in the 15 presentations demonstrate a difference between groups’ *reactance-inducing intensity* effects, then group effects will be controlled for as covariates in a survival analysis.

**Nested Data Structures.** HLM (hierarchical linear modeling) enables the analysis of nested, data structures. People in this study, as in similar studies, exist within nested organizational structures such as the individual, the VIP cohort group, and the condition group, that is, intervention or comparison group. Participants who exist within each nested group are more similar to one another than individuals randomly sampled from a larger population. Therefore they should be statistically analyzed within the context of their nested groups.

**Unit of Analysis.** The unit of analysis for HLM would be specified in two levels of scale. The unit of analysis at the first level of scale would be mean level of VIP *reactance-inducing intensity* perceived by each participant in a VIP group. The unit of analysis at the second level of scale would be mean level of VIP *reactance-inducing intensity* for each group.

**Should IVs be analyzed as fixed or random?** The sample of MADD VIPs that was used in the study was a sample taken, for the sake of argument randomly sampled, from the entire population of MADD VIP presentations. Because the sample is considered random, the MADD VIP message dosage data can be treated, not as a fixed

factor, but as a random factor. A random factor classification assumes the different levels of dosage within different MADD VIPs were representative of the population of dosage in all VIPs. In order to determine whether the MADD VIP message dosage should be treated as a random (varying) factor or fixed (same) factor an ANOVA should be conducted to test for difference in message dosage levels between MADD VIP groups. If the MADD VIP message dosages are different, then MADD VIP intervention should be considered as a random factor in a mixed (random and fixed) model design known as HLM (Hierarchical Linear Modeling).

In the present study the low and high *level of reactance-inducing statement* dosage groups were treated in a fixed factor design because the randomness (variability) of the independent factors of *level of reactance-inducing statements* and *proportion of reactance-inducing statements* were converted into two fixed factor categories (low/high levels) that, it is argued, adequately represented VIP statement population variation. As continuous variables they were not normally distributed. In fact, they were strongly bimodal and were thus best converted to categorical variables that were regressed using loglinear logit regression.

*Loglinear logit regression.* Loglinear logit regression (also known as the logistic model, the logit model, multinomial logit, and maximum-entropy classifier) is a type of loglinear or logistic regression analysis. It is a generalized linear model (Durbin & Watson, 1950; Durbin & Watson, 1951) used for binomial regression. The dichotomous dependent variable is known as the *logit*. The logit function is the inverse of the "sigmoid", or "logistic" function used in statistics. The logit of a number  $p$  between 0 and 1 is given by the formula:

$$\text{logit}(p) = \log\left(\frac{p}{1-p}\right) = \log(p) - \log(1-p). \quad \text{Equation 3-1}$$

The outcome, in loglinear logit regression, is the log odds ratio of a case experiencing one level or another of a dichotomous dependent variable. The dependent variable outcome value for each case is the logit or log of the odds (Tabachnick & Fidell, 2007, p. 438). The equation for logistic regression is:

$$Y = \beta_0 + \beta_1x_1 + \beta_2x_2 + \beta_3x_3 + \dots \beta_kx_k, \quad \text{Equation 3-2}$$

where  $\beta_0$  is called the *intercept* and  $\beta_1, \beta_2, \beta_3 \dots \beta_k$  are the *regression coefficients* of  $x_1, x_2, x_3 \dots x_k$  that represent scores for the predictor variables. The intercept is the value of  $y$  when the value of predictor variables is zero. Each of the regression coefficients describes the size of the contribution of that predictor. Table 3-3 lists interpretation guidelines for different values of the logistic regression coefficient.

**Table 3-3: Guidelines for Interpretation of Logistic Regression Coefficient**

<b>If the coefficient is:</b>	<b>Then the interpretation is:</b>
Positive in value	The covariate (predictor) increases the probability of the outcome
Negative in value	The covariate (predictor) decreases the probability of the outcome
Large in value (significantly different from zero)	The covariate (predictor) strongly influences the probability of the outcome. It contributes meaningfully to the regression model.
Small in value (near zero)	The covariate (predictor) has little influence on the probability of the outcome. It does not contribute meaningfully to the regression model.

### **Loglinear Logit Regression Compared to Other Regression Alternatives.**

Loglinear logit regression evaluates the contribution of predictors, as does discriminant analysis, but unlike discriminant analysis logistic regression does not assume normal distributions of predictor variables. Loglinear logit regression is a type of multiway frequency analysis, which requires discrete predictors; predictors in loglinear logit regression may have more than two levels. In the present study, data were analyzed as in more than two categories and as dichotomous variables, depending on the question and level of analysis necessary to obtain the clearest result. Loglinear logit regression is more flexible than multiple regression analysis. “In logistic regression, the predictors do not have to be normally distributed, linearly related (if they are not continuous), or of equal variance within each group [i.e., homoscedasticity]” (Tabachnick & Fidell, 2007, p. 437).

Loglinear logit regression is a good choice when there are unequal  $n$  in two groups being compared and when the predictor variable influences the two groups unevenly. Bennett, Beaurepaire, Langeluddecke, Kellow, and Tennant (1991) found that while univariate analysis indicated two groups differed on 17 predictors, yet logistic analysis indicated that only one predictor, by itself, contributed to a best fit model. The reason for differences in results between univariate analysis and logistic regression was that logistic regression is robust to unequal  $n$  in predictor variables. In the present study, as in the Bennett et al. study, the sample sizes were uneven. The DWI School comparison group comprised only 2% of the sample, versus 98% sample comprised of the MADD VIP plus DWI School intervention group. Logistic regression was able to discern a predictor relationship despite unequal  $n$  between groups, making it appropriate for use in

analysis of the present study data. There are other reasons logistic regression was appropriate and these are discussed next.

**Loglinear Logit Regression Appropriateness for the Present Study.** The loglinear logit regression method is the appropriate regression method for the present study due to qualities of the data. Given non-normal distributions, unequal  $n$ , homoscedasticity, and bimodal distribution of effects in terms of bifurcated effects outcomes in independent and dependent variables, it was necessary to transform continuous variables into categorical variables and loglinear logit regression is suited to regress categorical variables. The method outputs odds of an event occurring, given the data. For example, logistic regression can output log odds and probability measures that DWI offenders will be rearrested for DWI again in the sooner/later categories given their age (dichotomous), number of priors (dichotomous or categorical), and antecedent patterns of VIP message dosage (low/high *levels of reactance-inducing statements*, dichotomous, or *no VIP* versus *low reactance-inducing VIPs* versus *high-reactance VIPs*).

Loglinear logit regression is suitable for evaluating two predictors, *level of reactance-inducing statements* and *proportion of reactance-inducing statements*, because these two predictors are not normally distributed, linearly related to the dependent variables, and are heteroscedastic. A bimodal distribution cannot be transformed into a normal distribution. They are not linear, and they are not homoscedastic. They are best categorized, being bimodal, as dichotomous variables. Loglinear logit regression can evaluate *levels of reactance-inducing statements* and *proportion of reactance-inducing statements* though they do not meet necessary assumptions for other forms of regression.

Loglinear logit regression identifies the most adequate regression model even if there are unequal split of cases (as extreme as a 2% / 98% split) in levels of the independent variables. Unequal  $n$  in levels of the independent variables is the case with reactance-inducing level ( $n_{\text{low}} = 90$ ,  $n_{\text{high}} = 294$ ), where the smaller group has 31% of the number of cases as the larger group, and *priors* ( $n_{\text{none}} = 786$ ,  $n_{\text{one-or-more}} = 47$ ), where the smaller group has 6% of the number of cases as the larger group.

When the distribution of the outcome variable in relation to an independent variable is not linear, as is the case with *level of reactance-inducing statements*, loglinear logit regression can still identify an effect. In the present study, the probability of short *time\_to\_recidivism* was affected by *level of reactance-inducing statements* for those *priors* who were age 30 and older, but the relationship was not linear. A linear relationship was not possible due to the bimodality of both variables. Loglinear regression is sensitive to detecting and identifying these differences in non-linear relationships.

According to one rule-of-thumb, there should be at least five cases expected in each cell. According to another rule-of-thumb the optimal situation is where all expected cell frequencies are greater than one for all cells created by pairs of discrete predictors paired with the dependent variable. If the minimum number-of-cases-per-cell criterion is not met, then the remedy for this situation is first, collapse predictor variables into fewer levels. If that does not resolve the problem, then eliminate weakly contributing predictor variables that are correlated with strongly contributing predictor variables. Another remedy, not always available, is to increase the sample size.

The dependent variable, *time to recidivism*, in the loglinear regression was dichotomized as the first four years after intervention versus after four years following the intervention. The division between two levels of *time to recidivism* may be a relatively crude division point because there are only three cases of prior offenders who survived beyond four years. However, the inflection points of the survival change curves (see Figure 4-4) for both *priors* and *no priors* determined the best estimate of a proper break point for the dichotomous dependent variable. Again, it may be noted that over 100 *prior* offenders who had not been recently arrested were included in the *no prior* category in the present analysis.

**Unit of analysis.** Logistic regression uses the individual case as the unit of analysis.

#### *Survival analysis method*

The survival analysis method calculates the time DWI offenders “survive” until they are rearrested for DWI offenses once again. Of the several types of survival analysis available to statisticians, the most suitable statistical tests for this study are the Cox Proportional Hazards Regression and Life Tables analysis. Cox Proportional Hazards Regression evaluates the predictor effects upon survival time until recidivism. It also allows for the use of covariates. Life Tables analysis does not allow for use of covariates, but it provides the Wald statistic, a test for group difference in survival analysis.

**Unit of analysis.** The survival analysis method uses the individual case as the unit of analysis.

**Test for Time Dependence.** Time-dependent Cox regression can be used if the variables of interest vary over time. All of the variables in the present study were tested

for time dependence and found to be constant over time and so a time-dependent Cox Regression was not required.

**Censored Data.** Survival data usually includes some cases for which the event of interest has not happened. For example, by the end of the study on December 31, 2007, the event of interest, recidivism, had not occurred for a majority of offenders. At the end of the study they still have not been rearrested. Cases that have not experienced the *event* or recidivism, who have not been rearrested for whatever reason, are classified as *censored cases*. Censored, or missing, cases cause traditional techniques such as t-tests or linear regression to be inaccurate. A survival analysis excludes censored cases from the regression section of the calculations but reintroduces them and uses them in calculating the survival function, a hazard likelihood—because these non-event cases have an odds ratio, a *probability of no event* to contribute to the hazard model.

**Causes for Missing Event Data.** Event data can be missing from a case record for other reasons other than the offender was not rearrested: for some cases recidivism for DWI happened after the study closed. In other cases the court system lost track of DWI status sometime before the end of the study, for example a case file was lost, data were entered incorrectly, or a DWI arrest was made but the offense was transmuted to a different type of offense. In this case, the recidivism DWI offense did not show up in that participant's court record. In other cases, some study participants may have “dropped off the New Mexico traffic safety radar” because they were in prison, moved out of state, or because they were deceased.

**Prediction of Survival based on IVs.** Claims of causality, the extent to which they can be made in the present study, are now considered. The original study designed

by Rogers, Woodall, Rao, Polacsek, and Milan (1994), of which this study is a message effects extension, was an empirical study that compared participant outcomes between two randomly assigned groups: VIP only versus VIP plus DWI School. If a significant difference between these groups was found, then due to the experimental design, causality might be inferred. However, the present study subdivides both groups into high and low reactance-inducing VIP groups. This subdivision introduces an observational element into the study because participants were not randomly assigned to high and low reactance-inducing VIP groups. At the time the original study was conducted, it was not known that the VIP intervention consisted of two *levels of reactance-inducing statements*. The observational nature of the VIP subdivisions in this study precludes an ability to draw causal inferences from the VIP subdivisions. However, causal inferences can be made at the VIP versus VIP plus DWI School levels of the independent variable that compares intervention types. These considerations are kept in mind when discussing predictability of independent variables influence upon the dependent variables. Because the independent variable is sometimes referred to as the predictor variable in the present study does not mean that causal inferences are being made. Rather the term *predictor* is used in a general sense as an independent variable in the context of a regression equation.

Cox regression is a subtype of survival analysis that allows for the inclusion of predictor variables (covariates) in the model. Cox regression omits the censored cases (those who did not experience the outcome event, recidivism) from the stepwise regression but includes censored cases in the computation of the probability of survival. Cox regression, using stepwise regression analysis, provides regression coefficients for each of the predictor variables, enabling assessment of the impact of multiple covariates

in the same model. Cox Regression can be used to examine the effect of continuous or discrete covariates (Cox, 1972). The Cox regression assumes the time to event (in this case the event is recidivism) and the covariates are related using the hazard function in equation 3-4.

$$h_i(t) = [h_0(t)] e^{b_0 + b_1 x_{i1} + \dots + b_p x_{ip}} \quad (\text{Equation 3-4})$$

Where

$h_i(t)$  is the hazard rate for the  $i^{\text{th}}$  case at time  $t$

$h_0(t)$  is the baseline hazard at time  $t$

$p$  is the number of covariates

$b_j$  is the value of the  $j^{\text{th}}$  regression coefficient

$x_{ij}$  is the value of the  $i^{\text{th}}$  case of the  $j^{\text{th}}$  covariate

The hazard function is a measure of the potential for the event to occur at a particular time  $t$ , given the event did not yet occur. Larger values of the hazard function signal greater potential for the event to occur.  $S_i(t)$  is the likelihood the  $i^{\text{th}}$  case survives past time  $t$ .

The value of the hazard is equal to the product of the baseline hazard and a covariate effect. While the baseline hazard is dependent upon time, the covariate effect is the same for all time points. Thus, the ratio of the hazards for any two cases at any time period is the ratio of their covariate effects. This is the proportional hazards assumption.

$$S_i(t) = e^{-\int_0^t [h_0(t)] e^{b_0 + b_1 x_{i1} + \dots + b_p x_{ip}} dt}$$

where

The concept of "hazard" may not be intuitive, but it is related to the survival function. The value of the survival function is the probability that the given event has not occurred by time  $t$ . Again; the baseline hazard determines the shape of the survival function.

The equation 3-4 denotes  $-S(t)$ , which stands for the survival time until recidivism.  $S$  is the conventional denotation for the *survival function*;  $t$  is the

conventional denotation for time. Equation 3-5 describes the equation  $S(t)$  such that survival until recidivism is a function of time.  $S(t)$  is equal to the likelihood “Pr” (probability)  $T$  is later than some time  $t$ . For example, arrest  $T$  is later than intervention date (for MADD VIP plus DWI School intervention group) or enrollment date (for DWI School comparison group).  $S(0) = 1$ , at the beginning of the study.

$$S(t) = \Pr(T > t) \quad (\text{Equation 3-5})$$

*The Wald Statistic in Logistic Regression and Survival Analysis*

The Wald statistic is used in the Cox regression to test whether each covariate (including the independent variable) has a significant causal relationship with the dependent variable of time to event. SPSS compares the square of the difference to the chi-square distribution. For the one dependent variable, such as time to event in the case of the single event Cox regression, the Wald statistic for the univariate case is represented in equation

3-6.

$$\frac{(\hat{\theta} - \theta_0)^2}{\text{var}(\hat{\theta})} \quad (\text{Equation 3-6})$$

The Wald statistic is used in logistic regression to evaluate the statistical significance of each of the coefficients in an acceptable model. For this purpose, the Wald statistic is computed as represented in equation 3-7, where “the squared regression coefficient is divided by its squared standard error” (Tabachnick & Fidell, 2007, p. 445).

$$W_j = \frac{B_j^2}{SE_{Bj}^2} \quad (\text{Equation 3-7})$$

### *Procedures*

The present study employed a four-phased procedural approach.

1. *Quantifying reactance message dosages.*
  - a. *The qualitative constant comparison* method was used to identify coding themes in transcripts of 15 MADD VIPs. Qualitatively identified themes were refined to create eight ordinal reactance intensity codes, and their definitions, compiled in a codebook. Table 3-2 presents the reactance intensity codebook. Each code was developed as unique and distinct, with definable differences from other codes. Eight reactance intensity codes were developed to be parsimonious but sufficiently rich to classify all of the 2,021 MADD VIP statements by 56 presenters in 15 VIPs.<sup>18</sup> The zone of red reactance intensity codes is arranged in an ordinal order of increasingly strong confrontational messages to induce behavior change. Brock (1968) found the best way to characterize “threats to freedom” is by an ordinal scale. Hong and Faeda (1996) used an ordinal reactance scale to predict reactance. The present study also used an ordinal scale of *level of reactance-inducing statements*. Researchers have identified the confrontational messages in the ordinal continuum of the red zone as increasing *levels of reactance-inducing statements* as message strength increases (Buller et al., 2000; Campo &

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<sup>18</sup> It was not fruitful to analyze VIP texts at the level of each of the 56 presenters due to the high within-presenter message variance compared to the low between-presenter message variance. Thus a presenter-based analysis was not conducted; it was outside of the scope of possibility for these naturally occurring *in vivo* (real life) speaker data.

Cameron, 2006; Engs & Hanson, 1989; Miller et al., 2006; Quick, 2003; Quick & Stephenson, 2004). The last five themes —“frewarned: sad message coming,” “worried, depressed, confused,” “irritated, hurt, devastated,” “you should change,” and “angry” were reactance-inducing statements according to the research of Dillard and Shen (2005) and others (Brehm, 1966, 1972; Brehm & Cohen, 1962; Brehm & Cole, 1966; Goranson & Berkowitz, 1966). Researchers characterize these confrontational messages as reactance aggravators, “reactance can be operationalized as a composite of self-report indices of anger and negative cognitions” (Dillard & Shen, 2005, p. 144). Quick and Stephenson (2007) model reactance as “a latent variable comprised of negative cognitions and state anger” (p. 255). Previous researchers have identified red-area codes four, five, six, seven, and eight as reactance inducing (Dillard & Shen, 2005). They produce a lowered mood (Hong & Faeda, 1996); they are strong inducements to induce contrary behavior (Festinger, 1957, Festinger & Carlsmith, 1959; Freedman, 1965); and they are likely to increase a “boomerang effect” of increased noncompliance (Hollander, 1971).

i. **Reactance Constructs Quantified within an Ordinal Scale of**

**Codes.** The blue area of the codes in Table 3-4 signifies positive valence statements intended to set up rapport between the speaker and his or her audience. These low-numbered codes signify a message that is not reactance inducing.

1. **Code 1: “I am happy, hopeful”** is a positively valenced statement. This statement has not been found to be reactance

inducing in previous research (Brehm, 1966, 1972; Brehm & Cohen, 1962; Brehm & Cole, 1966; Buller et al., 2000; Campo & Cameron, 2006; Dillard & Shen, 2005; Engs & Hanson, 1989; Goranson & Berkowitz, 1966; Miller et al., 2006; Quick, 2003; Quick & Stephenson, 2004, 2007).

2. **Code 2: Pathos** is emotional identification between the speaker and the audience, also a positive state according to research cited in the previous item. These first two blue-area statements encouraged DWI offenders in the audience feel at ease and to like the speaker.
3. **Code 3: “please change,”** is not reactance inducing according to research by Dillard and Shen. However, no matter how politely it is spoken, according to other researchers, “please change” may threaten or irritate audience members by degrees depending on the extent to which an offender believes he or she has the freedom to drink and drive. Behavior change requests are most likely to annoy repeat offenders (Brehm, 1966, 1972; Buller, Burgoon, Hall, Levine, Taylor, Beach, Buller, & Melchor, 2000; Camp & Cameron, 2006; Engs & Hanson, 1989; Miller, Benefield, & Tonigan, 1993; Miller, Burgoon, Grandpre, & Alvaro, 2006; Quick, 2003).
4. **Codes 4-8: Reactance-inducing statements.** Researchers identified “forewarning” as reactance inducing (Petty &

Cacioppo, 1977). ~~W~~orried, depressed, confused,” ~~H~~irritated, hurt, devastated,” ~~Y~~ou should change,” and ~~I~~am angry with your” are types of statements that also have been found to be reactance inducing in the research cited in the first item of this code list. For purposes of creating an ordinal scale that signified reactance-inducing intensity, the above statements were organized in an ordinal hierarchy, in increasing levels of emotional escalation.

- ii. **Codebook Production.** Each code was defined and structured as independent of the other codes. A codebook was produced that employed the above ordinal list of high/low threat codes. As the ordinal number increased in the code list there was a corresponding increase signified in reactance-inducing intensity. Reactance research and reactance theory attributes more reactance-inducing affect as message intensity increases. For example, the higher the level of reactance-inducing level, confrontation, and loss frame, the more reactance inducing the message. Each reactance intensity message code was specified with a definition and an example, as demonstrated in the coding example in Table 3-2. The full list of reactance intensity codes is displayed in Table 3-4.

For ease of use and to increase coding accuracy, reactance intensity codes used by the coders were reordered to represent ordinal escalation of the strength with which they induced reactance. ~~P~~lease change” and ~~y~~ou should change” were adjoining as codes six

and seven. However, “please change” is not reactance inducing and “you should change” is a reactance-inducing statement (Dillard & Shen, 2005). For purposes of creating an ordinal measure of reactance inducement, codes were re-ranked in an order representing least to most reactance-inducing statements. “Please change” became code number three and each successive code moved up by one code number. The messages in the upper scale are positive and nonthreatening or not reactance inducing. These messages are “Happy, hopeful” and “You and I are same.” “You and I are same” is also a *pathos*-producing (Aristotle, 2006) statement that rhetoricians use to increase consubstantiality (Burke, 1965) and thus compliance from their audience.

**Table 3-4: Set of eight ordinal reactance intensity codes used to code the 2,021 statements by 56 presenters in 15 MADD VIPs.**

Adjusted Codes	1 happy, hopeful	
	2 you & I are same	
	3 please change	Chg from 6
	4 forwarning: a sad message is coming	Chg from 3
	5 worried, depressed, confused	Chg from 4
	6 irritated, hurt, devastated	Chg from 5
	7 you should change	
	8 angry	

An ordinal range of levels of reactance constructs were identified that ranged from non-reactance inducing, to mild reactance inducing, and to strong reactance inducing. Its number in the ordinal scale represented the ordinal position of a code. These

ordinal numbers were then used to calculate two independent variables that measured reactance message dosage: *level of reactance-inducing statements* in the VIP intervention (average reactance-inducing level for each VIP based on an mean frequency of occurrence combined with the intensity code levels) and *proportion of reactance-inducing statements* (proportion of statements in a VIP that were on the reactance-inducing levels of the scale).

The zone of red codes contained an ordinal order of increasingly strong, confrontational, reactance-inducing messages. An ordinal scale was found to be best way to characterize “threats to freedom” (Brock, 1968). Hong and Faeda (1996) used an ordinal reactance scale to predict reactance. The present study used an ordinal scale to differentiate between increasing severity of reactance-inducing statements.

The ordinal scaling of reactance-inducing message severity was informed by research on these five reactance constructs (Buller et al., 2000; Campo & Cameron, 2006; Engs & Hanson, 1989; Miller et al., 2006; Quick, 2003; Quick & Stephenson, 2004). The reactance-inducing themes “drewarned: sad message coming,” “worried, depressed, confused,” “irritated, hurt, devastated,” “you should change,” and “angry” have also been categorized as reactance-inducing statements by Dillard and Shen (2005) and others (Brehm, 1966, 1972; Brehm & Cohen, 1962; Brehm & Cole, 1966; Goranson & Berkowitz, 1966). Researchers characterize these confrontational messages as reactance aggravators, aggravating anger and negative and contrary behaviors. (Dillard & Shen, 2005; Quick & Stephenson, 2007). Previous researchers have identified that red-area codes four, five, six, seven, and eight are reactance inducing (Dillard & Shen, 2005). They produce a lowered mood (Hong & Faeda, 1996). They are strong inducements to

induce contrary behavior (Festinger, 1957; Festinger & Carlsmith, 1959; Freedman, 1965), and they are likely to increase a “boomerang effect” of increased noncompliance (Hollander, 1971) rather than the compliance expected by the sources of the messages.

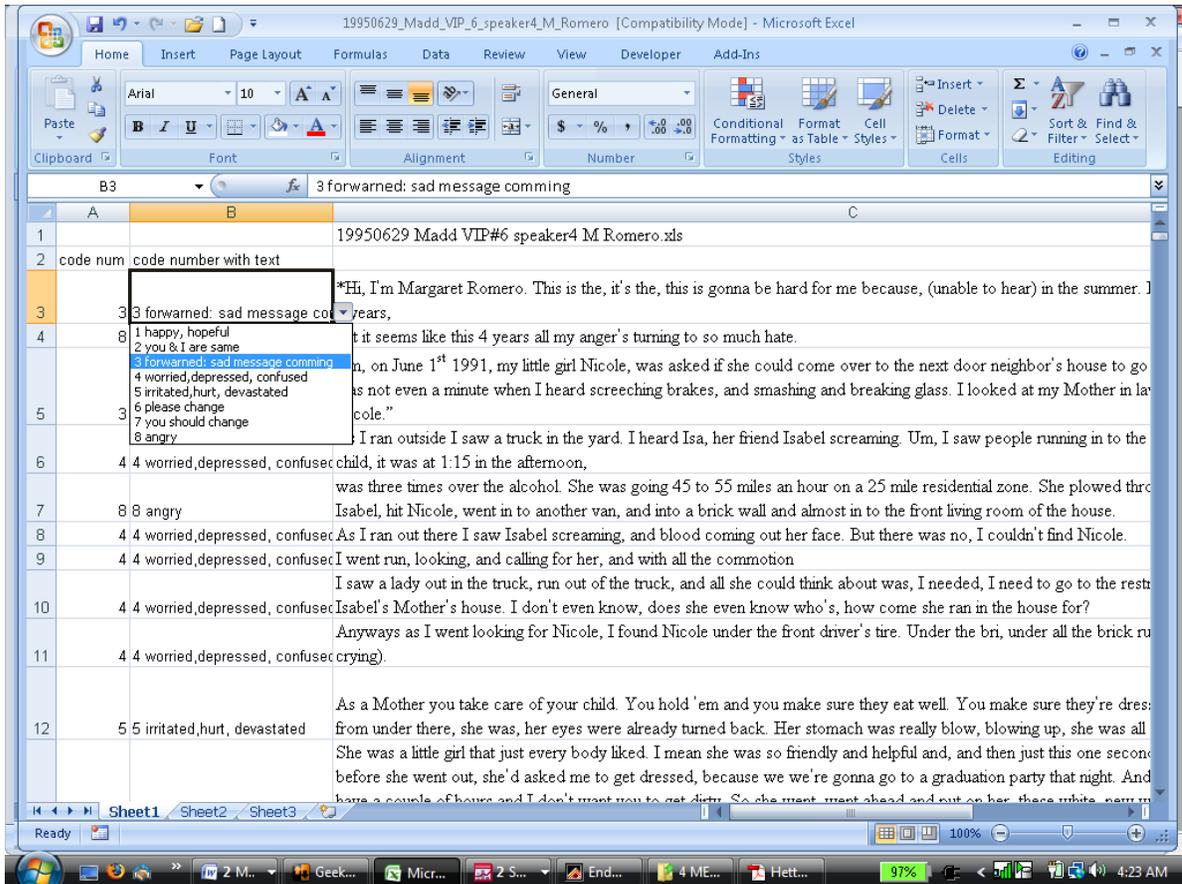
iii. **Separate spreadsheets were created for each VIP presenter**

**transcript.** Each spreadsheet contained (1) a cell for each MADD VIP presenter statement and (2) a drop-down menu for each cell. Each drop-down menu contained a choice of the eight ordinal codes in increasing reactance-inducing intensity that were to be used in the content analysis. Thus a coder would be able to read a presenter statement then choose from a drop-down menu next to that statement which of the eight ordinal reactance-inducing codes would best classify that presenter statement. Figure 3-1 contains a screen shot of a portion of a coder’s Excel coding spreadsheet.

iv. **Quantitative content analysis method** was used to quantify the frequency of occurrence of coding themes.

v. **Training of Coders.** Eight coders were trained to code the MADD VIP transcripts using the qualitatively generated reactance-inducing codes. The independent coders each coded text using Excel spreadsheets with drop-down code menus for each VIP unit of analysis. Each unit of analysis (one scene, complete thought, or narrative) had its own cell with an adjacent drop-down menu. The coders made a choice from the eight reactance-inducing codes for each

unit of analysis. Figure 3-1 is a screen shot of a portion of a coder's Excel coding spreadsheet.



**Figure 3-1: Screen shot of Excel spreadsheet from which coders coded MADD VIP transcripts.** Each unit of analysis was contained in one cell, with adjacent drop-down menu from which coders chose one of eight reactance-inducing codes.

After coding was completed, the interrater reliability was computed using the Fleiss' kappa described below. If reliability is less than 80% then the coders must be retrained. The investigator and coders discuss where the differences are found. They redefine the problematic codes with refined definitions and examples. Then the coders

recode. If reliability is less than 80% then it is necessary to redefine codes and/or retrain coders until reliability reaches 80%.

- b. **Phase 1 Content Analysis Validity and Reliability.** In quantitative analysis, the epistemological assumption is: there is one conclusion that is probably true that can be arrived at by agreement of different parties. That level of truth in content analysis is measured by interrater reliability, a measure of coder agreement. The coded data was collected from the eight coders and interrater reliability was computed using *Fleiss' kappa*.

*Fleiss' kappa* is a generalization of Scott's pi statistic (1955), a statistical measure of interrater reliability. It is also related to Cohen's kappa statistic (1960). Whereas Scott's pi and Cohen's kappa work for only two raters, Fleiss' kappa works for any number of raters who are determining categorical ratings for a fixed number of items. Fleiss' kappa can be interpreted as expressing the extent to which the observed amount of agreement among raters exceeds what would be expected if all raters made their ratings completely randomly. If a fixed number of people assign numerical ratings to a fixed number of items then the kappa will give a measure for how consistent are the ratings.

To measure coder reliability, half of each coder's documents were assigned to two other coders. Overlapping the coding provided a means to measure interrater reliability and a basis for arguing for generalizability of the content analysis. This standardized content analysis yielded generalizable and replicable results with kappa as a coefficient of agreement for nominal scales = 0.68 (Cohen, 1960). Phase 1 kappas between pairs of coders ranged from 0.42 - 0.90, with a standard deviation 0.12. Statisticians consider a kappa of 0.61 - .80 substantial agreement (Everitt, 1996; Landis & Koch, 1977).

According to Cohen, an average kappa of 0.68 is interpreted as follows. On the average 68% of the coders' joint judgments were agreements (with chance excluded). The kappa marginals for the eight coders in ten overlapping pairs were 0.78, 0.96, 0.74, 0.90, 0.92, 0.78, 0.89, 0.96, 0.97, and 0.84. The average marginal marks the maximum value that kappa could take for this data as a function of the expertise of coders, the level of focused attention of the coders, and the quality of the data. The marginal was 0.87. Therefore, nearly 20% of the disagreement was a result of marginal inconsistencies, and this number signaled a degree of coder inattention. The marginal of .87 was not due to quality of the data or ambiguity of the coding set because the highest kappa was .90, pointing out the data set and coding set were unambiguous (Cohen, 1960). Figure 3-1 shows the formula used to calculate coder kappa. This kappa uses a simpler and more conservative calculation for nominal scales than that for ordinal scales. The calculations of the ordinal scale kappa are presented in the next discussion.

$$\kappa = \frac{\bar{P} - \bar{P}_e}{1 - \bar{P}_e} \quad (\text{Equation 3-8})$$

A coefficient of interjudge agreement for nominal scales is described as follows:  $\bar{P}$  is the likelihood of observed data, the proportion of units in which the judges agreed.  $P_e$  is the likelihood of chance, the proportion of units for which agreement is expected by chance. Kappa equals the proportion of joint judgments in which there is agreement, after chance is excluded. Its upper limit is +1.00, and its lower limit falls between zero and negative 1.00, depending on the distribution of judgments by a pair of two judges. The

maximum value which kappa can take for any given set of data is  $\kappa_M$ , which is dependent on the marginal distributions” (Cohen, 1960, pp. 37-47).

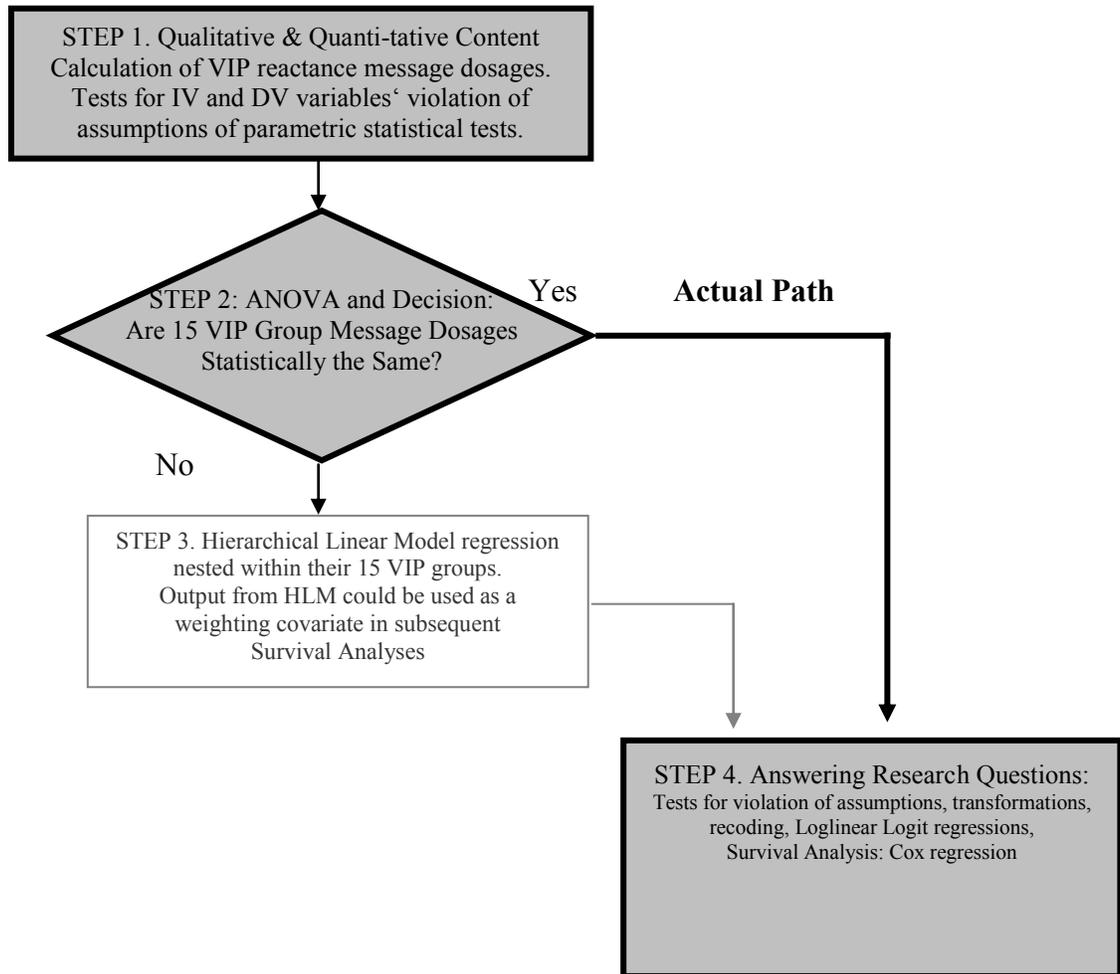
c. **Phase 2 Content Analysis Validity and Reliability.** The two highest-scoring coders obtained the highest interrater reliability score in overlapping partial data samples in phase 1, a nominal kappa of 0.90. In phase 2 of content analysis, these two highest-rating coders each recoded the entire data set of 56 presentations again, once again using the eight ordinal reactance-inducing codes. This phase 2 of content analysis yielded a second measure of generalizability and replicability of results yielding a kappa of 0.78 for nominal scales. *Kappa* only considers whether judges agreed exactly or did not agree exactly on category coding. *Kappa weighted* is a chance-corrected proportion of weighted agreement for ordinal reactance-inducing codes that adds credit for the *degree of disagreement* on ordinal scales (Cohen, 1968). In phase 2, the highest-scoring phase 1 partial-data coders each recoded the entire data set and scored a kappa weighted, adjusted for ordinal scales, of 0.83. Everitt (1996) and Landis and Koch (1977) classify kappa of 0.61 to 0.80 as substantial agreement and a kappa of .81 to 1.00 as strong agreement. Therefore phase 2 content analysis by the highest-scoring coders produced a strong agreement. Equation 3-9 presents the formula for weighted kappa for ordinal coding scales.

$$\kappa = 1 - \frac{\sum v_{ij} p_{oij}}{\sum v_{ij} p_{cij}} \quad (\text{Equation 3-9})$$

The previously described unweighted kappa (Cohen, 1960) treats all judge disagreements equally. Cohen's (1968) generalization to weighed kappa provides for the incorporation of ratio-scaled degrees of disagreement (or agreement) for each of the cells of the  $k \times k$  table of joint nominal scale assignments such that disagreements of varying gravity (or agreements of varying degree) are weighted accordingly" (p. 213).  $V_{ij}$  is the ratio weight, which represents the *degree* of disagreement on an ordinal scale.  $P_{oij}$  is the proportion of the joint judgments ( $N$  in number) observed in the  $ij$  cell.  $P_{cij}$  is the proportion in the cell expected by chance. Weighted kappa equals the proportion of joint judgments in which there is agreement, after chance is excluded. Its upper limit is +1.00, and its lower limit falls between zero and -1.00, depending on the distribution of judgments by a pair of two judges. The maximum value which kappa can take for any given set of data is  $K_M$ , which is dependent on the marginal distributions.

2. *Omnibus ANOVA to determine if HLM was warranted.* This test was conducted upon the VIP message dosage values for the 15 VIP groups. There was no significant difference between the 15 MADD VIP groups mean *level of reactance-inducing statements*, or reactance dosage values, thus step 3 was not conducted. It was not necessary to conduct a hierarchical linear model to regress the outcome variables onto independent variables within participants' nested groups. However, a contrast revealed that there was a significant difference between VIP Group 13 (low dosage) and the other 14 groups (high dosage). Group 13 was then assigned a level of the analysis as "low dosage" and all the other groups were assigned as "high dosage" groups.

3. *Hierarchical Linear Modeling was not necessary.* There was no need, based on the ANOVA in step 3, to conduct HLM for treatment of random factors. (An independent variable is referred to as a *factor* in the language of research design.) A basic assumption in introductory statistics is to assume a fixed factor design. A one-way fixed factor, in general, is defined as a design where participants are grouped into different groups, where each group experiences different levels of a factor. The problem with applying fixed-factor design is that the different MADD VIP meetings may randomly vary in levels of MADD VIP message dosage. This is because different presenters presented, somewhat randomly, at different VIPs. A random factor design takes the perspective that the independent variable is —not so much *‘manipulated’* as *‘sampled.’*” (Maxwell and Delaney, 2004, p. 479).
4. *Tests for outliers, violation of assumptions, transformations and recoding, tests for relationships between reactance antecedents and recidivism to answer research questions:* Figure 3-2 provides a flow chart that describes the order of the four procedural steps of analysis used in the present study.



**Figure 3-2: Flow chart of order of procedures.**

*Instruments and Data Sources*

Rogers, Woodall, Rao, Polacsek, & Milan (1994) assessed MADD participants four times during the original study using a adaptation, *Form 90-DWI*, from a standardized questionnaire *Form 90* (Hetteema, Miller, Tonigan, & Delaney, 2008), and DWI recidivism data, with the fifth assessment being the present study that employs previous assessments and a 12-year database of participant recidivism data.

*Instrument: The questionnaire*

Self-report questionnaires and interviews were used to obtain data on pre/post change in emotional mood in the original study. Rogers, Woodall, Rao, Polacsek, & Milan (1994) administered *Form-90 DWI*, a variant of NIAAA Form 90 developed by Hetteema, Miller, Tonigan, and Delaney (2008), at pretest, post-test, and at one and 2-year follows ups. Form 90 was developed as a standardized assessment in NIAAA (National Institute on Alcohol Abuse and Addiction) Project Match, a \$27 million dollar, nationwide test of alcohol interventions, conducted over eight years.

The questionnaire asked participants an array of questions related to drinking. It also asked participants how they felt about being assessed about drinking. It asked, for example, whether participants were interested, nervous, distressed and it asked other mood indicators at different points in the study. The questionnaire asked participants about their attitudes towards driving drunk or their attitudes about being a passenger of a drunk driver.

Woodall et al. (2005) administered the above-described instrument at pre and post MADD VIP, post DWI school, and at one and 2-year follow-ups. Some additional questions were added to the questionnaire at the later follow-up dates. Appendix 2: Pre-post MADD VIP Instrument contains a copy of the questionnaire used in the present study. Some of the follow-up interviews could not be conducted because the participant was not located, thus there were cases where data were missing. In the present study, the rule for inclusion in calculations of the pre-post differences in *emotional change scores* was as follows. If the pre test had less than 6 responses missing, empty responses were replaced with case mean. Pre-post difference scores were calculated for those participants

who could be located for the post interviews ( $n = 518$ ). Because of not being located for follow-up interviews, 198 cases were missing from the treatment group and 117 from the DWI School comparison group for *emotional change scores*.

#### *Questionnaire reliability and validity*

Self-reports are often not a reliable source of data (Richard, van der Pligt, & de Vries, 1996). Perhaps this observation is most true when the report is self-incriminating. Due to their self-incriminating content and thus less reliable nature, questionnaire self reports were not used to measure drinking frequency.

Other sections of the questionnaire, derived from Form-90, were used in the data analysis. According to Hettema, Miller, Tonigan, and Delaney (2008), their retested *Form 90-DWI*, of which this questionnaire was an adaptation (Hettema, Miller, Tonigan, & Delaney, 2008), may be the current —most reliable tool for assessing DWI behavior.”

Our data indicate that the Form 90-DWI shows promise for providing a reliable estimate of drinking behavior and several important DWI behaviors, including frequency of DWI and associated DWI BACs... as the BAC level associated with behaviors increased, reliability decreased. It is possible that this phenomenon is the result of memory deficits that have been documented to accompany high BAC levels...Assessing levels of validity is an important next step. This task may be difficult, however, as there is currently no established —gold standard” for assessment of DWI behavior...In sum, the Form 90-DWI appears to yield reliable indices of DWI behavior among the tested sample, a finding that provides impetus for further research with additional samples. The Form 90-DWI shows promise for providing a much-needed measure of DWI intervention outcome. Form 90-

DWI overcomes limitations of indicators in current use, such as arrests and injuries. These measures occur at low frequency. Their accuracy is influenced by a variety of confounding factors. The Form 90-DWI does not rely on the respondent's subjective judgment of intoxication but rather estimates BAC from reconstructed drinking data. The current investigation provides preliminary evidence that the Form 90-DWI may be a reliable tool for assessing DWI behavior itself rather than just its tragic consequences (p. 120).

#### *Secondary data source*

Public records of participants' subsequent arrests at twelve years post intervention were used as a secondary data source.

#### *Public arrest records*

The public records of DWI re-arrests, obtained through the Citation Tracking System (CTS) data file maintained by the Division of Government Research at the University of New Mexico, provided the source of outcome measures—*time to recidivism* and *number of subsequent arrests*.

### *The Variables*

#### *Covariate operationalizations and measure of constructs*

C' de Baca, Lapham, Liang, and Skipper (2001) found there was no statistical association between MADD VIPs and first-time offender recidivism. However, "female repeat offenders who were referred to VIPs were significantly more likely to be rearrested" (p. 615) compared to non-VIP comparisons. Wells-Parker, Pang, Anderson, McMillen and Miller (1991) also found difference in male and female recidivism rates. With the caveat that these studies were quasi-experimental and their findings not entirely

reliable, yet they suggest that gender and number of previous DWI arrests should be at least investigated as covariates in the present study.

#### *Age*

Age is constructed as the age of participants at the time they were enrolled in the study, obtained from New Mexico court records.

#### *Gender*

Gender is constructed as participants' gender at the time they were enrolled in the study, obtained from New Mexico court records.

#### *Number of prior arrests*

Number of prior arrests is obtained from New Mexico traffic violation records.

#### *Independent variable operationalizations and measures of theoretical constructs*

Values for the independent variable, *level of reactance-inducing statements*, was arrived at through an operationalizations process that quantified presence of theoretical reactance-inducing constructs in the form of reactance-inducing message types. There is an advantage to aggregating multiple messages into archetypal message types in order to measure theoretical constructs and to further the science of message design. Jackson, O'Keefe, Jacobs, and Brashers (1989) compared single laboratory-controlled message research to research involving exemplars of multiple message types and found the multiple-message study design to be superior.

multiple-message designs provide greater reliability in estimation of treatment effects, equivalent power for detection of variability in treatment effects, and easier identification of moderator variables (p. 364).

In the present study, MADD VIP transcripts containing multiple exemplars of reactance-inducing message types were analyzed. Six archetypal conventional message effects constructs plus eight constructs from reactance theory (Brehm, 1966) were held in mind as the researcher developed definitions and exemplars for message types from the MADD VIP transcripts. Employing constant comparison analysis, these fourteen constructs were translated to a hierarchical arrangement of increasing reactance-inducing message codes that coders used to measure level of presence or absence of reactance antecedents in 2,021 statements of 56 presenters at the 15 MADD VIP presentations. Variables that measure the levels and proportions of reactance antecedents in MADD VIPs comprise the independent measures in this study.

A psi contrast was conducted to compare those VIP groups who scored relatively low on the reactance scale to those who scored relatively higher. This contrast revealed that there was a statistical justification for categorizing VIP groups into low and high-reactance groups. The DWI School Only group functioned as a third comparison group, representing a group that had not been exposed to any level of the reactance-inducing VIP statements. Categorical comparison of the three groups enabled exploration of whether a change in reactance levels was consistent with a change in DWI recidivism.

#### *Identification of reactance constructs in VIP transcripts*

Theoretical constructs that guided the qualitative analysis were message context, content, function, intensity, and pathos as discussed above and in the review of literature. Force or pressure has been found to reduce compliance (Festinger & Carlsmith, 1959). Forceful language, language in the imperative, subjunctive, or conjunctive mood that expresses wishes or commands was classified as high-threat language (Duda, Hart, &

Stork, 2001). An example of high-threat language is —Responsible drinking: you have to do it” (Dillard & Shen, 2005). Informational declarative language or language in the indicative mood (for example, questions) was coded as low-threat language (Dillard & Shen, 2005). Verb mood and inductive/deductive reasoning was classified as either high-threat or low threat according to the guidelines set down by Dillard and Shen (2005).

#### *Dependent variable operationalization and measure of reactance outcomes*

Reactance is an intervening state between reactance antecedents (Brehm, 1966) and the contrary behavior that results from the state of reactance. *Reactance* is an attitude that must precede acting out the reactant behavior. *Reactance* is not the reactant behavior itself but an intervening state between reactance antecedents and the contrary outcome behavior, in this case increased DWI recidivism. Evidence for *reactance* is found when an intervention condition that evidences high levels of reactance antecedents is associated with increased recidivism such as *shorter time to* recidivism and *greater number of subsequent arrests*. These two dependent measures are used in the present study.

As in the C´de Baca et al. study (2001), the present study uses the Citation Tracking System (CTS) data file maintained by the Division of Government Research at the University of New Mexico to provide outcome data. The database holds all New Mexico DWI records from July 1984 to present. Two dependent measures were derived from the CTS: *time until* recidivism and *number of subsequent arrests*.

#### *Time until recidivism*

The dependent measure *time until* recidivism was calculated from the CTS database. It was calculated as the time until the first re-arrest after enrollment in the study. This date was used instead of the date of the index arrest that landed the participant

in DWI School because in some cases the participant incurred a second DWI after the index event and before DWI School. *Time until* recidivism is a dependent variable used in survival analysis (Cox regression) and logistic regression.

For logistic regression, *time until* recidivism is dichotomized into two categories: four years post intervention versus five years or more post intervention. The decision to break the continuous form of the variable at the end of four years is due to the decay curve for the outcome. There is a marked decay inflection point at the end of four years in the survival outcomes (see Figure 4-4). In this figure, the survival decay rate for those with *no prior* DWI arrests is shallower than the decay rate for those priors. However, both appear to have a decay rate inflection point around the end of the fourth year or beginning of the fifth. The survival curve decay rate thus provided the rationale for where to break the continuous variable *time until* recidivism into a two-level categorical variable.

#### *Number of subsequent arrests*

The dependent measure, *number of subsequent arrests*, was calculated from the CTS database. It was calculated as the number of subsequent arrests after enrollment in the study. The study enrollment date was used instead of the date of the index arrest that landed the participant in DWI School because in some cases the participant incurred a second DWI after the index event and before DWI School. The *number of subsequent arrests* is a dependent variable used in survival analysis (Cox regression) and logistic regression.

### *Emotional Change Score*

The dependent measure *emotional change score* was calculated from the study questionnaires administered at DWI School and one year following DWI School. Pre scores were subtracted from post scores to arrive at an emotional change score. A positive change score indicated a higher mood following intervention than before the intervention. A negative change score indicated lowered mood following intervention than before the intervention. Emotional change scores were found to drop as low as -37 units after an intervention in the present study. However, a negative value cannot be used in logistic regression for the dependent variable. In order to perform logistic regression with the emotional change scores as dependent variable, 40 points were added to all scores. The transformation resulted in *emotional change scores* that ranged in value from three to ninety five. A score of 40 indicated no emotional change from pretest to one-year posttest. A score of below 40 indicated a drop in mood following the intervention. A score of above 40 indicated an elevation in mood following the intervention.

Wells-Parker et al. discuss using DWI recidivism data, as it is used to calculate the dependent variable in 99.5% of DWI intervention studies. They estimate that DWI arrest data causes an underestimate in effect size, but that there are “no clearly superior measures” (p. 922) to DWI recidivism as a dependent variable.

In the present study, the efficacy of the MADD VIPs’ message (not to drink and drive) was judged by three main outcome variables:

- (a) *Time to recidivism* (Cox Regression, a type of survival analysis)
- (b) The number of MADD VIP participants’ re-arrests over time versus their category comparisons (Logit Loglinear Analysis)

(c) Participants' pre/post test change in emotional variables as a measure of message effect.

### *The Datasets*

#### *Priors separate from no priors*

Participants with differing "Number of Prior Arrests" were tested in separate datasets from those with no recidivisms. Levels of *priors* variable have been found to produce significantly different effects in a previous study (Woodall et al., 2008) of which this study is an extension. *Numbers of prior arrests* were related to DWI recidivism in quasi-experimental studies discussed in the review of literature. Although there is evidence to suggest that *no priors* (first offenders) as a group exhibit a high rate of alcohol dependence (Pristach, Nochajski, Wieczorek, Miller, & Greene, 1991), as does the *prior* offender group, yet differences between the two groups in recidivism rates supports analyzing them separately.

#### *Censored cases separate from non-censored cases*

Those participants who were not rearrested were not included in the database used to conduct regressions (they were censored data). The Cox Proportional Hazards Regression was an exception to this rule. Cox PH Regression does not use censored cases in the stepwise regression, but it does employ them to compute the hazard of recidivism in the calculation of the survival function.

### *Software and its Use*

#### *QSR N6*

QSR N6 is user-friendly qualitative analysis software with capability to adjust and refine coding categories, merge categories. QSR N6 allows for coding *in vivo* or coding

text in real life contexts without artificiality of a laboratory manipulation or preconceived themes. It is flexible and allows the evolution of reactance-inducing codes. It supports the electronic merging or bifurcation of codes, automatically updating all units that carry those codes. It supports filtering, and segmenting of coding themes.

QSR N6 also allows for organizing themes in a hierarchical relationship. Thematic relationships can be specified in a hierarchical organization of categories, then re-evaluated and adjusted as the picture of trends in the data comes into focus. All adjustments, merges, and splits in code definitions and the coded data are recorded automatically on the history of each code category. The software also allows for export of frequency counts of units in each category into a file format that is readable in SPSS.

Each of the fifteen MADD VIP presentation transcripts were converted into ASCII text files and imported separately into QSR N6. The advantages of these separate entries was that once message themes were identified within MADD VIP group sessions, their frequency counts could be exported to SPSS for each separate MADD VIP group.

The transcript texts were reread iteratively in QSR N6. During successive iterations, themes were identified. These themes were then reorganized iteratively in a hierarchical structure to represent relationships among them. Notes were iteratively redefined for each category as the coding process evolved. Notes for each categorical theme described what was included and why, and what was excluded and why, and the evolution of the different reactance-inducing codes. The coding scheme evolved because in qualitative analysis the coding scheme is not preset. The advantage of the constant-comparison approach is that the categories evolve from the data. Patterns in the data that may not have been expected are allowed to emerge. Variables are not excluded because

of a preexisting schema. Because they arise from the data, they describe and fit the data better than if they had been preconceived. This method of developing reactance-inducing codes for content analysis offers the advantage of being sensitive to nuances in the data that would not be evident if a codebook were used that was developed solely from the literature.

### *SPSS*

SPSS (Statistical Package for the Social Sciences), a user-friendly statistics software with a graphical user interface. Statistical analyses, both parametric and nonparametric, were run in SPSS. Most of the analysis and all of the charts in the present study were products of SPSS. Data from SPSS, in order to create better charts, were imported into Excel.

### *Microsoft Office Excel*

Microsoft Office Excel was used to create charts of higher clarity than available in SPSS. Excel was used to perform complex vertical lookup functions, create pivot tables, and conduct other similar data manipulations in order to prepare raw data and create new variables. Such data was then imported into SPSS for analysis.

### *Methods Limitations*

#### *Under-identification of prior offenders*

Due to analyst error in construction of the current data set, up to 125 prior offenders, those whose offenses older than months or weeks prior to their study enrollment were analyzed as having no prior offenses. Only those offenders with very recent prior offences were included in the *prior* category of the present study. This under-identification of participants with prior DWIs had the effect of reducing likelihood the

present study would produce significant results. Regardless of the direction of the error, the findings in the present study concerning prior offenders will need to be replicated to validate the present study's reliability concerning effects of MADD VIPs upon those with prior DWIs.

#### *Attrition due to deaths*

Random assignment to group condition likely results in an equal distribution of deaths, and so deaths in study populations who have been randomly assigned to group are usually similar for all groups. Random assignment to group equally distributes the probability of attrition due to deaths among all groups. In such a random situation, deaths occur equally in all groups and do not impact the study. As such, the reasons for death are not usually of interest. The assumption that deaths are not of interest holds true if the attrition due to deaths is equally probable for all groups. But it would not be true if group condition changed the probability for death in groups. In this case death becomes an effect of group condition and is of interest.

Deaths and reasons for death might be worthwhile to investigate when group condition may increase or decrease risky behavior such as drunk driving and affect study outcomes. In the present study, attrition due to participants' deaths was not recorded. The reasons for death, such as drunk-driving-crash-related, or not, were not known.

An investigation into number of participant deaths and causes of death would require use of participant identifiers. This research did not have access to participant identifiers. The data used in this study had been stripped of those identifiers in accordance with IRB (Institutional Review Board for Human Subjects Protection) recommendations. A future study might use participant identifiers to search public

obituary records for possible deaths and cause of deaths for participants. There are two causes of deaths that would be of interest in a future study: deaths from natural causes and non DWI crashes, and deaths from DWI crashes.

*Participants' deaths from natural causes and non-alcohol-related crashes*

Because 16 of participants were over age 60 at the time of entering the study, there is some likelihood that some participants may have deceased before 12-31-07, the date the 12-year post safety data was collected. Non-alcohol-related crashes are of interest as a cause of death in order to distinguish from these types of accidental deaths versus deaths from DWI crashes.

*Participants' deaths from DWI crashes*

Since 125 participants reported drinking and driving more than ten days per month, some of the participants who are listed as not having recidivisms may have been put in this category in error. They could have died following an alcohol-related crash, in which case they died before the end of the study but would have been not cited and arrested if they had lived. DWI offenders have a higher risk for death and death from accident and violence (Mann et al., 1994).

*Nonrepresentative sample*

Only 80% of those mandated to DWI school did attend, and within that group only 70% of the DWI school attendees elected to participate in the study. These numbers suggest that the population sample obtained for the study may not have been 100% representative of all DWI first offenders. Of those who had been arrested for DWIs during the study enrollment period only those offenders who were functional enough to

attend DWI school and altruistic enough to volunteer for the study were enrolled as study participants.

*Bimodal distribution of independent variables indicate conversion to dichotomous variables*

The data for *level of reactance-inducing statements* and *proportion of reactance-inducing statements*, the two independent variables of interest for research questions one through five, demonstrated bimodality in their distribution. This means that they are best represented as categorical variables in an analysis. There is no transform to normalize bimodal data.

*Reactance-inducing level* and *proportion of reactance-inducing statements* were banded into *high/low* dichotomous categories (category membership was determined through a psi contrast discussed in the methods section) and compared to a third category, the DWI School no-VIP-reactance exposure group. These three levels of the two independent variables could be employed in survival analysis, where the stepwise regression does accept categorical predictor variables, in nonparametric chi-square, and as grouping variables in ANOVA and loglinear regression. Transformations, recoding to change score values, dichotomization of variables, and their rationale are, by convention, reported in the Results chapter (Tabachnick & Fidell, 2007, p. 77).

*Variable categorization increased power*

Given the preceding limitations of the independent variables' data structures, values for *low-reactance* and *high-reactance VIPs*, *low-reactance* and *high-reactance VIPs*, *age* were best dichotomized. The three dependent variables *time to recidivism*, *emotional change*, and *number of subsequent arrests* required recoding as dichotomous

variables in order to be used in loglinear logit regression, which requires discrete dependent variables. Although categorization is considered undesirable because it reduces the sensitivity of the data, yet in this case the predictor variables, due to bimodal distribution of their values, could not be described otherwise. Dichotomization is most often associated with loss of sensitivity in statistical tests, yet the loglinear logit method of regression yielded clearer results and more power, given data structure, for these data (Cohen, 1988). The non-normally distributed data were best parsed for categorical loglinear regression that employs a multinomial distribution. The multinomial logit regression, another name for loglinear logit regression, was more robust than other forms of regression that depend upon a normal distribution. Chinn's  $d$  (2000) was used to calculate effect size from odds ratio and  $\text{Exp}(B)$  parameters. Dependent variables did not appear to be compromised as a result their categorization. In fact, dichotomization of dependent variables for loglinear logit regression proved to be a benefit.

Loglinear logit regression was the most efficacious regression because the logit model offers a conservation of power. It has fewer parameters than other regression models because “the constant and all of the parameters that involve only the independent variables cancel” (Norusis, 2004, p. 27). Additionally, when a custom loglinear logit model is specified, the constant for the dependent variable may be omitted from the model, which also reduces the number of parameters and thus increases power. The dichotomous form for VIP data was chosen over multiple categories because two categories described the VIP data adequately, conserved power in the analysis, and allowed for inclusion of the DWI School Only group as a comparison group in the analyses. Without categorization of VIP independent variables, the DWI School Only

group could not have been included because this group had not experienced the VIP condition and thus had no values for *low-reactance* and *high-reactance VIPs*, or *low-reactance* and *high-reactance VIPs*.

### *Chapter 3 Summary*

There are disadvantages inherent in conducting research on problem drinkers. Participant recruitment inefficiencies resulted in a population sample that may be nonrepresentative. This inefficiency was a function of the nature of the population where 44% of the pool of drunk drivers at the time of the study enrollment was either:

(a) Unable to function normally enough to make it to DWI School and avoid a bench warrant, or

(b) Not being altruistic, that is, not interested in benefiting society or other who may come after them through the court system. Thus, the study results are not generalizable because those who were the most problematic drinkers are probably not represented in the sample. This handicap must be accepted as part of the nature of the population being studied. Heavy drinkers are characteristically low functioning and they are not characteristically altruistic or other centered. A benefit of researching this population of problem drinkers is that their outcome data, number and frequency of DWI recidivisms, is available on public record.

The methods employed in the present study range from qualitative (constant comparison analysis) to quantitative (content analysis, chi-square, ANOVA for unequal *n*, Fisher's LSD, Pearson's *r*, odds ratios, loglinear logit regression, and Cox Proportional Hazards Regression). The choice of regression methods was limited by the non-normal distributions of the independent variables. This limitation, however, was overcome by

using loglinear logit regression, which assumes a multinomial distribution and does not rely upon continuous variables or a normally distributed data set.

## CHAPTER 4: RESULTS

This chapter begins with a preview of which tests were used to obtain results for the eight study research questions. It describes the calculations of the dependent variables, data structure considerations regarding outliers, bimodality of independent variables and how these conditions limited and informed the choice of statistical tests. Benefits and tradeoffs are discussed regarding the dichotomization of independent and dependent variables to meet data structure requirements of the appropriate tests, to reduce degrees of freedom, and to increase power. Next, the research questions are answered with tables and figures that organize and describe the output and results. At the end of the chapter a synthesized summary of the results is presented.

### *Statistical Tests Conducted for Each Research Question*

The following forms of statistical analyses were employed to answer research questions one through eight.

1. Levels of reactance antecedents present in MADD VIPs were quantified via mean and proportions. The significance of the strength of their message dosages were determined by chi-square goodness of fit tests.

2. *VIP levels of reactance-inducing statements* were tested for difference among different VIPs using ANOVA for unequal n, Fisher's LSD, Pearson's r.

3. *VIP levels of reactance-inducing statements* were tested as predictors of lowered mood (lower *emotional change scores* following intervention) using loglinear logit regression. These results were validated through computation of odds ratios.

4. *Levels of reactance-inducing statements* were tested as predictors of survival time until recidivism using Cox Proportional Hazards regression, loglinear logit regression. These results were validated through computation of odds ratios.

5. *Levels of reactance-inducing statements* were tested as predictors of number of subsequent arrests using loglinear logit regression. These results were validated through computation of odds ratios.

6. Demographic predictors of number of subsequent arrests were explored using Cox Proportional Hazards Regression.

7. Demographic predictors that exacerbate negative message effects of MADD VIPs were explored using Cox Proportional Hazards Regression.

8. Whether VIPs are effective was summarized by reviewing significant results for research questions 1-7.

#### *Necessity of splitting data into levels of prior arrests*

The number of prior arrests, though only the most recent priors for the last two-thirds of the sample, had the greatest effect in predicting survival for all cases. Thus, in order to answer the research questions, within the modification influence of levels of prior arrests, data were split into levels of *recent prior arrests* (hereinafter *priors*) versus *no recent priors* (hereinafter *no priors*). These two levels were analyzed separately. Results of these analyses are limited in application, as noted in the limitations of the study.

#### *Rationale*

An independent samples t-test was conducted to compare the number of subsequent arrests for offenders with one prior DWI versus offenders with no priors.

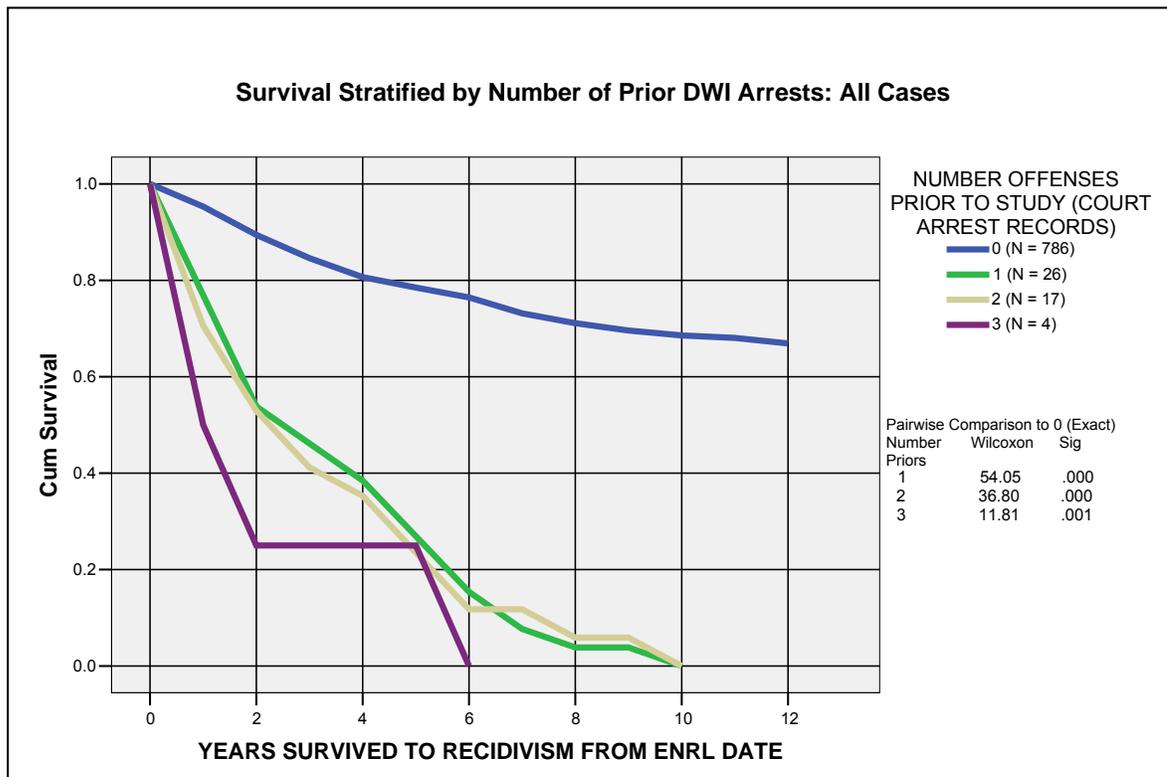
There was significant difference in number of subsequent arrests for those with one prior arrest ( $M = 2.31$ ,  $SD = .62$ ) versus those with no priors,  $M = .51$ ,  $SD = .88$ ;  $t(812) = 10.35$ ,  $p < .0001$ . The addition of just one recent prior arrest made a significant difference in likelihood of recidivism. The influence of just one prior arrest upon recidivism was the same no matter which group condition, *DWI School Only* or *DWI School plus MADD VIP*, to which offenders had been assigned and no matter whether they had priors or *no priors*.

The rationale for segmenting the data set into those priors and no prior offences was supported by findings from previous studies that differentiated these groups' outcomes. Wells-Parker et al. (1995) reported that those with no prior arrests were at low risk for recidivism. Those with multiple prior arrests were at high risk for recidivism. *Number of priors* was also found to have a contributing effect in a quasi-experimental study by C' de Baca et al. (2005).

A breakout of cases with no prior DWI arrests versus those priors indicated that these two classes of participants appeared to demonstrate different survival patterns. The intervention impacted the two groups differently. Those last two-thirds enrollees with recent prior arrests had a significantly greater hazard of recidivism, evidenced by lower cumulative probability of survival, than others in the study designated as *no priors*, but which included over 100 non-recent *prior* offenders. Note that for brevity, this distinction that over 100 non-recent *prior* offenders are analyzed as *no priors* will be assumed in further discussion of the *prior* versus *no prior* results.

Figure 4-1 illustrates survival curves for *priors* and *no priors*, intervention and DWI School comparison groups combined, stratified by number of priors. Only 5.6% of

the sample, 47 participants, had DWI arrests prior to the study as calculated by the faulty CTS index date, and as has been discussed in the methods chapter. This means that the results reported here were biased in favor of not finding significant results because many offenders with *prior* DWI offenses have been erroneously included in the *no prior* category. The fact that significant results were obtained in the present study points to the possibility that when the data are reanalyzed with the 100 non-recent *prior* offenders moved to the *prior* offender category, the significance levels and effect sizes may be higher or lower than effects observed here.



**Figure 4-1: No priors versus priors: Survival function.** Those with *no prior* DWI arrests survived significantly longer than offenders with recent *priors* (Wilcoxon Gehan statistic,  $p < .0001$ ). Many *no priors* survived to end of study without recidivism. No one

with one or two recent *prior* DWI arrests survived longer than 10 years, no one with three recent *priors* survived longer than six years.

Since the number of subsequent arrests was highly correlated with number of prior arrests ( $r = .40$ ,  $n = 833$ ,  $p < .0001$ ), it follows that those who were arrested more frequently before the intervention were likely to be arrested more frequently after the intervention regardless of what type of intervention they received. The correlations between these same two variables for intervention participants ( $r = .43$ ,  $n = 426$ ,  $p < .0001$ ) versus comparisons ( $r = .37$ ,  $n = 406$ ,  $p < .0001$ ) support this explanation and support the rationale to test prior offenders separately from those with no priors.

Gender and age did not significantly affect recidivism for those priors, although age trended toward significance ( $p = .065$ ) (Table 4-1). Therefore, gender and age were not considered as covariates in the analysis of the treatment effects for those with prior DWI arrests.

**Table 4-1: Priors: Covariates in the Cox Regression Equation**

	<b>B</b>	<b>SE</b>	<b>Wald</b>	<b>df</b>	<b>Sig.</b>	<b>Exp(B)</b>
GENDER2	-.141	.216	.426	1	.514	.869
AGE_REVERSED	.018	.010	3.415	1	.065	1.018
NUM_PRIORS	.281	.104	7.235	1	.007	1.324

Gender and age did not significantly affect recidivism for those with prior DWI arrests, although age trended toward significance. Number of priors did affect DWI recidivism. For every one-unit increase in number of priors the hazard for recidivism increased 1.3 times.

## *Calculation of Dependent Variables*

### *Time to recidivism*

Time to recidivism was a measure of how long participants survived from the beginning of their enrollment in the study until being rearrested for DWI. This variable was calculated by subtracting the study enrollment date from the date of the first recidivism. If the participant had survived the length of the 12-year study without recidivism, then time date of first recidivism was set to the date the data were collected, December 31, 2007, and the study enrollment date was subtracted from end of study date.

In order to designate survivors who were never rearrested, a separate variable, *status\_event*, indicated whether the participant had a recidivism status or not. Survivors who were not rearrested were reported as 0 for a status of zero occurrence of the recidivism event.

The *status\_event* variable was used in survival analysis to exclude censored cases, those who did not experience DWI recidivism, from the stepwise regression portion of the analysis. For the survival analysis computation of hazard of recidivism, the censored cases were included. The *status\_event* variable was used in case selection for logistic regression analysis. Only those cases that experienced the event, DWI recidivism, were included in regression analysis. The dates of participant DWI arrests were obtained from publicly available traffic safety records.

### *Number of subsequent arrests*

Numbers of subsequent arrests were determined by summing the number of times a participant had been rearrested for DWI following their enrollment in the study. The

dates of participant DWI arrests were obtained from publicly available traffic safety records.

### *Emotional change scores*

To aid in interpretation of results for research question 3, it is useful to discuss the source of the data used to calculate the variable *emotional change scores*. The pre-score was obtained from the emotional scale (see Appendix 1) administered to the MADD VIP plus DWI School intervention group at DWI school. The scale measured the level of emotional mood at the point when the participant took the test. Thus the pre-test was administered at DWI School to obtain a baseline mood before intervention. The post score employed in this study was obtained from the emotional scale administered to the MADD VIP plus DWI School intervention group only at their one-year follow-up interview. The one-year follow-up post score was used in this study because the immediate post VIP score was not included in the database available for this study.

The *emotional change score* values were calculated by subtracting pre from post scores for each case where there were both scores. A high pre score subtracted from a low post score yielded a negative number, indicating a lowered mood<sup>19</sup> following intervention. A positive valence change score indicated a more elevated mood following intervention. Raw emotional change scores ranged from a negative 38 to a positive 38. In order to prepare data for logistic regression, which requires positive values in the

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<sup>19</sup> A *lowered* mood is distinguished here from a *depressed* mood. The scale that was used to evaluate participant mood was not a diagnostic scale for clinical depression. Further, a mood change to a lower level did not necessarily mean that a participant was depressed. They could have been extremely happy prior to the intervention and then just less happy, but still happy, after the intervention. A lower mood does not necessarily mean a sad or depressed mood. Similarly, a higher mood score following intervention does not mean that a participant was happy. They could have been extremely depressed before the intervention and an improvement in mood might have still left them depressed and sad, only less depressed.

dependent variable, a value of 40 was added to all raw change scores to produce the emotional change score.

### *Identification and Removal of Outliers*

#### *General considerations regarding outliers*

Outliers must be considered in use of continuous forms of variables. Outliers may be equally present in intervention and DWI School comparison groups due to random assignment. In any case, they compromise model fit, within the constraints of the given model. Outliers can occur in independent variables, covariates, and dependent variables.

Outliers may be a result of inaccurate data entry where there are blank fields, read as zero values, or due to unspecified missing values. In the case of the present study, data entry was rigorous. Data were entered twice, independently by different data entry personnel, the two databases were compared, and errors corrected. Outliers, in the present study, were not likely due to data entry error. In the present dataset, all data have been analyzed for missing values. Those cases with missing values were not included in the analyses.

The outlier may not be a member of the population that the research design intended to sample. This would not be likely in the present study because the intended population was DWI offenders who had been convicted of DWIs. Only convicted DWI offenders were present in DWI School where the present sample was obtained. Finally, and the most likely reason for an outlier in the present study is if the intended population sample contained more extreme cases than are expected in a normal distribution. This case is addressed in the following section. Outliers should be identified, corrected if due to incorrect data entry, and otherwise removed (Tabachnick & Fidell, 2007).

### *Identification of outliers in the present data*

Outliers were present in the data, but it was unnecessary to remove them because variables were categorized. Variables were categorized because of data distributions and effect categories. In some cases, the data were bimodal. In other cases, the effect was bifurcated between two levels of the variable. In all these cases and for the above stated reasons, outliers did not affect analysis because the data were recognized as bimodal and then bifurcated.

### *Bimodal data*

It was not possible to use *levels of reactance-inducing statements*, and *proportion of reactance-inducing statements*, the two independent variables of interest, as other than categorical variables. These two variables were bimodal; they were not transformable into a normal distribution and therefore not suitable for use as continuous variables. These variables were coded categorically, which eliminated the outlier bias. An additional benefit of the categorical coding was inclusion of the no-VIP comparison group, which could not have been included if the independent variables were continuous. Where continuous independent variables are used, all cases must contain values that are used in the statistical calculations. However, categorical grouping allowed for inclusion of participants who had no values for *level of reactance-inducing statements* or *proportion of reactance-inducing statements*, those who had attended DWI School Only. Categorization allowed the DWI School Only participants to be included in analyses as a comparison group because the numerical value for all members within a categorical group is the same. For example, the value for all members in the no-VIP group might be

−1,” the value for all members in the low reactance-inducing VIP group might be −2,” and the value for all members in the high-reactance VIP group might be −3.”

#### *Bifurcated effect of age*

*Age* was used as both a continuous and categorical variable. *Age* outliers did not influence its accuracy as a continuous variable in survival analysis to compute the decrease in hazard for each annual increment in age. This was the only case where *age* was useful as a continuous variable. *Age* was useful as a categorical variable for use in survival analysis to study the differences between those with no prior DWI arrests who were under 30 years old versus those who were age 30 and older. The age of 31 was the mean for offenders, but the survival time to recidivism was markedly different for those under 30 versus age 30 and older among those with *no priors*. This was the rationale for banding age into two levels for those with *no priors*. Among those with prior DWI arrests, age did not make a difference in recidivism. Thus, age was not used as a covariate in the analysis for *prior* offenders.

#### *Bifurcated effect of emotional change*

*Emotional change score* values were simplified into a dichotomous dependent variable, which was used in loglinear logit regression and in computing odds ratios. A value of −1” signified a depressed mood one year following intervention. A −2” signified no change or a positive mood one year following intervention.

#### *Bifurcated effect of number of subsequent arrests*

*Number of subsequent arrests* ranged from zero to six ( $M = .61$ ,  $SD = .975$ ). This variable, because the mode was zero subsequent arrests, was simplified into a dichotomous dependent variable. The number −1” indicated zero subsequent arrests. The

number –2” indicated one to six subsequent arrests. This variable was also categorized into three levels for analysis of differences between odds for one subsequent arrest versus two or more. The categorical versions of this variable were used in loglinear logit regression and in computing odds ratios.

#### *Bifurcated effect of time to recidivism*

*Time to recidivism* was used both as a continuous variable, for which there were no outliers, and as a dichotomous variable. Survival time to recidivism was markedly different before and after the fourth year. At the fourth year there was a marked and rapid decline rate for time to recidivism in all three intervention modalities (no VIP, low reactance-inducing VIP, high-reactance VIP). This was the rationale for banding *time* into two levels: short time to recidivism (less than four years) and long time to recidivism (greater than four years). No case had a recidivism exactly at four years, thus the exact value of –four” was not included in the short or long time to recidivism categories.

#### *Research Questions and Results*

##### *1. At what levels are reactance antecedents present in MADD VIP presentations?*

*VIPs Contained High Levels of Reactance Antecedents.* Reactance antecedents were present in MADD VIP presentations in significantly higher levels than would be due to 50/50 chance. Two variables measured the presence of reactance antecedents in VIP presentations: *VIP level of reactance-inducing statements* (high levels are reactance-inducing) and *VIP proportion of reactance-inducing statements*. The variable *VIP reactance-inducing level* reported the mean reactance-inducing level coded by coders who rated VIP presenters’ statements. *VIP level of reactance-inducing statements* was measured on an eight-point scale where statements coded above level 3 indicated an

increasingly severe reactance-inducing statements. A frequency count of number of statements categorized within each of the codes indicated that 1,397 out of 2,021, or 69% of VIP presenter statements were above level 3 on the eight-point ordinal scale of *reactance-inducing intensity* and could be considered to be reactance inducing.

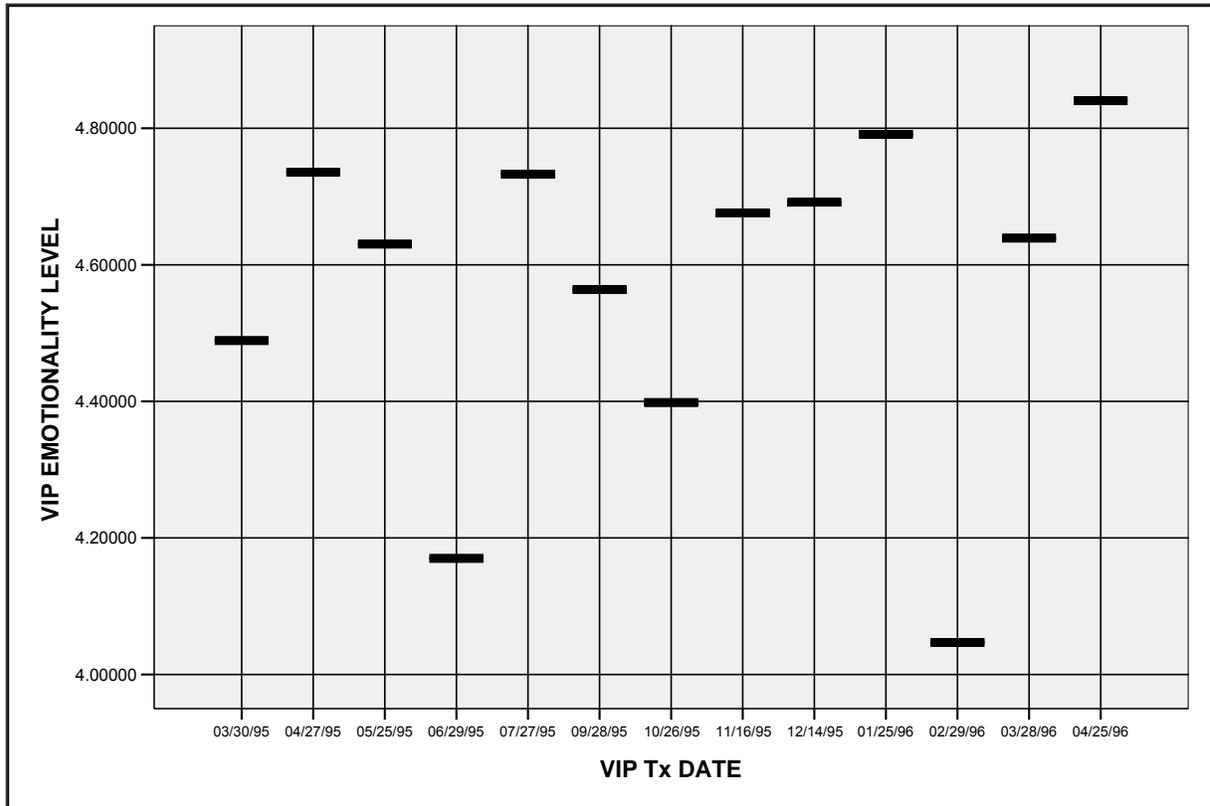
The variable *VIP proportion of reactance-inducing statements* reported the number of presenters' reactance-inducing statements in each VIP proportional to total number of statements. A statement was reactance-inducing if it scored above level 3 on an eight-point scale. As reported in the previous paragraph, a frequency count of statement codes indicated that 1,397 out of 2,021, or 69% of VIP presenter statements were above level 3, where a score of 1-2 is a supportive and positive message, a score of 3 is neutral, and any score above 3 is increasingly reactance inducing (red area of Table 4-2). Scores for average *reactance-inducing intensity* by VIPs are reported in Table 4-3.

To determine whether VIP statements were higher in their *level of reactance-inducing statements* and *proportion of reactance-inducing statements* than would occur due to 50/50 chance, a chi-square goodness of fit test was conducted. The chi-square test indicated there was a significant difference in the *level of reactance-inducing statements* and *proportion of reactance-inducing statements* in all of the VIPs as compared with a 50/50 probability that a statement would be emotional or reactance-inducing,  $\chi^2 (1, n = 2,021) = 295.66, p < .0001$ . Table 4-2 displays the set of eight ordinal reactance-inducing codes, listed in order of increasing intensity of reactance-inducing statements, which coders used to code the VIP statements.

**Table 4-2: Set of eight ordinal codes used to code the 2,021 statements by 56 presenters in 15 MADD VIPs.**

<b>Adjusted Codes</b>	1 happy, hopeful	
	2 you & I are same	
	3 please change	chg from 6
	4 forewarned: sad message coming	chg from 3
	5 worried, depressed, confused	chg from 4
	6 irritated, hurt, devastated	chg from 5
	7 you should change	
	8 angry	

Figure 4-2 demonstrates the comparative increasing levels of reactance-inducing messages for the 15 VIPs that were sampled in the present study. Mean message reactance levels for each VIP are reported by VIP intervention date. Most VIPs were rated between 4.4 to 4.8 on an eight-point scale of *level of reactance-inducing statements*. This indicates most VIP presentations contained more reactance-inducing statements than they did supportive or neutral valence statements. VIP 13 on June 29, 1996, was rated at the lowest level, 4.05. The lowest reactance score of 4.05 was still 1.05 levels of severity above the threshold, indicating even the lowest scoring VIP still consisted of a reactance-inducing presentation.



**Figure 4-2: VIP Level of Reactance-inducing Statements by VIP Intervention Date.**

Any score above 3 on the *y-axis* represented a statement that was emotional and contained reactance antecedents. Most VIPs were rated between 4.4 to 4.8. VIP 13 on June 29, 1996, was rated at the lowest level, 4.05; it was still a reactance-inducing presentation overall; VIP 13 and VIP4 had lowest levels of reactance inducement. Reactance inducement is measured by the variable *level of reactance-inducing statements*, which includes all of the theoretical constructs associated with the reactance-inducing codes listed in Table 4-2. Note: there were 15 VIPs in the original study. All 15 are present in this study but in two instances there were two VIPs on the same date and they had to be merged because there was no other indication other than date to determine

which VIPs the participants had attended. This merging of four VIPs into two VIPs is discussed in the section below *Merging*.

2. *Do the 15 different MADD VIP presentations have different reactance message dosages?*

If it is true that the 15 VIPs demonstrate different levels of reactance-inducing statement dosages, then this difference will become a covariate that will be controlled for by nested regression, known as hierarchical linear modeling.

The 15 MADD VIP presentations, taken together in an omnibus ANOVA, were not found to demonstrate different reactance message dosages *as a comparison of 15 groups*. In order to determine whether there was a different message dosage for different VIP groups, and whether a hierarchical linear model should be tested, a one-way analysis of variance was conducted. The omnibus ANOVA explored whether there was a difference in *level of reactance-inducing statements* expressed by presenters of the fifteen different VIP groups. This one-way analysis of variance (ANOVA) for unequal "n" was calculated using coders' ratings of reactance-inducing level of VIP presenters' statements. The analysis was not significant,  $F(14, 2006) = 1.56, p = .075$ , (eta squared = .01).

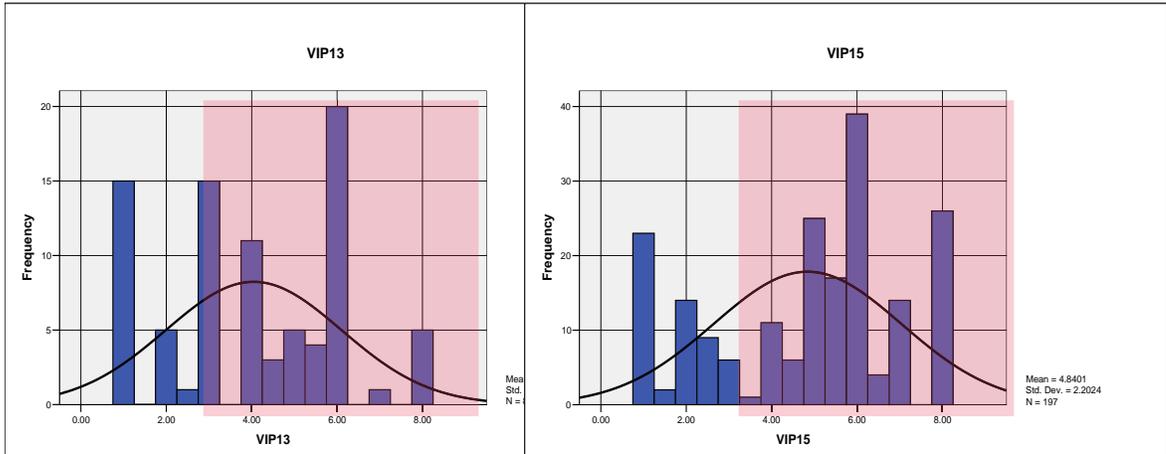
Because the VIP *level of reactance-inducing statements* variable is highly correlated with the VIP *proportion of reactance-inducing statements* variable ( $p < .0001$ ), an ANOVA test of difference of group would not yield new information. Further, ANOVAs are calculated based on a mean value for a group. Because the Proportion of Reactance-inducing Statements was not a mean but a proportion for each group, an ANOVA was not conducted on levels of this second variable. Later in the analysis it became evident that *proportion of reactance-inducing statements* was an inferior and

redundant measure compared to *level of reactance-inducing statements* and it was no longer used. However, for completeness this variable continues to be discussed in this chapter. Given the generalized omnibus ANOVA findings of non-difference between VIP groups, it was not necessary to conduct a hierarchical linear regression model to regress DWI arrest data upon individual participants' message dosages, nested within their 15 MADD VIP groups. Message dosage values, coded by coders as discussed in the methods section, for both reactance antecedent variables *VIP level of reactance-inducing statements* and *VIP proportion of reactance-inducing statements* were listed in Table 4-2.

*Bifurcation of Reactance Antecedents into Dichotomous Variables.* Although the 15 VIPs compared as 15 groups did not demonstrate significantly different reactance-inducing statement dosages, yet VIP Group 13 demonstrated lowest values for both variables *level of reactance-inducing statements* and *proportion of reactance-inducing statements*. The least significant difference test (Fisher's LSD with no adjustment for the post hoc nature of the test) was conducted contrasting VIP Group 13 (mean = 4.05) against the average of the other fourteen groups (weighted mean = 4.57) for a low/high-*reactance-inducing level* contrast.  $F(1,2006) = 5.28, p < .01$ .

The use of VIP 13 and VIP 4 as the "low" level category enabled bifurcation of *reactance-inducing level* into low/high levels. This bifurcation was useful in answering the research question 4 about whether *reactance-inducing level* of message dosages at MADD VIPs influence DWI recidivism. If lower levels of reactance-inducing level produce significantly lower number of recidivisms and lengthen the time of being arrest-free, than do higher levels of the same variables, then there is support to argue that the reactance variable *reactance-inducing level* is indeed an antecedent whose categorical

levels predict a portion of DWI recidivism. Figure 4-3 displays the histograms for the lowest (VIP13) and highest (VIP15) reactance-inducing VIPs.



**Figure 4-3: Histograms for VIP 13 (low reactance-inducing VIP) and VIP15 (high-reactance VIP).** Histograms display frequencies of reactance-inducing statements distributed by levels of *reactance-inducing intensity*. VIP 13 ( $n = 85, M = 4.05, SD = 2$ ) compared to VIP 15 ( $n = 197, M = 4.84, SD = 2$ ). The heights of bars indicate frequency of statement occurrence for each level of reactance-inducing intensity. Locations of bars on the x-axis indicate level of reactance intensity. Red shaded areas identify highest levels of reactance-inducing intensities. Bars to the right of level 3 indicate high-reactance statements. Intensity of reactance statements increases as bars move to the right. The most intense reactance category, *anger*, is level 8 on the far right. Enlarged histograms for all 15 VIPs are displayed in Appendix 2.

**Merging of same-day VIP groups.** Participant attendance at VIPs was reported by date, not differentiated by time of day. Thus if two VIPs occurred on the same date, their scores were averaged and participants were combined. This adjustment reduced number of VIP groups from 15 to 13. Table 4-3 displays these 13 MADD VIP groups. The colored rows indicate which presentations were combined

**Table 4-3: Raw scores and transformed values for reactance-inducing level and reactance.**

VIP Date	<i>n</i>	VIP Number	Raw Score VIP mean reactance- inducing level	Raw Score VIP proportion of reactance- inducing statements
3/30/1995	11	VIP 1	4.4890	0.7473
4/27/1995	46	VIP 2	4.7360	0.7528
5/25/1995	24	VIP 3	4.6302	0.7292
<b>5/25/1995</b>		<b>VIP 4</b>	<b>4.3116</b>	<b>0.6575</b>
6/29/1995	46	VIP 5	4.1700	0.5900
6/29/1995		VIP 6	4.3796	0.6788
7/27/1995	15	VIP 7	4.7328	0.7302
9/28/1995	23	VIP 8	4.5637	0.7070
10/26/1995	24	VIP 9	4.3984	0.6429
11/16/1995	25	VIP 10	4.6757	0.7117
12/14/1995	22	VIP 11	4.6915	0.7518
1/25/1996	25	VIP 12	4.7913	0.7476
<b>2/29/1996</b>	<b>44</b>	<b>VIP 13</b>	<b>4.0471</b>	<b>0.5765</b>
3/28/1996	51	VIP 14	4.6389	0.7037
4/25/1996	27	VIP 15	4.8401	0.7259
Total n =	383	Mean =	4.5397	0.6969

**Data structure imposed limitations.** Both *level of reactance-inducing statements* and *proportion of reactance-inducing statements* were found to be present in significantly high levels of dosages ( $p < .0001$ ) in VIP presentations and these two variables were highly correlated ( $p < .0001$ ). Both *levels of reactance-inducing statements* and *proportion of reactance-inducing statements*, the two variables of interest in this study that measure VIP message dosage of reactance, were bimodal and not suitable for use as

continuous variables. They were banded into high/low dichotomous variables and used in survival analysis and logistic regression as categorical independent variables.

3. *Does the reactance message dosage (level of reactance-inducing statements and proportion of reactance-inducing statements) predict direction of emotional change score in the MADD VIP plus DWI School intervention group?*

Neither VIP level of reactance-inducing statements nor VIP proportion of reactance-inducing statements predicted direction of emotional change score at year one post intervention. Emotional change direction was not dependent on group assignment or intervention category. However, those with *no* priors age 30 and older were happier one year post than they were during enrollment into the study at DWI School, no matter which intervention condition they attended (loglinear logit regression: DWI School Only  $\beta = -.457, p = .007$ ; DWI School plus *low reactance-inducing VIP*  $\beta = -1.030, p = .048$ , DWI School plus *high-reactance VIP*  $\beta = -.503, p = .043$ ).

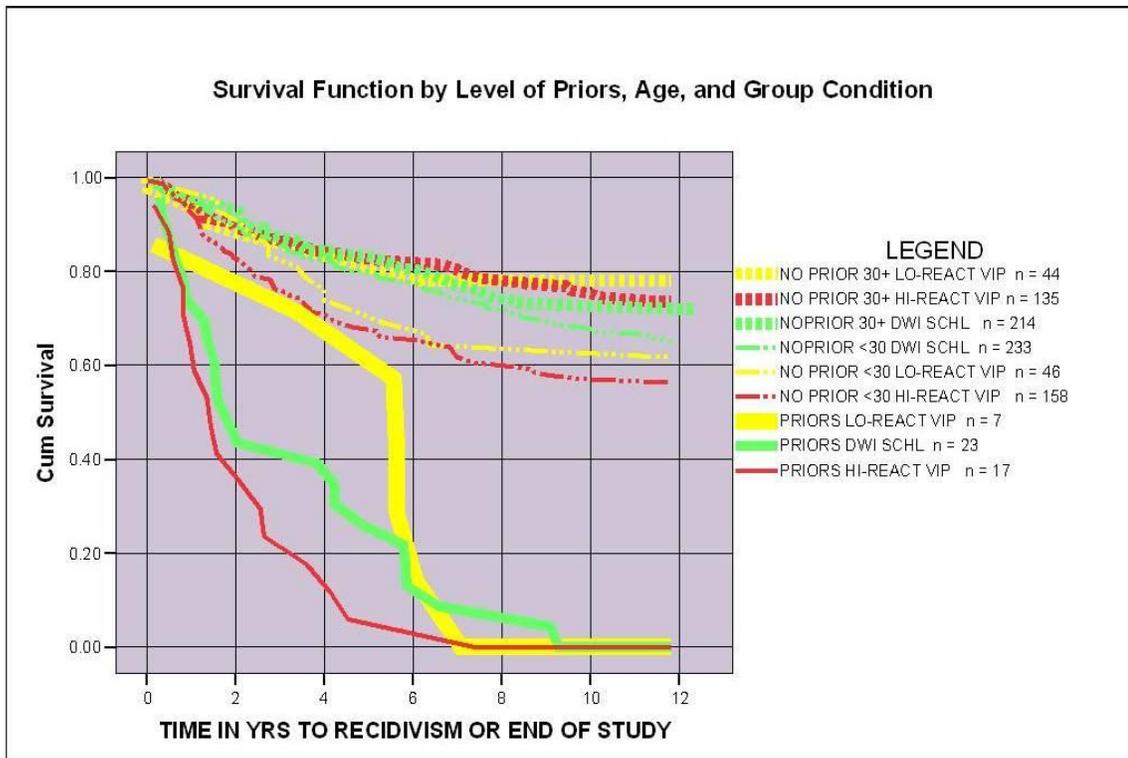
The negative direction of *emotional change score* immediately following VIP intervention, which Woodall, Delaney, Rogers, and Wheeler (2007) observed, did not linger one year later for any of the VIP intervention participants.

4. *Does the reactance message dosage predict survival time to first recidivism within the MADD VIP plus DWI School intervention group, while controlling for covariates age, gender, and number of priors?*

*Those with no prior DWI arrests:* For those with *no prior* DWI arrests age was significant predictor of *time to* recidivism. Between two age groups of offenders with *no priors*, those who were under age 30 ( $n = 411$ ) were 1.6 times more likely to be rearrested in the first four years, following intervention of any kind, compared to those age 30 and

older ( $n = 372$ ) (odds ratio  $p = .001$ ; Cox Proportional Hazards  $\text{Exp}(B)$  odds for *age* categorical variable  $p < .0001$ ). Beginning at age 18, hazard for DWI recidivism decreased by 3% for each year an offender matured (Cox Proportional Hazards for *age* continuous variable effect size  $\text{Exp}(B) = .97$ ,  $p = .009$ ).  $\text{Exp}(B)$  is  $e^B$  to the power of the regression coefficient. The natural log ( $\ln$ ) of  $\text{Exp}(B)$  is the regression coefficient. This finding compares with Marowitz's (1996b) finding of a 2.1% decrease in odds of recidivism for each year an offender matured.

Within the group of those with *no priors* who were over age 30, level of intervention of any kind did not make a significant difference in *time to recidivism*. Those with *no priors* age thirty and older demonstrated a higher cumulative survival rate than those *no priors* under age thirty and they were positively affected by low reactance-inducing VIPs, which decreased odds of subsequent recidivisms by 1.6 times. For this *no priors* over-30 group ( $n = 372$ ), the low reactance-inducing VIP ( $n = 44$ ) was significantly associated with 1.6 times odds of *fewer subsequent arrests* than DWI School ( $p \leq .05$ ,  $d = .26$ ).



**Figure 4-4: Effect of MADD VIP reactance-inducing level upon categories of offenders.** Offenders responded differently to intervention levels. Those with *no* priors (generally without recent prior DWI arrests) age thirty and older demonstrated a higher cumulative survival rate than those with *no* priors under age thirty and they were positively affected by low reactance-inducing VIPs, which decreased odds of subsequent recidivisms by 1.6 times. For those with priors, different responses to intervention conditions were most dramatic. Low reactance-inducing VIPs were associated with a cumulative survival proportional to survival rates of those with *no* priors, but only before five years. After five years, this low reactance-inducing VIP effect decayed exponentially.<sup>20</sup> For those with priors, the high-reactance VIP plus DWI School and DWI School Only intervention was associated with an exponential rate of decay in cumulative survival.

Within the group of those with *no priors* who were under age 30, level of intervention made a significant difference in *time to recidivism*. *Age* interacted with VIP *level of reactance-inducing statements* when the dependent variable was *time to recidivism*. The high-reactance VIP was associated with shorter survival *time to*

<sup>20</sup> The categorization of the dependent variable into four years post intervention and five years or more post intervention is based on inflection points of survival curves.

*recidivism* for this demographic group. Those with *no priors* who were under 30 were 1.9 times more likely to be rearrested in the first four years following intervention if they attended a high-reactance VIP than if they had no-VIP intervention (*time to recidivism* dichotomous, odds ratio and loglinear logit  $p = .01$ ). This *no prior* under-30 group was observed to be unaffected by low reactance-inducing VIPs. High-reactance VIPs were observed to double their odds of being rearrested in the first four years following intervention. Figure 4-4 illustrates survival differences for the nine different groups (three conditions segmented by levels of *priors* and within the level of *no priors* by *age*).

*Those with prior DWI arrests:* Those with *prior DWI* arrests, no matter which intervention condition ( $n = 47$ ), were 7-9 times more likely to be rearrested in first four years following treatment than those with no prior DWI arrests (7 times more likely: survival analysis *time to recidivism continuous*,  $p < .0001$ ; 9 times more likely: loglinear logit analysis,  $p < .0001$ ). See Figure 4-1, Survival Plot of Levels of Prior Offences. This finding compares with Marowitz's (1996b) findings of a significant increase in odds of recidivism for each prior DWI conviction.

MADD VIPs had a marked effect (both positive and negative) on recidivism for those with prior DWI arrests. Recent prior offenders were negatively affected by high-reactance VIPs and positively affected by low reactance-inducing VIPs. Prior offenders who attended high-reactance VIPs were six times more likely than prior offenders who attended low reactance-inducing VIPs to be rearrested during the first four years (survival analysis with *time to recidivism continuous*,  $p = .025$ ). When the *time to recidivism* was dichotomized, those recent *prior* offenders who attended high-reactance VIPs were 19 times more likely to be arrested (rounded from 18.75 times odds), within four years

following intervention. They were compared to recent *prior* offenders who attended low reactance-inducing VIPs (odds ratio using dichotomous dependent variable *time to* recidivism (<4 years / > 4 years),  $p < .05$ ); loglinear logit regression using dichotomous dependent variable *time to* recidivism,  $p = .009$ . (This particular model for loglinear logit did not meet the method's assumption of having no more than 20% of cells with less than five cases, however the probability values of the results from a more conservative odds ratio and the same probability value for Fishers Exact Test confirmed the adequacy of the loglinear logit model). The odds of 18.75 of the loglinear logit regression matched exactly with odds of 18.75 calculated via Fisher's Exact Test ( $p = .008603$ ).

*Positive Effects in Terms of Low reactance-inducing VIPs:* Those with *no* priors age thirty and older were positively affected by low reactance-inducing VIPs, which decreased odds of subsequent recidivisms by 1.6 times. For this *no priors* over-30 group ( $n = 372$ ), the low reactance-inducing VIP ( $n = 44$ ) was significantly associated with 1.6 times odds of *fewer subsequent arrests* than DWI School ( $p \leq .05$ ,  $d = .26$ ). All prior offenders were rearrested at least once in 12 years no matter which intervention they received. However, recent prior offenders appeared to be positively affected by low reactance-inducing VIPs. Recent prior offenders who attended low reactance-inducing VIPs were 19 times less likely than recent prior offenders who attended high-reactance VIPs to be rearrested within first four years following intervention (dichotomous dependent variable *time to* recidivism (<4 years / > 4 years),  $p < .05$ ); loglinear logit regression using dichotomous dependent variable *time to* recidivism,  $p = .009$ ; Fisher's Exact Test,  $p = .008603$ ).

5. *Does the reactance message dosage predict number of subsequent arrests within group for the MADD VIP plus DWI School intervention group, while controlling for covariates age, gender, and number of priors?*

The effect of intervention upon the number of subsequent arrests depended upon level of priors and age. Those with no prior DWI arrests, age 30 and older, could be characterized as having committed, in general, zero *subsequent arrests*. They were 1.7 times more likely to have zero subsequent arrests than those under age 30 (loglinear logit regression,  $p < .0001$ ). The *number of subsequent arrests* was reduced 1.3 times for those over-30 no-priors who attended low-reactance-inducing VIPs compared to those over-30 no-priors who attended no-VIP intervention (odds ratio  $p \leq .05$ ; loglinear logit  $p = .05$ .)

Recent prior offenders who attended low reactance-inducing VIPs were 2.4 times more likely to have only one subsequent arrest in 12 years than recent prior offenders who had no VIP intervention (loglinear logit,  $p = .002$ ). Recent prior offenders who attended low reactance-inducing VIPs were 19 times less likely than recent prior offenders who had no VIP intervention to be arrested twice or more (odds ratio,  $p < .0001$ ).

6. *Are there different predictor variables for recidivism for those study participants with DWI arrests before the study (who arguably believe they have the freedom, a reactance theory assumption, to drink and drive) versus those participants with no prior arrests?*

Demographic predictors of recidivism are different for study participants with prior arrests versus those with no priors. For those with no prior DWI arrests, *age* is predictive of DWI recidivism. For offenders with recent *prior* arrests, no demographic

predictors explain recidivism. For recent offenders, *number of prior arrests* does not predict recidivism. The only predictor is the first most recent DWI. In this study, the first DWI following July 1995 is analyzed as the first DWI, but more likely their more recent DWI, as discussed in study limitations.

Age alone had been found in previous research to be a predictor of recidivism (National Highway Traffic Safety Administration, 2001b, 2008). Gender alone was found as a predictor (C' de Baca et al., 2001; Shinar and Compton, 1995). Age and gender together had been found to be predictors (Donovan et al., 1983; Hedlund, 1994; KeRo Corporation, 2006; Moskowitz et al., 1979; Riala et al., 2003; Shinar & Compton, 1995; Simpson and Mayhew, 1991; Wells-Parker et al., 1995; Wells-Parker, Pang, Anderson, McMillen, & Miller, 1991). Gender and number of priors had been found to be predictors of DWI recidivism (C' de Baca et al., 2005; Wells-Parker, Bangert-Drowns, McMillen & Williams, 1995). The effect of age is evident in the present study when all cases are considered together in one sample, Table 4-4 displays categorical variable codings for all cases and *n* for *gender2*, *priors2*, and *age2*. Table 4-5, below, for all cases displays the results of a survival analysis where *priors2* (no priors versus priors), *age2* (under 30 versus 30 and older), and *gender2* (female, male) are considered for hazard of recidivism over 12 years following index DWI arrest. When cases are divided into levels of priors/no priors, then age does not influence recidivism for those priors.

**Table 4-4: Categorical Variable Codings for Cox PH Regression**

		Frequency	(1)
GENDER2(a)	1=FEMALE	209	.500
	2=MALE	620	-.500
PRIORS2(a)	1=NO PRIORS	782	.500
	2=1-3 PRIORS	47	-.500
AGE2(a)	1=UNDER 30	437	.500
	2=30 AND OVER	392	-.500

a Simple Parameter Coding

b Category variable: GENDER2 (FEMALES = 1, MALES = 2)

c Category variable: PRIORS2 (0 PRIORS = 1, 1-3 PRIORS = 2;

d Category variable: AGE2 (<30 = 1, >= 30 = 2)

**Table 4-5: Variables in the Cox PH Regression Equation**

	B	SE	Wald	df	Sig.	Exp(B)	95.0% CI for Exp(B)	
							Lower	Upper
GENDER2	-.284	.145	3.810	1	.051	.753	.567	1.001
AGE2	.363	.117	9.543	1	.002	1.438	1.142	1.810
PRIORS2	-1.889	.165	131.089	1	.000	.151	.109	.209

Comparison is to last level of each variable for Exp(B).

Females are .75 as likely, compared to males, to experience recidivism in 12 years following index DWI arrest. Under age 30 offenders are 1.4 times as likely, compared to those over 30, to be rearrested.

Those with no priors are .151 times as likely, compared to recent prior offenders, to be rearrested (the reciprocal is 7 times: those priors are 7 times more likely than those with no priors to be rearrested).

Whether or not an offender has been recently arrested is the most significant predictor of recidivism. *Number of prior arrests* does not make a significant difference. It may be concluded that the first most recent DWI offense is the most significant determinant of one's hazard for recidivism.

7. *What are the demographic covariates that predict positive or negative message effects of MADD VIPs?*

To fully evaluate the results of the demographic research, a framing of the spirit of the MADD VIP message, the intentions and framing of the message senders, is useful. Ridicule, devaluation, and lampooning are all methods of conflict resolution practiced in confrontational rehabilitation approaches to break down denial of the problem. In their own words (Lord, 1990), the MADD VIP program in New Mexico uses the following confrontational tactics to break down offender denial:

- (1) Exposing offenders to the consequences of drinking and driving;
- (2) ~~Helping~~” offenders move beyond focusing on their own ~~bad luck~~”;
- (3) Serving as a first step in breaking down the denial of alcoholics/drug addicts;

Miller, Benefield, & Tonigan (1993, p. 455), define tactics such as MADD’s confrontational because MADD intends the VIP to be ~~a~~ hard-hitting, directive, exhortation style intended to overwhelm robust defensive mechanisms” of the DWI offender. Confrontation is an antecedent to reactance. From this perspective, MADD VIPs would be expected to induce reactance. This study’s findings support such a conclusion.

A survival analysis, Cox Regression, was conducted on five demographic variables (*gender, age, ethnicity, education level, income level*) to determine their association, if any, to recidivism. The most significant predictors of recidivism were ethnicity, gender, and age. Education and income were not predictors of recidivism. Prevention and rehabilitation of DWI offenders with one or more offenses is the most expensive and least effective method to reduce DWI crashes. Confrontational

rehabilitation such as reactance-inducing MADD VIP programs are less effective than the standard DWI school, a non-emotional educational program.

Table 4-6 provides a frequency analysis of participants' gender, ethnicity, education, and income. Table 4-7 provides *p* values for these same categories as demographic risk factors that influence time to recidivism effect, as obtained from a Cox PH Regression.

**Table 4-6: All Cases: Number of Participants in Demographic Categories**

		Frequency	Percentage
GENDER2(a)	1=MALE	199	0.45
	2=FEMALE	599	0.12
ETHNICITY(a)	1=Hispanic	356	0.37
	2=Native	98	0.00
	3=Anglo	292	0.02
	4=Asian	2	0.04
	5=Black	16	0.20
	6=Other	34	0.09
DEGREE(a)	0=NO DEGREE	166	0.30
	1=GED	77	0.21
	2=HIGH SCHL	251	0.08
	3=TRADE SCHL	173	0.07
	4=ASSOC	63	0.01
	5=BACH	57	0.00
	6=MAST	8	0.15
	7=PhD	3	0.29
MONTHLY INCOME(a)	1=<500	120	0.25
	2=500-1000	232	0.15
	3=1001-1500	198	0.07
	4=1501-2000	118	0.03
	5=2001-2500	52	0.07
	6=2501-3000	25	0.45
	7=>3001	53	0.12

a Indicator Parameter Coding

**Table 4-7: Summary of Demographic Risk Factors that Influence Time to Recidivism**

<b>Demographic Effects on Time to Recidivism</b>		
<b>All Cases</b>	<b>No Priors</b>	<b>Priors</b>
<b>Gender, <math>p = .0</math></b>	<b>Gender, <math>p = .025</math></b>	<b>Gender, <math>p = .760</math></b>
<b>Age, <math>p = .053</math></b>	<b>Age, <math>p = .028</math></b>	<b>Age, <math>p = .552</math></b>
<b>Ethnicity</b>	<b>Ethnicity</b>	<b>Ethnicity</b>
1. Hispanic, $p = .051$	1. Hispanic, $p = .107$	1. Hispanic $p = .178$
2. Native, Am $p = .019$	2. Native Am, $p = .058$	2. Native Am $p = .230$
3. Anglo, $p = .564$	3. Anglo, $p = .786$	3. Anglo $p = .079$
4. Asian, $p = .855$	4. Asian, $p = .864$	4. Asian, <i>no data</i>
5. Black, $p = .012$	5. Black, $p = .016$	5. Black, <i>no data</i>
6. Other, <i>no data</i>	6. Other, <i>no data</i>	6. Other, <i>no data</i>
<b>Education</b>	<b>Education</b>	<b>Education</b>
1. GED, $p = .828$	1. GED, $p = .842$	1. GED, $p = .911$
2. High Schl, $p = .817$	2. High Schl, $p = .833$	2. High Schl, $p = .905$
3. Trade Schl, $p = .827$	3. Trade Schl, $p = .842$	3. Trade Schl, $p = .906$
4. Assoc Arts, $p = .823$	4. Assoc Arts, $p = .838$	4. Assoc Arts, $p = .904$
5. Bachelors, $p = .829$	5. Bachelors, $p = .840$	5. Bachelors, <i>no data</i>
6. Masters, $p = .839$	6. Masters, $p = .849$	6. Masters, <i>no data</i>
7. Ph.D., $p = .847$	7. Ph.D., $p = .856$	7. Ph.D., <i>no data</i>
<b>Monthly Income</b>	<b>Monthly Income</b>	<b>Monthly Income</b>
1. < 500, $p = .109$	1. < 500, $p = .221$	1. < 500, $p = .324$
2. 500-1000, $p = .182$	2. 500-1000, $p = .379$	2. 500-1000, $p = .347$
3. 1001-1500, $p = .249$	3. 1001-1500, $p = .370$	3. 1001-1500, $p = .435$
4. 1501-2000, $p = .085$	4. 1501-2000, $p = .445$	4. 1501-2000, $p = .569$
5. 2001-2500, $p = .963$	5. 2001-2500, $p = .712$	5. 2001-2500, $p = .288$
6. 2501-3000, $p = .304$	6. 2501-3000, $p = .908$	6. 2501-3000, <i>no data</i>
7. >3001, <i>no data</i>	7. >3001, <i>no data</i>	7. >3001, <i>no data</i>

*Effect of gender on survival of priors versus no priors:* Among all cases, women were 34% (beta = -.419,  $p = .007$ ) less likely than men to be rearrested than men. Among those with no priors, women were 31% (beta = -.365,  $p = .025$ ) less likely than men to be rearrested than men. Among those priors, gender did not make a difference. These results indicate that in preventive education among those males with no prior DWI arrests could yield the greatest impact.

*Effect of age on survival of priors versus no priors:* Among all cases, risk decreased by 1.3% for every year increase in age (beta = -.013,  $p = .053$ ). Among those with no priors, risk decreased by 1.6% for every year increase in age (beta = -.017,  $p = .028$ ). Among those priors, age did not make a difference. These results indicate that in preventive education among those with no prior DWI arrests, resources directed at younger men, minors to the mean offender age of 31, could yield substantial impact. This agrees with Guerin's (2002) finding that older offenders have higher odds of successful rehabilitation.

*Effect of ethnicity on survival of priors versus no priors:* Among those priors, ethnicity was not associated with a statistical difference in outcomes. The measurement of the effect of ethnicity upon DWI recidivism survival is controversial. Illegal drug and alcohol use is more prevalent among Anglo or "white" Americans than minorities (Maruschak, 1999; White, 2003). Yet White found that ethnic minorities hit the statistical radar as being heavier users than whites. White based his analysis on data from NHSDA (National Household Survey on Drug Abuse), NIDA (National Institute on Drug Abuse), NHTSA (National Highway Traffic Safety Administration), DAWN (Drug Abuse Warning Network), NIAAA (National Institute on Alcohol Abuse and Alcoholism), FBI (Federal Bureau of Investigation), CDC (Center for Disease Control and Prevention), and reports from SAMHSA (Substance Abuse and Mental Health Services Administration). In these databases, as in the present study, a popular measure of recidivism was *number of recidivisms* or *time to recidivism*. However, recidivism is not found to be a function of ethnicity. According to Guerin, who studied recidivism among DWI/Drug Court participants, "all [ethnicities] succeed and fail at similar rates" (Guerin, 2002, p. 18).

In consonance with White and in contrast with Guerin, the present study finds an ethnic bias in the recidivism statistics. Like the White study, the present study measured

recidivism by number of arrests per ethnic category. However, there is controversy over the disproportionate arrests of nonwhites, known as racial profiling, in the state where the data was collected. Other considerations regarding the ethnic bias of the data are discussed in the discussion section. These considerations cast a doubt upon the assumption that the incidence of recidivism is an equally representative measure of recidivism, across all ethnicities. If all ethnicities experience recidivism at the same rate but nonwhites are arrested and counted more often, then this may explain an ethnic bias that finds nonwhites more likely to be rearrested.

The present study found, with qualifications, that among all cases, Hispanics were twice as likely (beta = .713,  $p = .051$ ) than other ethnic group designations to be rearrested. Among all cases, Native Americans were 2.5 times as likely (beta = .894,  $p = .019$ ) as other ethnicities to be rearrested. Among all cases, African Americans were 3.3 times as likely (beta = 1.213,  $p = .012$ ) as other ethnicities to be rearrested. Among those with no priors, African Americans were 3.2 times as likely (beta = 1.188,  $p = .016$ ) as other ethnicities to be rearrested and they were the only ethnicity that had a significant risk in relation to other ethnic groups with no prior DWI arrests. The qualifications for these findings on ethnicity are discussed in the discussion section of this paper.

*Effect of education and income on survival priors versus no priors:* Among all cases, including those with no priors, and those priors, neither education nor income made a difference in predicting recidivism.

8. *Are MADD VIP messages effective in terms of lengthening time to recidivism and reducing number of subsequent arrests?*

High-reactance VIPs coincided with observations of increased recidivism for those with no priors and for those with no priors under age 30. High-reactance VIPs did not have an effect upon recidivism for those with *no* priors age 30 and older. Low reactance-inducing VIP attendance coincided with observations of fewer subsequent arrests for those with no priors aged 30 and older, had no effect upon those with no priors under age 30, and lengthened time to recidivism and reduced number of subsequent arrests for those with no priors of all ages. Thus, VIP effects were observed to be associated with different effects depending on levels of priors, age, and level of VIP reactance-inducing level. Table 4-7 displays odds ratios, *n*, *p* values, and effect size for stratified demographic predictors and dependent variables. Effect size is computed for odds ratios from Chinn's *d* (2000), a standardized difference statistic that uses odds ratios to compute Cohen's *d* (1988). Effect size for survival analysis is  $\text{Exp}(B)$ .

**Table 4-8: Summary of MADD Message Effects**

<b>Summary of Study Effects*</b>									
<b>Prior Effects:</b>	<b>Prior DWI Arrests</b> Hazard of recidivism 7 times more likely than offenders with no prior DWI arrests ( $n = 47, p < .0001$ , effect size $d = 1.07$ )			<b>No Prior DWI Arrests</b> Hazard of recidivism decreases by 3% each year gain in age ( $n = 783, p = .009$ , effect size $\text{Exp}(B) = .97$ )					
<b>Age Effects:</b>	<b>All Ages</b> No age effect			<b>Age under 30</b> Odds of arrest in first 4 yrs 1.6x more likely than Age 30 ( $n = 411, p < .0001$ , effect size $d = .26$ )			<b>Age 30+</b> Odds of no recidivism 1.7x more likely than Age under 30 ( $n = 372, p < .0001$ , effect size $d = .29$ )  Elevated social cognitive score one year after any Tx ( $p = .043$ , effect size $d = .28$ )		
<b>Treatment Effects:</b>	DWI School	VIP Low React	VIP High React	DWI School	VIP Low React	VIP High React	DWI School	VIP Low React	VIP High React
<b>Short Time to Recidivism</b>	$n = 23$	Rearrest in first 4 yrs 19 times less likely than VIP High React ( $n = 7, p = .009$ , effect size $d = 1.64$ )	$n = 17$	Rearrest in first 4 yrs 1.9 times less likely than VIP High React ( $n = 233, p = .01$ , effect size $d = .35$ )	$n = 46$	$n = 158$	$n = 214$	$n = 44$	$n = 135$
<b>Fewer Subsequent Arrests</b>		2 or more Rearrests 19 times less likely than DWI School ( $n = 7, p < .0001$ , effect size $d = 1.64$ )						Fewer Rearrests 1.6 times more likely than DWI School ( $n = 44, p < .05$ , effect size $d = .26$ )	
* Observed effect sizes $.25 < d < 1.65$ ; compare to meta analysis where "mean effect sizes ranged between 0.08 and 0.10" (Wells-Parker, Bangert-Drowns, McMillen & Williams, 1995, p. 913) or .26 after adjustment for DWI arrest records' underestimation of DWI behavior (Lipsey, 1992).									

TWO RESULTS FOR Low reactance-inducing VIPs THAT ARE NOT DISPLAYED IN TABLE 4-7: (1) Low reactance-inducing VIPs were associated with 1.28 times fewer subsequent arrests than No VIP for No Priors Age 30+ (loglinear logit,  $p = .05$ ; odds ratio,  $p < .05$ ), but this result duplicated the low reactance-inducing VIP result with less impressive odds. This result was reported in results section but has been left out of the results table because it would add another three columns, more complexity and table would be too wide for page. Additionally, this result was omitted from the table because this variable *proportion of reactance-inducing statements* was not an intuitive variable (the face value of *proportion of reactance-inducing statements* is difficult for readers to interpret because it is more difficult than *level of reactance-*

*inducing statements* to visualize in terms of the presenter statements). Further, there were no other interesting results with the *proportion of reactance-inducing statements* variable other than this marginal result.

(2) For Priors, low reactance-inducing VIPs were 2.4 times more likely to be associated with the minimum one subsequent arrest (all Priors were rearrested at least once) than no-VIP (loglinear logit,  $p = .0002$ ). Not included in Table 4-7 because it is somewhat redundant with, and less extreme than, the result that is reported in this table. A second reason this result is not reported in this table is because it is difficult to explain in just a few words. This result must be qualified such that the reader understands that one arrest is a good result for those priors because it was the minimum number of subsequent arrests of those priors who were sampled.

EFFECT SIZE CALCULATION: Effect sizes were calculated for odds ratio in Loglinear Logit Regression from Chinn's D (Chinn, 2000). "Each  $\ln(\text{odds ratio})$  ...[was] converted to effect size by dividing by 1.81." The effect size for Cox PH Regression is  $\text{Exp}(B)$ .

*Those with no prior DWI arrests:* For those with no prior DWI arrests *age* was observed as a significant predictor of *time to* recidivism. *Age* (maturation effect) was controlled to strengthen validity of the results. Accordingly, those offenders with no priors who were under age 30 ( $n = 411$ ) were observed to be 1.6 times more likely to be rearrested in the first four years, following intervention of any kind, than those age 30 and older ( $n = 372$ ) (odds ratio  $p = .001$ ; Cox Proportional Hazards  $\text{Exp}(B)$  odds for *age* categorical variable  $p < .0001$ ). Beginning at age 18, hazard for DWI recidivism decreased by 3% for each year an offender matured (Cox Proportional Hazards for *age* continuous variable  $\text{Exp}(B) = .97$ ,  $p = .009$ ). Guerin also found a greater success rate with older offenders: "as age increases, so do the odds that a client will graduate drug court ( $\beta = .0315$ ;  $p = .001$ )" (2002, p. 16). Guerin's study aggregated prior and *no* prior offenders; approximately half of the participants were first offenders, compared to a control group of offenders with three to six priors. However, the present study, conducted in the same state and county but three years earlier than Guerin's study, and which disaggregated both intervention and comparison groups into priors and *no* priors, found there was no maturation effect observed for those priors. Guerin's study covered two

years of data from 1998 to 2000. The present study data covered 12 years from 1995 to 2007. The difference in comparison groups and length of followup may explain the difference in results for those priors. This difference in results based partly on the length of study argues for longer followup times for DWI recidivism studies.

For those with no priors who were under age 30, *age* was observed to interact with *VIP level of reactance-inducing statements*. The high-reactance VIP was associated with shorter survival time to recidivism for this demographic group. Those with no priors who were under 30 were 1.9 times more likely to be rearrested in the first four years following intervention if they attended a high-reactance VIP than if they had no-VIP intervention (*time to recidivism* dichotomous, odds ratio and loglinear logit  $p = .01$ ). Low or high-reactance VIPs did not affect the *number of subsequent arrests* and the emotional *mood* level for this group. The high-reactance VIPs did not make these under-30 *no* priors depressed or angry; pre/post change in hostility (positively disposed/hostile) and pre/post change in mood valence (depressed/happy) were not significant. In the present sample, this group was observed to be relatively unaffected by low reactance-inducing VIPs. This finding suggests that future research might be conducted to verify if those with no prior DWI arrests under 30 should not be sent to MADD VIPs. Low reactance-inducing VIPs had no effect and high-reactance VIPs doubled the odds of under age 30 *no* recent prior offenders' recidivism in the first four years following intervention in the present sample.

Those with no prior DWI arrests, age 30 and older, were observed as having committed, in general, zero *subsequent arrests*. They were 1.7 times more likely to have zero subsequent arrests than those under age 30 (loglinear logit regression,  $p <$

.0001). *Number of subsequent arrests* was reduced 1.3 times for those over-30 no-priors who attended lowreactance-inducing VIPs compared to those over-30 no-priors who attended no-VIP intervention (odds ratio  $p \leq .05$ .; loglinear logit  $p = .05$ .) High reactance-inducing or high-reactance VIPs did not affect over-30 *no* priors. They appeared to be disposed in general to elevated emotional *moods* one year following their DWI arrest,  $p < .05$ . Elevated moods following DWI intervention were not associated with type of intervention but were common to all *no* prior over-30 offenders in all intervention modalities, including the DWI School Only comparison.

*Those with prior DWI arrests:* Those with prior DWI arrests ( $n = 47$ ) were 7 times more likely to be rearrested in first four years following treatment than those with no prior DWI arrests (7 times more likely: survival analysis *time to recidivism continuous*,  $p < .0001$ ; 9 times more likely: loglinear logit analysis,  $p < .0001$ ).

The treatment group received two significantly different treatments that resulted in opposite treatment effects. Therefore, if the entire treatment group were to be analyzed as one group, the two oppositely reacting group effect would cancel out and no effect, or a relatively small effect, would be detected. The message effect check conducted in the present study determined that different treatments were being applied within the treatment group. Thus it became necessary to analyze the two treatment groups separately. This is why it is vital to perform a message effect check, similar in concept to a manipulation check, before conducting analysis on the data. Such checks avoid Type II errors.

MADD VIPs were associated with a strong effect (both positive and negative) on recidivism for those with prior DWI arrests. Recent prior offenders were observed to be

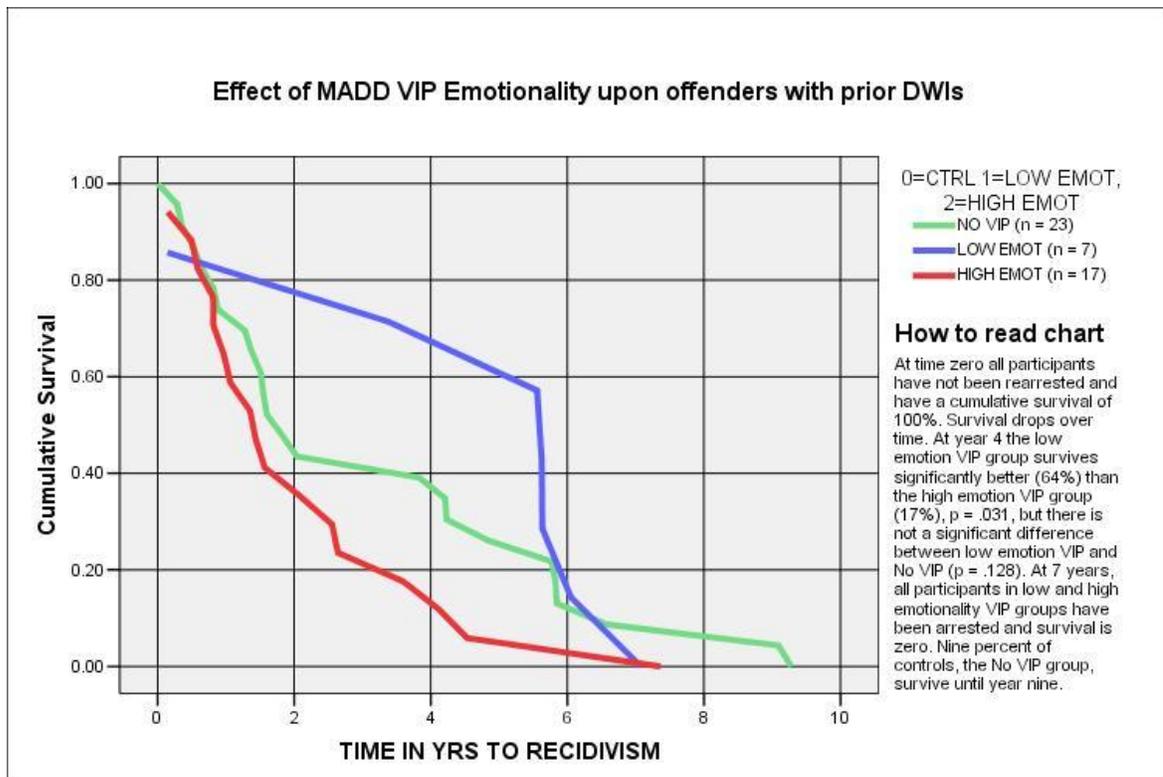
negatively affected by high-reactance VIPs compared to low reactance-inducing VIPs and positively affected by low reactance-inducing VIPs compared to DWI School Only. During the first four years, recent prior offenders who attended high-reactance VIPs were six times more likely than recent prior offenders who attended low reactance-inducing VIPs to be rearrested (survival analysis with *time to* recidivism continuous,  $p = .025$ ). When the *time to recidivism* was dichotomized, those recent *priors* who attended high-reactance VIPs were 19 times more likely to be arrested, within four years following intervention, than recent prior offenders who attended low reactance-inducing VIPs (odds ratio using dichotomous dependent variable *time to* recidivism (<4 years / > 4 years),  $p < .05$ ); loglinear logit regression using dichotomous dependent variable *time to* recidivism,  $p = .009$ . This particular model for loglinear logit did not meet the method's assumption of having no more than 20% of cells with less than five cases, however the same odds ratio (18.75) and the same probability value ( $p = .009$ ) obtained from a more conservative test confirmed the adequacy of the loglinear logit model, Fisher's Exact Test ( $p = .008603$ ).

All recent prior offenders Recent prior offenders were rearrested at least once in 12 years no matter which intervention they received. However, low reactance-inducing VIPS positively affected recent prior offenders. who attended low reactance-inducing VIPs were 19 times less likely than recent prior offenders who attended high-reactance VIPS to be rearrested within first four years following intervention (dichotomous dependent variable *time to* recidivism (<4 years / > 4 years),  $p < .05$ ); loglinear logit regression using dichotomous dependent variable *time to* recidivism,  $p = .009$ ; Fisher's Exact Test,  $p = .008603$ ). Recent prior offenders who attended low reactance-inducing

VIPs were 2.4 times more likely to have only one subsequent arrest in 12 years than were recent prior offenders who had no VIP intervention (loglinear logit,  $p = .002$ ). Recent prior offenders who attended low reactance-inducing VIPs were 19 times less likely than recent prior offenders who had no VIP intervention to be arrested twice or more (odds ratio,  $p < .0001$ ).

*Life cycle of VIP message effect:* The first year following intervention evidenced no message effect for those priors. This inhibition of message effect may have occurred because arrest records typically lag behind actual events of drunk driving. Legally intoxicated drivers may drive drunk 300 to 2,000 times before they are caught and arrested (Borkenstein, 1975; Jones & Joscelyn, 1978; Voas & Hause, 1987). The National Commission Against Drunk Driving (NCADD) and The Century Council (1996) estimated that chronic alcoholics might drive drunk 1,000 times for every one time they are arrested. NHTSA (2001a) estimated more conservatively that DWI offenders are caught only once out of every hundred times. Because self-reports are not reliable and public records do not contain this data, these are necessarily loose estimates. However, given this range as a best estimate, the probability of DWI detection is once in 1-3 years if a driver drives drunk every day, the VIP message effect as measured by DWI recidivisms is a lagged effect. Yet, after year one the VIP message effect began to show up gradually in arrest records until year two when the full message effect became evident. Low reactance-inducing VIPs had a positive message effect, relative to other groups. This positive message effect of low reactance-inducing VIPs increased until year five when the message effect abruptly declined. Its message effect decayed; it did not last.

If a survival analysis had been conducted at year four, then the positive message effect for low reactance-inducing VIPs would appear to have been lastingly significant. Yet such premature interpretation would have been inaccurate because the low reactance-inducing VIP message effect did not last indefinitely. It wore off between years 4 and 5.5. This study illustrates the life span of a message effect. The life span of a message effect is useful information for follow-up intervention scheduling. An advantage of this 12-year longitudinal study is that the entire life cycle of the message effect, both growth and decline can be studied over time. Figure 4-5, *Effect of VIP level of reactance-inducing statements upon offenders priors (n = 47)* illustrates the survival curve for low reactance-inducing VIPs, no-VIP intervention, and high-reactance VIPs. Figure 4-5 is purely a survival curve stratified by intervention type, not to be confused with a Cox Proportional Hazards Regression survival curve. A Cox PH Regression would show all three curves starting at time zero with 100% cumulative survival, and since the odds would be proportional, the three curves would not vary in shape from each other. This stratified survival chart was chosen to contrast the variation in survival rates between the three intervention modalities in this study.



**Figure 4-5: Effect of MADD VIP level of reactance-inducing statements upon offenders with priors.** The low reactance-inducing VIP demonstrated a slow decline that continued for five years following intervention before dropping dramatically. Cumulative survival of the high-reactance VIP plus DWI School group and DWI School Only group declined at an exponential rate.

In Figure 4-5, the first occurrence of recidivism for each group is the beginning point of its survival curve. However, the cumulative survival at time zero is still 100% even though the survival curve does not depict time zero for the three intervention modalities.

Positive effects in terms of low reactance-inducing VIPs: There is some evidence, though thin evidence for those priors due to the low sample size ( $n = 7$ ), that the low reactance-inducing VIP had a positive effect. Those with no priors age thirty and older ( $n = 44$ ) were quite positively affected by low reactance-inducing VIPs, which decreased

odds of subsequent recidivisms by 1.6 times. For this no priors over-30 group (n = 372), the low reactance-inducing VIP group (n = 44) was significantly associated with 1.6 times odds of fewer subsequent arrests than DWI School ( $p \leq .05$ ,  $d = .26$ ).

All prior offenders were rearrested at least once in 12 years no matter which intervention they received. However, recent prior offenders appeared to be positively affected by low reactance-inducing VIPs in that the low reactance-inducing VIPs delayed their recidivism and were associated with less recidivism. Recent prior offenders who attended low reactance-inducing VIPs (n = 7) were 19 times less likely than were recent prior offenders who attended high-reactance-inducing VIPs, to be rearrested within first four years following intervention (dichotomous dependent variable time to recidivism (<4 years / > 4 years),  $p < .05$ ); loglinear logit regression using dichotomous dependent variable time to recidivism,  $p = .009$ . Fisher's Exact Test, a more conservative test that is robust to small sample sizes confirmed this positive low reactance-inducing VIP effect for recent prior offenders ( $p = .008603$ ). Recent prior offenders who attended low reactance-inducing VIPs (n = 7) were 19 times less likely than prior offenders who attended DWI School ( $p < .0001$ ,  $d = 1.64$ ) to have two or more subsequent arrests.

#### *Chapter 4 Summary*

**Low reactance-inducing VIP: A favorable impact across all groups:** It is interesting to note that, given the limitations of the study, the *low reactance-inducing* VIP was observed as having a temporary favorable impact. The favorable impact was observed for those with recent prior DWI arrests of all ages (and for those with no prior DWI arrests over age 30 who are not depicted in Figure 4-5), until year 5.5 post intervention. After year 5.5, post intervention, there was a sharp decline in the *low*

*reactance-inducing* VIP message effect. All DWI offenders in the study who had recent prior offences experienced recidivism but the low reactance-inducing VIP was associated with a delay in onset of recidivism and associated with less recidivism for those recent priors. It is noted here, as before, that the present study is limited in its generalizability for the effects of MADD VIPs upon *priors* versus *no priors*.

**High-reactance VIP: An unfavorable impact across all groups:** The *high-reactance* VIP was observed as having an unfavorable impact on all participants (except those with *no priors* age 30+, who appeared unaffected). All DWI offenders in the study who had recent prior offences experienced recidivism but the high-reactance VIP was associated with 19 times higher odds of arrest in first four years (compared to low reactance-inducing VIPs) and a 19 times higher odds of two or more recidivisms (compared to DWI School) for those priors. High-reactance VIPs were associated with 1.9 times higher odds for recidivism in the first four years (compared to high-reactance VIPs) for those with *no priors* under age 30. It is noted here that the sample size for recent prior offenders who attended *low-reactance* VIPs was very small,  $n = 7$ . Though a Fisher's Exact Test, robust to small sample sizes, found the same odds and same  $p$  value, the study result is still limited. As discussed in limitations, the *priors* sample was restricted to only the last two-thirds of the enrollees who had recent prior DWIs places a strong limitation on generalizability of this result.

**Reactance theory may explain VIP effects:** Where reactance antecedents were high in the intervention message dosage there was significantly more recidivism observed with a high effect size range ( $.34 < d < 1.65$ ). Where reactance antecedents were low in the intervention message dosage there was less recidivism observed with a very high

effect size range ( $.25 < d < 1.65$ ). Thus, reactance theory may explain negative outcomes for VIP message effects.

High-reactance VIPs were associated with a negative outcome relative to low reactance-inducing VIPs. Low reactance-inducing VIPs were associated with a positive outcome relative to high-reactance VIPs and DWI School Only. The 19 times worse negative effect of high-reactance VIPs (80% of the sampled VIPs), compared to low reactance-inducing VIPs (20% of sampled VIPs), may be explained by reactance theory (Brehm, 1966). Reactance to confrontational (highly emotional, threatening, and confrontational) intervention messages has been associated with increased recidivism in studies of alcohol and drug intervention failures (Buller, Borland, & Burgoon, 1998; Buller et al., 2000; Campo & Cameron, 2006; Dillard and Shen, 2005; Engs & Hanson, 1989; Miller, 1995, 2000; Miller, Benefield, & Tonigan, 1993; Miller, Burgoon, Grandpre, & Alvaro, 2006; Quick, 2003).

**Demographic Risk Factors.** Characterization of demographic risk factors in a geographic region such as the state of New Mexico must include certain qualifications when ethnicity is being considered. New Mexico is a minority majority state. *Minority majority* means that a major percentage of the population consists of those who would be considered a minority elsewhere. Hispanics, Native Americans, and Blacks comprise 54% of the general population in New Mexico, thus it is not surprising to find these groups represented in 60% of the DWI offender subpopulation. Hispanics, Native Americans, and Blacks evidenced higher risk factors for one or more subsequent DWI arrests. However, it is unknown whether other influences such as fewer DWI check points in white upper-income neighborhoods or racial-profiling-biased numbers of arrests

favor of non-whites. Ethnicity may not be an accurate measure of demographic risk for recidivism in the present study. At a national level, White (2003) pointed out the misrepresentation of ethnicity in public statistics on DWI incidence. White found in national databases<sup>21</sup> a higher prevalence for illegal drug and alcohol use among white non-ethnic population but higher levels of abuse by whites did not show up in police arrest and other public services data. He noted an over representation of ethnic minorities in the “casualty” data. White also cautioned that the ethnic minority status of the offender interacts with the ethnic background of the evaluator and “can enhance or inhibit the evaluation process” (p. 50). Guerin (2002) found that when successful rehabilitation was measured by means other than recidivism data, in this case rehabilitation program graduation, that success or failure is not a function of ethnicity.

**Study Extension Supports Original Study.** The present study supports and extends the results of a two-year follow-up by Woodall, Delaney, Rogers, Wheeler, Rao, Polascek, and May (2007). The previous researchers found that MADD VIP participants’ recidivism rates were 30% higher than their DWI School comparison group, trending toward significance at  $p = .0583$ . Although limited by the designation of *recent prior* offenders, this message effects extension offers a partial explanation. It may be that VIP-induced reactance influences an association between *high-reactance* VIPs and increased recidivism for some recent prior offenders.

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<sup>21</sup> NHSDA, NIDA, NHTSA, DAWN, NIAAA, FBI, and CDC.

## CHAPTER 5: DISCUSSION

This study offers an interesting and novel study of reactance theory (Brehm, 1966). It is an unusual study in that it is a longitudinal randomized field trial of message effects. Under longitudinal conditions, the present study observes different levels of reactance antecedents and their relationship to long-term reactance-related behavior. Most behavioral research concludes at three to six months. If a study lasts longer than one year, it is considered longitudinal. This study is unusual in that it offers a view of the rise and decline of messages effects over a twelve-year timeline.

For scholars in the intervention research field, this empirical longitudinal field study is useful in documenting:

- (a) The life cycle of intervention message effects
- (b) The persuasive effect of a particular message quality (such as emotion and threat) and how the persuasive effect changes at different levels of dosage and for different demographics
- (c) The quantification of the effect of age (maturation) over time on rehabilitation
- (d) The interaction between age and message type and influence on rehabilitation

The study also suggests best practices for training MADD VIP presenters.

**Best practices for training for MADD VIP presenters:** If VIPs are continued as an intervention program, this study suggests benefits of training presenters to conduct low reactance-inducing VIPs. MADD VIP presenters might increase VIP efficacy after studying exemplars of *low-emotion/low-reactance-inducing* VIPs statements versus *high-emotion/high-reactance-inducing* VIP statements. The classification exemplars from these two categories, *low* versus *high-reactance* statements, might be found useful in

improving efficacy of VIP presentations. A VIP presenter training might be comprised of learning the difference between two presenter messages:

(a) *Reactance-inducing* statements (*high-reactance-inducing* statements, such as "Drunk drivers killed my child. Every morning I wake up angry at people like you. You should not drink and drive"), versus

(b) *Non-reactance-inducing* statements (*low reactance-inducing* statements, such as "you and I are the same, we all like to have a good time, all I am hoping is just please don't drink and drive").

Training of VIP presenters could be simple, and of short duration. The effectiveness of the training would rest upon the trainers' ability to affect a change in attitude among VIP presenters. Trainers would need to persuade VIP presenters of the fruitlessness of indulging in personal satisfaction through berating DWI offenders using high levels of *reactance-inducing statements* such as —people like you killed my child” and —if you continue to drink and drive you could kill someone, lose everything, and spend the rest of your life in jail.” Instead trainers would need to persuade VIP presenters that a greater good is possible through affecting the greatest possible intervention effect, using *non-reactance-inducing statements* such as —you and I are similar, we all like to have a good time” and —all I ask is that if you drink, please don't drive.”

**A serendipitous finding:** Due to plea-bargaining legal maneuvers, prior offenders are plead down to first offense status and then assigned to a first offender treatment such as DWI School. The presence of 47 recent prior offenders in the current study is a result of the plead-down practice. Originally, only first offenders were intended

to be included in this study. However, prior offenders, having been plead down to first offense, were sent to DWI School. Thus, prior offenders were recruited to the study. This error became fortuitous in that it enabled comparison of offenders with *no priors* to those with recent *priors* in the context of VIP *levels of reactance-inducing statements* versus no exposure to VIP *levels of reactance-inducing statements* in the no-VIP comparison group. These comparisons became pivotal to understanding the effect of VIPs across levels of *priors* and levels of *age*.

Rogers, one of the principal investigators in the original study upon which this extension is based, observed that sometimes it is the fortuitous error or serendipitous insight that identifies the most important finding in a study (personal communication, September 26, 2001). Roger's observation would accurately portray the identification of the most important results in this study that were only possible after the parsing of data by *priors/no-priors* offender categories.

Message effects analysis, via content analysis, regression, and survival analysis, suggests that the chastising and highly emotional “dosages” of MADD VIP messages is associated with negative reactance among prior offenders, which results in a negative message effect. As discussed previously, if the message sender is censuring, threatening, or publicly ridiculing a behavior that a receiver believes he has the freedom to perform then the receiver is likely to respond with reactance. He or she will reassert his freedom by increasing his practice of the censured behavior. Reactors may band with each other to perform their contempt of those who are censuring them. Reactance theory explains why reactors are likely to increase and celebrate the practice the censured behavior to assert their freedom.

**DAMM.** DAMM (Drunks against Madd Mothers) is a loosely organized reactance movement that has grown through socialization in bars, social drinking networks and the Internet. On the Internet one can purchase t-shirts, drinking glasses, mugs, and a variety of other items inscribed with the large acronym “DAMM” subtitled “Drunks Against MADD Mothers.” There is no official membership site and there are no statistics available on membership. However, the researcher learned in an email interview with an online vendor of DAMM products (personal communication, www.cafepres.com owner, November 21, 2008), that the most popular selling items, among DAMM coffee mugs and other items, were the DAMM t-shirts. These t-shirts are worn at bars and social occasions where drinking occurs. The existence of this grass roots organization offers contemporary evidence that MADD engenders reactance among career drinkers.

As reactance theory explains, reactors are likely to increase and celebrate the practice the censured behavior to assert their freedom. DAMM is an example of a social movement intended to ridicule and oppose MADD VIPs. DAMM publicly promotes drunkenness and the drinker’s freedom to enact drunk-related behaviors. The popularity of DAMM in bars and drinking contexts indicates the presence of reactance against the MADD VIP message among those in the alcohol drinking community.

MADD purposefully invokes public censure, goading and chastising as a means to dissuade drinkers from driving drunk. However, some drinkers glorify in public censure and aspire to invoke it because it glorifies them as the anti-hero. Public censure strengthens their identification with anti-social heroic role models. Those who aspire to invoke public censure subscribe to the *Herostratos Syndrome* (Borowitz, 2005; Cooper,

1977; Harmon, 2000; Stern, cited in Greenberg, 2005; Stohl, 1988; Wright, 1985).

Herostratos reactors perceive the negative attention of public censure as a reward for romantic anti-social heroism. DAMM is an example of the anti-hero Herostratos syndrome, a reactance response that glorifies in public censure.

This study, its unique approach to message analysis, offers implications for message effects theory, message effects study design, persuasive message design, and DWI intervention design.

### *Implications for DWI Intervention Design*

#### *Interaction effect between age and message type*

The effect of age (maturation) over time on rehabilitation was quantified in the present study. For those with prior arrests there was no effect of age. This implies that those offenders for whom an intervention is most important, those multiple offenders who could be classified as career drinkers, there is no evidence that growing older reduced their odds of recidivism. This finding is supported by previous research that characterize career drinkers as repeat DWI offenders who have greater vulnerability to alcoholism and factors that work against recovery: family history of substance abuse, low age of onset of substance abuse, and co-occurring medical and psychiatric disorders. This category of career drinker problematizes recovery in terms of pain. There was no maturation effect for career drinkers. This finding supports other research that indicates 75% of those who recover from addiction require in-depth alcohol treatment and “mutual aid” support groups (Knupfer, 1972; Vaillant, 1979; Sobell et al., 1996). These offenders may be classified for the most part as the *high-risk drinkers who drive* (Voas, 2000).

However, for those with *no priors*, those first-time offenders who demonstrated through their *no prior* status a shorter and less severe drinking career, growing older did make a difference in their likelihood of rehabilitation. This finding agreed with other research on *high-risk drivers who drink* (Sobell et al., 1993; Sobell et al., 1996; Larimer & Kilmer, 2000). In the present study, first offenders' hazard of recidivism decreased by three percent for each year they gained in age. This finding on maturation effect for first offenders was associated with a very strong effect size ( $e^{\beta} = .97$ ).

In the light of the present study, it would be informative to reanalyze data from previous studies. If separate analyses were conducted for two age groups, those under age 30 and those age 30 and older among those with *no priors*, then the outcomes and effect sizes may change. For previous studies, did an interaction between age and type of intervention cause, as in the present study, those under-age-30's and those age-30-and-older's outcome effects to cancel when analyzed together? If so, then there may actually be an intervention effect for low and high-risk offenders. Such an analysis segregated by age category may change the findings of meta-analysts Wells-Parker, Bangert-Drowns, McMillen & Williams, 1995, p. 917) that low-risk (*no priors*) and high-risk offenders (*priors*) did not respond to DWI intervention ( $t(19) = 0.68$ ;  $t(22) = 0.20$ , respectively,  $p > 0.05$ ). It may be the case, different categories of offenders did respond to interventions. However, when all ages were analyzed together, their effects cancelled out because different categories of offenders responded oppositely to the same interventions.

In the present study, which intervention type is most effective depended on the category age. For those first offenders under age 30, the informative intervention delivered at DWI school was 1.9 times more effective than the high-reactance high-threat

VIP intervention. This finding disconfirms the report by Mann, Wingillis, Leigh, Anglin, and Blefgen (1986) and Sheppard and Stoveken (1993) that claimed DWI schools have no effect on changing attitudes about whether to drink and drive. If the Mann et al. analysis combined all age groups in the same analysis then different effects for different age categories may have confounded their outcomes, causing an observation of no effect when there was an effect. They may have observed a different and opposite effect if *under/over 30* age categories had been analyzed separately.

For example, in the present study, for the first-offender under-age-30 group the low reactance-inducing VIP had no effect whatsoever. However, the low reactance-inducing VIP was the most effective intervention for those first offenders age 30 and older. The low reactance-inducing VIP was associated with 1.6 times less recidivism for first offenders age 30 and older. The informative DWI school was the least effective intervention for this age group.

#### *Life cycles of intervention message effects and effect sizes*

The present study documents the life cycle of the VIP and DWI school intervention message effects. It is interesting to observe the rise and fall of an intervention message effect over time. Survival analysis lends itself well to this observation of the life cycle of an intervention message effect. The first year following intervention evidenced no discernable message effect for any of the demographic groups or group conditions. This inhibition of message effect may have occurred because arrest records typically lag behind actual events of drunk driving. Legally intoxicated drivers may drive drunk multiple times before they are caught and arrested. The application of

this finding to intervention design is that an intervention may not show immediate results but it may, over time, evidence a cumulative effect.

The effect sizes obtained in the present study ranged from .26 to 1.64. These effect sizes were relatively larger than those reported by meta-analysts Wells-Parker et al. (1995) for DWI interventions. The normal effect sizes for DWI interventions ranged between seven to nine%. For those DWI intervention studies that used DWI arrests for calculation of outcome variables (99.5% of those studies analyzed) mean effect sizes centered around nine%.

However, Wells-Parker et al. estimated that using DWI arrests in calculation of study outcome variables leads to an underestimation of study effect size. This estimation by Wells-Parker et al. supported results obtained by earlier researchers (Lipsey, 1992; Lipsey & Wilson, 1993). Lipsey expected that DWI intervention effect size should range between 14-18. Lipsey further estimated that a more realistic effect size, accounting for the low bias of DWI arrest records as an outcome measure, would be about 25%. This adjusted expected effect size of 25% coincides with the lower range of effect sizes obtained in the present study, .26 to .29 for those of ages 30 and older with no prior offenses. Effect sizes for those under age 30 *no priors* ranged from .26 to .35.

The present study found that when the MADD VIP intervention was analyzed singularly as an intervention there was no message effect. However, when the same MADD VIP intervention was analyzed as a message, and the message was analyzed for message qualities and message types, then there was a very high effect size. Higher-range effect sizes observed in the present study for those with prior DWI offenses ranged

between 1.07-1.64. This effect range was only apparent when the intervention message style was analyzed and dichotomized into low and high reactance-inducing messages.

This finding demonstrates that analyzing an intervention message based on message qualities can yield a strong effect when analyzing the same intervention without analyzing message qualities yields no effect. This finding is interesting. It suggests fruitfulness of analyzing message qualities and message types in intervention treatments. If there is a significant difference in message qualities or types in an intervention then the independent variable for the intervention should contain different levels for these different message types. Otherwise, as observed in the present study, the effects from the different message types could confound each other and lead to a Type II error. The error would consist of no effect being detected (due to improper experimental design or methods) when there actually was an effect present.

By separating the intervention independent variable into different message type levels it became possible to observe a striking example of a life cycle for a message effect. Among those *priors* who attended low reactance-inducing VIPs there was a message effect with 19/1 odds of an outcome different from those who attended high-reactance VIPs. After year one a low reactance-inducing VIP message effect began to show up gradually in arrest records, reaching its zenith at year 2. At year 2, a strongly identifiable message effect is seen in the cumulative survival chart for low reactance-inducing VIPs.

For those *priors*, the life cycle for the low reactance-inducing VIP message effect rose after year one and abruptly declined at approximately year 5.5. By six years the low reactance-inducing VIP effect had completely vanished. The low reactance-inducing VIP

message effect for *priors* was observed to have an approximately 4.5 year life cycle. Limitations on the interpretation of this message effect apply and are discussed in the limitations section at the end of this chapter. The implication for intervention design is the understanding that low-reactance or non-reactance-inducing interventions, may have positive and long-lasting effects but these effects should be studied over time to learn the extent of their effective life cycle.

There were cases where no life cycle of a message effect was evident in the cumulative survival curves. For those *priors* who attended the high-reactance VIP plus DWI School and for those *priors* who attended DWI School Only, there were no rise and fall of message effects life cycles. Instead, the survival of these two groups demonstrated two exponential rates of decline that were not significantly different from each other. The implication for intervention design is twofold. First, intervention messages should be analyzed to determine if there are significantly different levels of message types. If so, then the effect of these different levels should be compared in any analysis. Second, it is informative to map the longitudinal cumulative failure rate of intervention participants by message type. When outcomes demonstrate an exponential rate of decay of a message type then the fruitfulness of the associated intervention might be scrutinized. If there is a relative positive effect from a certain message type then the intervention may benefit from an increased frequency of employment of that message type.

For those with no *priors*, as portrayed on cumulative survival curves, there did not appear to be a life cycle of the message effects for any of the intervention conditions. This group of *no prior* DWI offenders evidenced a gradual decline that stabilized after year four. Because all of the survival curves for different conditions appeared to be

proportional to each other, survival did not appear to be related to type of intervention condition. Outcomes over time appeared to be dependent on offender age and not on their intervention condition when *time to first subsequent* recidivism was continuous. When *time to first subsequent* recidivism was dichotomized, employing four years post intervention as the division between categories, a loglinear logit analysis found significant differences in outcomes for different intervention conditions.

Outcome differences were strongest (odds ratio = 19) between high and low reactance-inducing VIP conditions for *priors*. Strong effect sizes of 1.07 to 1.64, were also observed when the independent variable for intervention was stratified by message type. Odds ratios for those *priors* indicate that the low reactance-inducing VIP increased odds of survival and lowered number of subsequent arrests 19 times over the high-reactance VIP, with a strong effect size of 1.64.

Although these results for *priors* are interesting, there is a caveat in their interpretation. The generalizability of findings in this study is compromised by the probable nonrepresentativeness of the sample, as discussed in the population sample sections of the methodology chapter. Further, it is not possible to claim a causal relationship between the low reactance-inducing VIP and increased survival because the independent variable, *levels of reactance-inducing statements* were observed levels, not manipulated by the experimenter. These limitations are further discussed in the study limitations section at the end of this chapter.

The strongest implication for intervention design that is offered by this study is the benefit of stratification of the data set by demographics and prior conditions. Different groups may respond differently, even oppositely, to the same intervention

conditions. As a result, if a DWI offender data set is so affected, then demographic and prior condition levels may act as confounds, cancelling each other out and leading to a Type II error.

The present study findings indicate that when different demographic groups respond in widely different ways to the same interventions then they must be stratified in the analysis by their demographic predictors. In such a case, the intervention effects may surface with significant strength and effect size that otherwise results would have been nonsignificant. For example, *priors* under age 30 responded better to DWI School while those age 30 and older responded better to low reactance-inducing VIPs. If analyzed together in the same group then their effects would cancel and no intervention effects would have been detected.

#### *Identification and different treatments for repeat offenders*

Those repeat offenders who were included in this study, although their inclusion was serendipitous in assessing the negative effect of high reactance-inducing VIP upon *priors*, were nevertheless ill served by having their offense reduced, in justice vernacular “pled down,” to first offender status. They were ill served by being treated as first offenders. The MADD VIP is a first offender intervention. If a prior offender’s identity in the court system had remained intact as a repeat offender, rather than changed to first offender status, then these repeat offenders would have been assigned to more appropriate and successful interventions than the MADD VIP.

Proper identification of repeat offenders in the court system was recommended by the National Judicial College at a DWI Sentencing Summit (Brunson & Knighten, 2004) and the majority of DWI analysts tabulated in a comprehensive DWI literature review

(Dieringer Research Group, 2001). According to the majority of researchers surveyed, when the repeat offender is properly identified through a thorough records check then the offender's compliance record can also be determined. An individualized assessment and mix of interventions tailored to each repeat offender can then be assigned according to offender risk factors, including level of alcohol dependence, previous levels of compliance, compliance monitoring, and efficacious sanctions.

For example, 95 drug courts, specially designed to individually assess and intervene for repeat offenders ( $n = 2,020$ ) in a low reactance-inducing environment, were found to have an 84% success rate at year one that dropped only 11% in the second year (Roman, Townsend, & Bhati, 2003; Wilson, Mitchell, & MacKenzie, 2006). This 2-year rate of survival mimics the first two years of the survival rates in the present study for *priors* ( $n = 7$ ) who received the low reactance-inducing VIP intervention. It should be noted, however, that the number of participants in the recent *priors* + low reactance-inducing VIP category in the present study, and this study's observational nature, preclude causal inferences. The result may only be considered interesting and a subject for future research.

For first time offenders under age 30 in the present study the odds ratio of success is significant ( $OR = 1.9$ ,  $n = 233$  individuals) for DWI School success compared to high-reactance VIPs. Similar odds ratio was found in a meta-analysis when comparing low reactance-inducing drug courts ( $1.6 < OR < 1.9$ ,  $n = 55$  studies) compared to anti-drug court interventions (Wilson, Mitchell, & MacKenzie, 2006). The similarities and differences between these comparison groups are also a subject for future research.

*Pre-DWI interventions may be more effective than post-DWI interventions*

This study's outcomes suggest that the *least* effective prevention of DWI crashes would be one that relied on rehabilitation of those who have already committed their first DWI offense. Other researchers echo this interpretation of the results. They argue that courts need to intervene more strongly and earlier, before multiple DWIs accrue on a drivers' record. First offenders have just as much risk of recidivism when they have high BAC levels and multiple moving violations in the previous two years (Marowitz, 1998, 1996a; Pristach, Nochajski, Wiczorek, Miller, & Greene, 1991). Once the first offense has been committed, it becomes the strongest predictor of future DWIs.

The present study found the most recent *first* DWI arrest to be the greatest predictor of recidivism. The present study found that in New Mexico, during the years 1994-1996, during the original Delaney, Kunitz, Zhao, Woodall, Westerberg, Rogers, and Wheeler (2005) study, once an offender was convicted of the first DWI arrest, he or she had 7 times greater hazard of being rearrested for DWI again. In California, during the years 1985-1991, the mean number of crashes, alcohol-related or not, doubled after the first DWI conviction (Peck & Helander, 1999). *Number of prior arrests* do not make a significant difference, the only significant difference in predicting repeat DWI offense is whether the driver has committed the *first* recent DWI. DWI prevention efforts may be 7 times more effective if directed at non-recent at-risk pre-DWI drivers.

Level of alcoholism may appear to be an indicator of risk of recidivism. However, this is not necessarily the case. Marowitz (1996a, 1996b) found that MAST and CAGE and other alcohol dependence assessment instruments did not predict recidivism. Evaluations by alcohol dependence clinicians did not predict recidivism. Although first

time and multiple offender groups both evidence a high level of alcohol dependence, level of alcohol dependence does not appear to predict level of recidivism.

A more effective means of reducing DWI crashes would be to prevent first offenses. A pre-DWI intervention program would target drinkers with no priors. Those pre-DWI drivers at highest risk for DWI offenses might be identified by a high number of moving violations. Researchers (Cavaiola, Strohmetz, & Abreo, 2007; Donovan, Marlatt, & Salzberg, 1983; Woodall et al., 2007) have found that the number of non-DWI moving vehicle citations predicted DWI offenses. Another predictor of the first DWI offense is number of prior substance abuse and criminal drug related offenses. Researchers (Chang & Lapham, 1996; Kochis, 1997; Taxman & Piquero, 1998) have found that the following offenses preceded the first DWI in 40-70% of DWI first offenders: illegal possession, illegal transportation, disorderly conduct, larceny, criminal property damage, resisting arrest, public urination, and assault and battery. Previous criminal arrests are a predictor of future DWI arrests (Nochajski, Miller, & Wieczorek, 1989). A list of previous arrests might be employed to identify the highest risk target audience for a DWI prevention education program.

#### *Implications for Persuasive Message Design*

The present study offers an unusual contribution to message design research. Unlike single-message designs, it aggregated naturally-occurring multiple versions of the same message types. This is an important contribution to message effects research that has been called for by Jackson, O'Keefe, Jacobs, and Brashers (1989).

In this study two different persuasive message designs, in the form of different interventions, were evaluated against each other: the MADD VIP intervention was tested

against the standard and customary DWI School. The presence and levels of theoretical message constructs, operationalized as message types, were quantified.

This study offers pragmatic implications for real life message designs based on outcomes in a naturally-occurring environment that employed exemplars from natural speakers. The study found that the same message designs have different persuasive effects depending on the demographics or prior conditions of the message receiver. When the science concerning the different effect of the same message design upon different receivers is not considered, as was the case with the non-scientist MADD message designers, then the message not only failed but also induced a strong opposite reaction. The undesired behavior increased among the message receivers.

Values for the independent variable, *level of reactance-inducing statements*, was arrived at through an operationalizations process that quantified presence of theoretical reactance-inducing constructs in the form of reactance-inducing message types. There is an advantage to aggregating multiple messages into archetypal message types in order to measure theoretical constructs and to further the science of message design. Jackson, O'Keefe, Jacobs, and Brashers (1989) compared single laboratory-controlled message research to research involving exemplars of multiple message types and found the multiple-message study design to be superior.

multiple-message designs provide greater reliability in estimation of treatment effects, equivalent power for detection of variability in treatment effects, and easier identification of moderator variables” (p. 364).

In the present study, MADD VIP transcripts containing multiple exemplars of reactance-inducing message types were analyzed in a manner that advanced message design as a science.

#### *Effect of message intensity*

The present study found that the intensity, the degree of emotion, the strength of aggression, and the opinionatedness displayed by the VIP presenters (Burgoon, Pauls Denning, & Roberts, 2002) influenced different demographic groups differently. Messages with high-emotional intensity and anger-evident aggression were found to induce a strong negative effect on the prior DWI offenders and those DWI offenders with no priors who were under the age of 30 years old. Those offenders who were not receptive to the high-reactance VIP message (career drinkers with multiple prior DWI arrests) responded as if they found the highly graphic and intense VIP messages to be cognitively dissonant (Festinger, 1957), a negative reactance to forced compliance (Festinger & Carlsmith, 1959). Dissonance induces nonreceptive offenders to consider the message inappropriate or inapplicable to them. In such a case, offenders would be expected to react negatively against the MADD VIP message. For nonreceptives, a graphic and emotionally intensive message induces psychological reactance.

Dillard and Shen (2005) studied reactance using two message intensities: high-threat and low threat. They found that high-threat messages induced reactance, whereas low-threat messages did not. In the case of a Monte Carlo simulation (Medina et al., 2005), as in the case of the present study, a weak message induced compliance while a strong message (a high-emotion, high-threat message) induced reactance. Correspondingly, a theoretical mathematics study of message reinforcement for a

wireless network system found that a large number of weak messages may reinforce each other and cause the message to persist longer and with less reactive effect upon a system than a strong message (Freeman, Ramesh, & Mohan, n.d.).

Whether high-threat always induces reactance is debatable. Other variables, such as demographic distinction or prior condition, may confound this effect. In the present study, those with no prior DWI arrests (prior condition) age 30 and older (demographic distinction) were not affected by high-threat high-intensity VIP messages. This group was also characterized by an elevated cognitive mood, significantly more different from those under 30, one year after DWI arrest, regardless of type of treatment. Age and the elevated cognitive mood correlated with imperviousness to reactance-inducing statements.

#### *Effect of pathos versus fear appeals*

The present study found evidence that *pathos* invoking messages —“You and I are the same, we both like to have a good time. When I drink, I don’t drive. All I am asking is that you do the same” worked better than threatening fear appeals —“You will lose your license, maybe kill someone and go to jail, if you don’t stop drinking and driving.” Researchers (Baron, Inman, Kao & Logan, 1992; Janis & Feshbach, 1953; Jepson & Chaiken, 1990; Liberman & Chaiken, 1992) have found that strong fear appeals incite a boomerang or backfire effect. A backfire occurs when the receiver is nonreceptive. He or she discounts the threatening message and behaves in an opposite behavior than the message sender intended.

*Reactance theory* explains why fear appeals fail when they are too strong. If message receivers feel threatened by a message they may become defensive, disagree with the message, lampoon it, and refuse to think rationally about the message. Through

ridiculing and making an irrational interpretation of the message repeat offenders move beyond justification; they validate their opposing behavior. The propensity to validate anti-sender messages as preferable, the propensity to embrace, and even seek out risky and destructive behaviors has been called the *Herostratos Syndrome* that is discussed in the DAMM section in the introduction to this chapter (Borowitz, 2005; Cooper, 1977; Harmon, 2000; Stern, cited in Greenberg, 2005; Stohl, 1988; Wright, 1985). DAMM is an example of the Herostratos syndrome-associated reactance response that is enflamed by fear appeals and high-intensity counter attitudinal messages.

#### *The effect of message strength*

Festinger (1957) and Festinger and Carlsmith (1959) found that the less inducement or strength used to achieve compliance, the more effective the message. This would support the finding in the present study that low reactance-inducing VIPs invoked a better response than stronger and more threatening high-reactance VIPs. Brehm (1966) also proposed that the stronger the message used to achieve compliance the less effective is that message.

The views of Festinger (1957), Festinger and Carlsmith (1959), and Brehm (1962) were supported with the results of a complex systems study of strength of persuasive messages in a group persuasion situation (Medina et al., 2005). The study found that a weak persuasive message was more effective than a strong message when the persuasive message was counter attitudinal. The successful weak persuasive message from the persuader, an out-group person, was 1/37<sup>th</sup> the strength of in-group interactive messages. Additionally, the persuader's message could be characterized as including *pathos* type

messages such as, “you and I are the same,” and “I agree with you” that also characterized the low reactance-inducing VIP message type.

Message strength in this study is defined as “a strong intent to persuade.” According to the MADD message designers, victims have a strong intent to persuade; thus for 80% of the sampled MADD VIPs the message strength was strong with high levels of emotion and threat. Since strong messages are known to be counter-persuasive in counter attitudinal situations, it is reasonable to argue that the high-reactance high-threat MADD VIP message could be expected to be counter-persuasive.

#### *The effect of forewarning and confrontation*

*Forewarning* is an alert that another message is coming. Petty and Cacioppo (1977) found participants’ reactance increased if researchers forewarned them they were going to receive a counter-attitudinal message. Brehm’s reactance theory (1966) agrees with Petty and Cacioppo’s finding. In the MADD context, a message sender’s forewarning is a cue to an audience they are going to receive a negative message intended to “reduce behavioral freedom” (Brehm, 1966) to drink and drive. Examples of forewarning statements are “I am going to tell you about how a drunk driver ruined my life,” or “That was before a drunk driver ran into her and stopped her life.”

*Confrontation* is defined as a counter-attitudinal message. Miller, Benefield, & Tonigan (1993, p. 455) define confrontation as “a hard-hitting, directive, exhortational style intended to overwhelm robust defensive mechanisms” of the message receiver. MADD states that such an effect is the goal of the VIP message. However, researchers of confrontational messages have found that confrontational messages are counterproductive. Miller (2000) and Miller, Benefield and Tonigan (1993) found

participant's reactance is increased when the persuader is confrontational. The confrontational nature of the MADD VIP message would explain why participants resulting behavior was increased drunk driving.

A common response to confrontational messages is ridicule, devaluation, and lampooning, discussed in the discussion section of this dissertation. Disgruntled message receivers use these responses to discredit message senders and affect resolution through avoidance. In their own words (Lord, 1990), the MADD VIP program in New Mexico uses the following confrontational tactics:

- (1) Exposing offenders to the consequences of drinking and driving;
- (2) Helping offenders move beyond focusing on their own "bad luck";
- (3) Serving as a first step in breaking down the denial of alcoholics/drug addicts;

Miller, Benefield, & Tonigan (1993, p. 455), define tactics such as MADD's confrontational because MADD intends the VIP to be "a hard-hitting, directive, exhortational style intended to overwhelm robust defensive mechanisms" of the DWI offender. Confrontation is an antecedent to reactance.

#### *The effect of public censure and anger*

*Public censure* is face threat with the possibility of public shunning or legal penalties. *Face threat* is intimidation or embarrassment in a public or social forum. Public censure evokes face threat (Brehm, 1966). Public censure increases likelihood of reactance. A high face threat, consistent with a high degree of public censure, evokes low compliance (for those with no priors) and reactance (for those with prior arrests), as suggested by study findings.

Public censure can arouse the desire to increase reactance behavior among those with aspirations to identify with anti-social heroic role models. As discussed in the review of literature, for some rebellious types, reactance behavior is aroused by public censure because the aspirant glorifies in being censured, subscribing to the *Herostratos Syndrome* (Borowitz, 2005; Cooper, 1977; Harmon, 2000; Stern, cited in Greenberg, 2005; Stohl, 1988; Wright, 1985). Herostratos subscribers are incited by public censure to perform risk-taking anti-social behavior because they perceive it as heroic (Burke, 2003; Harmon, 2000; Hoffman cited in Greenberg, 2005; Stern cited in Greenberg; 2005).

Public censure can result in anger and negative cognitions. Dillard and Shen (2005) found that “reactance can be operationalized as a composite of self-report indices of anger and negative cognitions” (p. 144). Quick and Stephenson (2007) found that support for treating reactance as “latent variable comprised of negative cognitions and state anger” (p. 255). A significantly lowered mood in message receivers following an urging to change their enjoyable behavior may induce anger or negative effect that translates into reactance, or opposite behavior from that which they have been entreated to perform. Reactance can occur after the intervention message induces significantly lowered mood (Hong and Faedda, 1996). Rogers, Woodall, Rao, Polascek, and Milan (1994) and Woodall, Delaney, Rogers, Wheeler, Rao, Polascek, and May (2006) also found a lowered mood among VIP participants following the MADD VIPs’ strong message to stop drinking and driving. These results would suggest that public shaming of DWI offenders during MADD VIPs would have been expected to invoke a negative state of reactance that increased DWI recidivism.

Opposite and positive effects are reported when DWI offenders receive caring and concern from authority figures. Researchers Wiliszowski et al. (1996) found that DWI offenders reported an increased desire to alter drinking and driving behaviors because a judge, probation officer, counselor, or therapist demonstrated care and concern for them. Care and concern invokes a sense of responsibility to reciprocate and comply (Goranson & Berkowitz (1966). Such compliance in response to care and concern has been associated with “natural recovery,” the case when addict recovers without treatment (Granfield & Cloud, 1996, 1999; Tucker & Gladsjo, 1993). Compliance resulting from care and concern is the opposite reaction to negative reactance resulting from experiencing public censure. Care and concern invoke a desire to reduce drunk driving behavior, while public censure and anger appear to increase the desire to drive drunk among DWI offenders.

*The Import of Considering Message Receiver Function in Message Design*

Social science studies human patterns of behavior. Within the scope of communication message effects studies, social scientists study what types of messages induce what types of outcomes. There is a benefit in consulting message effects scientists when designing a persuasive message. Without the benefit of empirical social science considerations, a message has a higher probability of failure. Current social science literature on reactance theory (Brehm, 1966) would predict that a confrontational, high-threat, high-emotion message would not only fail but also function to increase behavior in the opposite direction among message receivers. Such an outcome was observed in the present study.

MADD VIP message failure is rooted in ignorance of social science research. MADD message designers, without the benefit of social science, are preoccupied with their VIP message as they wish it to function, rather than as it actually functions for the message receiver. MADD considers its VIP confrontation successful if it imprints images of the suffering of DWI victims in the offenders' minds because the message designers wish to confront, challenge, and "break down" the offenders' attitudes toward drunk driving. MADD believes imprint of victims' tragic stories will stop drunks from driving. According to MADD, VIPs are persuasive if they succeed in the following goals as listed by Lord (1990):

The goal of the VIP is to influence DWI offenders on an emotional level to change their attitudes about drunk driving, thus reducing the likelihood of recidivism. This is accomplished in four ways, by: (1) exposing offenders to the consequences of drinking and driving; (2) helping offenders move beyond focusing on their own "bad luck"; (3) serving as a first step in breaking down the denial of alcoholics/drug addicts; and (4) imprinting images of real people in the offenders' minds that may replay when he or she considers drinking and driving (p. 1421).

Implicit in the message design goal of the VIP is the assumption that the outcome of MADD confrontations will be that offenders switch their orientation from self-centered pleasure and freedom seeking to being "other-centered." MADD's reasoning assumes the drunk (a) has full reasoning capacity and (b) values safety of unknown other people over the personal convenience and/or the pleasure of driving drunk. The MADD

VIP presenters designed their message with a focus on how they wish the VIP message will function, not on how the VIP message actually functions for offenders.

The present study results remove the veil of MADD's nonscientific assumption that DWI offenders process the MADD VIP message in the manner that MADD presenters expect. Evidence of a strong effect size for reactance antecedent levels in the MADD VIP message ( $.26 < d < 1.64$ ) points to a strong possibility that DWI offenders in the MADD VIP audience do not process the VIP message as MADD anticipates. They are not disposed to cognitively elaborate on the message in the logical manner that MADD expects. Rather, the more that the VIP presenters adhere to the MADD message style of confrontational, high-reactance high-threat statements, and the more presenters adhere to the goal of "breaking down" offender denial, the more (19 times odds) the offender audience is likely to do exactly the opposite, to drink and drive sooner and more frequently. These findings from the present study support the argument that the MADD VIP message clearly functions differently for the message receiver audience than MADD intends it to function.

Message function should inform message design. The MADD VIP message does not function as a positive live-changing experience for the offenders who are the message receivers. This understanding may be confusing to MADD proponents because the VIP message functions as a positive experience for the presenters. According to Jeong (2004), the MADD VIP message functions as a stress reducer for the presenters. Additionally, the VIP message pleases presenters because it functions as retaliation. They feel efficacious in their ability to deliver punishment and perform public censure upon DWI offenders. Public censure delivers an emotionally intense negative message. Thus, it is no surprise

that the VIP message appears to function as a stress-increaser for the DWI offender audience (Woodall et al., 2004).

Reactance theory informs the function of the MADD VIP message for DWI offenders. In the context of reactance theory and the results of this study, those who were most invested in the drinking lifestyle (those with prior arrests) were not only not persuaded by the high-reactance VIPs, they reacted negatively. They were arrested sooner and arrested more often. This means they drove drunk sooner and more often than those not exposed to the high-reactance VIP message. This is an example of how a message that may appear to be persuasive to the message designer can instead produce the opposite effect than was intended when the perspective and message function for the message receiver is not taken into account in the message design. A persuasive message designer should take into account the possible effect it will have on the receiver from the receiver's point of view (Fishbein & Ajzen, 1975; O'Keefe, 2002; Rogers, 2003).

Because the function of the MADD message from the perspective of the drunk drivers were not considered in the MADD VIP message design, the message was not effective. The same high-reactance catharsis, the mode VIP message that afforded relief to the victim presenters resulted in a negative message effect for drunk drivers with prior offences, a negative message effect for those with no priors under age 30, and no message effect for those with no priors age 30 and older.

#### *Implications for Message Effects Study Design*

This study demonstrates the benefit of designing a message effects study as a randomized field trial, a longitudinal study, and stratification of message variables by objectively measured message qualities. The usefulness of a randomized field trial is that

because the message effect is studied in a natural environment the observed results are more useful in informing real life applications. When a message effects study is designed and conducted in an artificial laboratory environment using college students as participants then the generalization of the results is limited to other college students in artificial environments.

The usefulness of conducting a longitudinal study is that it is possible to measure the rise, fall, and length of a message effect over time. The usefulness of objectively measuring message qualities and stratifying message variables by these qualities is demonstrated in the present study. Unless message effects are measured separately by levels of strength and difference in message qualities there is a possibility of Type II error. Effects of different message types can confound and cancel each other's effects, causing no effect to be observed when there was actually a significant message effect.

When the experimenter assumes the quality of a message (for example, the experimenter assumes a message is a weak or strong) without objectively measuring message qualities and testing for difference in those qualities, then the experiment may suffer from unintended and difficult to identify confounds. This was the case for the confusing message effects results obtained by Updegraff et al. (2007). To avoid confusing and confounded results, it is beneficial for study designers to incorporate some type of manipulation check to insure internal validity. Study designers may perform a manipulation check to test whether the manipulated message conveys the same meaning that the experimenter intended. Yet in a field trial, where contact with participants may be constrained, a manipulation check is sometimes not possible. In such a case, the present study demonstrates the fruitfulness of employing content analysis as a method to

determine the classification of message types. The interrater reliability score can be used as a measure of validity of the study design. If the analysis finds a significant difference between high versus low-reactance message types, then the classification of these message types as levels of independent variables in the design is supported.

The longitudinal nature of the present study offers implications for the benefits of designing studies with long timelines. A longitudinal study design affords investigators the opportunity to map the rise and decline of a message effect over long periods of time. Time is an under-investigated variable in message effects research. This is unfortunate since effects, as has been demonstrated in the present study, may not have time to develop in a short time frame.

At two years post study, recidivism for recent prior offenders who attended MADD VIPs trended towards significance. This trend was misleading. After the study outcomes were reevaluated at twelve years, it became evident that the message effect for recent prior offenders was not significantly different between VIP and the DWI School comparison groups. Where a significant difference in recidivism existed, which was not evident at two years post intervention, was between different levels of VIP message dosage.

The long timeline afforded an accurate view of the message effect of MADD VIPs. This outcome suggests that message effects study designs may benefit from longer timelines than is currently considered the norm. A 2-year study is considered longitudinal in the current message effects literature. However, the present study demonstrates that, in at least the case of MADD VIP message effects, two years was not enough to obtain an accurate analysis of the true message effects. This study suggests the benefit of designing

message effects studies that incorporate timelines three to six times longer than the current norm.

*Incorporation of time dependence into a message effects study design*

This is the first study to consider the time dependence of message variables. In the process of considering whether the assumptions for Cox Regression had been met (non time dependence), an interesting concept emerged that is useful and important in studying the effect of messages over time. A regression line is fitted to a scatter plot of the time to outcome event versus partial residuals of the covariates. If the regression line is not significantly different from zero, then the variable is not time dependent. If a variable is not time dependent then its effect may be interpreted as continuous (not diminishing or increasing) over time. Time dependence is a very important test for message effects studies that is seldom, if ever, used.

Adoption of a time-dependent test in message effects research is a new idea, perhaps because survival analysis is not yet popular in message effects research. As more communication scholars adopt survival analysis to test length of time survived between message receipt and behavior, time dependence may become a more familiar message effect parameter.

*Benefits of incorporating mixed methods in message effects study designs*

The methodological approach taken in this study, combining qualitative and quantitative message analysis, demonstrates the usefulness of incorporating a hybrid approach to message analysis. Hopper (1981) suggested context analysts make use of frame analysis (Goffman, 1974) when analyzing communication contexts. This concept

was employed in the classification of message types and the determination of units of analysis for the qualitative portion of this study.

Jacobs and Jackson (1983) adapted a similar qualitative method, conversation analysis, to consider context as a variable in speech acts. Variables in discourse analysis of context are sounds (intonation), gestures, rhetoric, meanings, speech acts, and turn taking as tactics to attain a strategic goal. These variables informed the qualitative constant comparison analysis of the MADD VIP messages, although they may not have appeared to be influential in the quantitative study design. The benefits of incorporating qualitative approaches to message analysis in a message-related study design are found in the richness and depth of tools used in message classification. This richness and depth may have contributed to the sensitivity and accuracy of the values assigned to the independent variables in the present study.

*Standardization of message effects terms and definitions, internal validity*

Dillard and Shen (2005) define message strength and message intensity in the same way that Brehm (1966) defined those constructs. Yet this definition is not standardized in message effects research. As discussed in the review of literature, a strong message is sometimes not qualified as a high-reactance high-threat message. Rather a *strong message* is may be referred to in message effects literature as a *strong argument*.

The definition and exemplar of a strong message has perplexed researchers in that their idea of what is a strong message does not always carry the same meaning for their study participants, and thus their study outcomes lack internal validity and produce confusing results. In such a case, what researchers consider a *strong message* might have

no effect while a *weak message* may demonstrate a strong message effect. Updegraff et al. (2007) found that a weak rather than strong message had greater influence on health behavior, although in the discussion of results the authors downplayed their perplexity about the counterintuitive results because results did not confirm their theoretical perspective.

This discussion underlines the import of standardization of message effects terms and definitions across the message effects research community. Such standardization would benefit study designers both to reduce confusion during their research of the message effects literature and in the designing of their studies. This discussion also points out the importance of manipulation checks if the study is conducted in a laboratory setting. If the study is an empirical field study, as is the present study, then it may be useful to employ content analysis or some other form of objective third party validation that the terms and definitions used by the researcher are the same terms, definitions, and meanings as understood by the study participants. Such standardization both within and outside of the study will improve internal and external validity in message effects research. It will not only improve the quality of the body of research on message effects but also serve as a standardization that will assist in meta-analysis of message effects research.

#### *Implications for Tests of Theoretical Message Constructs*

Observation and speculation on cause and effect gives rise to theory building about the cause and effect relationships. In the process of scientific evolution, these cause and effects relationships are then tested via empirical designs to validate the theory. This study offers a unique approach to testing theoretical message constructs because, unlike

many experimental tests of theoretical constructs that are conducted in the university laboratory, this study investigates *reactance antecedents* in an experimental longitudinal field trial. Further, this study demonstrates a novel use of odds ratios, loglinear logit regression, and survival analysis to analyze the strength of relationship between theoretical constructs and their theorized effects. Higher levels of the theoretical constructs were associated with higher levels of the theoretical effect.

Reactance theory is the main theory tested in this dissertation. However, in addition to testing relationships between specific reactance theory constructs and their theorized effects, the dissertation refers to supporting message effects theories that inform and deepen the understanding of general message theory constructs.

This dissertation is conducted within the scope of the following theories: reactance theory (Brehm, 1966), cognitive dissonance theory (Festinger, 1957; Festinger & Carlsmith, 1959), message-context theories (Miller, 2002; vanDijk, 2008), grounded theory (Strauss & Corbin, 1990), message function theory (Jeong, 2004), theories about influences of message intensity (Aristotle, 2006; Dillard & Shen, 2005), theories about how audience pathos reduces reactance (Aristotle, 2006; Burke, 1965; Corbett, 1984), theory of reasoned action (Fishbein & Ajzen, 1975). These theories informed the ordinal message classification system used to quantify levels of *reactance antecedents* in the MADD VIP messages. These theories also informed the interpretation of the results of this study.

#### *A test of reactance theory antecedents*

Reactance antecedents that were investigated in the present study were strong intent to persuade, forewarning, confrontation, and public censure. These constructs were

present in content analysis reactance-inducing codes used to represent ordinal increases in reactance-inducing level and threat. Where reactance antecedents were observed in high levels (high reactance-inducing level was associated with strong levels of intent to persuade, forewarning, confrontation, and public censure) there was a corresponding high level of observed reactance behavior (shorter time to recidivism and more subsequent recidivisms). The present study thus supports the theoretical propositions that (a) high levels of reactance antecedents are associated with high levels of reactance behaviors, and (b) reactance theory explains increased recidivism of MADD VIP participants.

*A test of message effects theory that includes specific message types*

The present study offers a test of message effects theory that includes specific message types: (a) the strong versus weak message as quantified by independent coders, (b) the forewarning message, (c) the confrontational message, and (d) the public censure message. These specific message types were coded using message exemplars and definitions. This type of theoretical investigation of specific message types is rare. Sally Jackson (1992) has characterized literature on the testing of message effects theory as lacking empirical support from research designs that test specific message types. This study offers a fruitful example of empirical testing to support theoretical message effects constructs.

*Validation of General Variables in Message Effects Research*

This study evaluates, for the first time, whether message sender and message-receiver related reactance antecedents are present in the MADD VIP message. It also provides a ground upon which the effects of general constructs of message effects theory can be quantified: message context, message content, message function, message

intensity, message frequency, and message pathos. These general constructs were incorporated in the ordinal message classification system used to quantify levels of reactance antecedents in the MADD VIP messages. These general constructs were also considered in the interpretation of the results of the study.

#### *Use of hard end-point data to measure message theory constructs*

The use of hard end-point data, which are completely objective DWI recidivism records, offer a new approach to message effects observation and theory building. Message effects are usually measured by subjective reports of participants, via questionnaires, responding about their feelings, subjective reactions, and their future behavioral intentions. Self-reports are often not a reliable source of data (Richard, van der Pligt, & de Vries, 1996), perhaps most true when the report is self-incriminating. The questionnaire method has been criticized but remains nevertheless in extensive use in message effects research use due to lack of known alternatives. While theory can be built from such observations, the data that make up the observations are unreliable, leading to unreliable theory development. This study, in using hard endpoint data as a measure of message effect, offers a new approach to message effects studies that can produce reliable observations and lead to productive theory building.

#### *Limitations*

There are limitations on the interpretation of results due to constraints in the study design and sample characteristics. The values of the independent variables were observed and not under the control of the experimenter. The current study, an extension, used observational data collected in the original study to quantify independent variables. The

study sample was nonrandom, thus possibly nonrepresentative. The sample size for recent prior offenders was marginal when segmented into three intervention conditions.

*Under-identification of prior offenders*

Due to analyst error in construction of the current data set, up to 125 prior offenders, those whose offenses older than months or weeks prior to their study enrollment were analyzed as having no prior offenses. Only those offenders with very recent prior offences were included in the *prior* category of the present study. This under-identification of participants with prior DWIs had the effect of reducing likelihood the present study would produce significant results. Regardless of the direction of the error, the findings in the present study concerning recent prior offenders will need to be replicated to validate the present study's reliability concerning effects of MADD VIPs upon those with prior DWIs, depending on years since last DWI.

*Levels of independent variables were observed, not manipulated*

Findings in the present study are suggestive and interesting but because of study design limitations, a causal influence of reactance-inducing level upon recidivism cannot be inferred. The observed associations between high-reactance VIPs and recidivism cannot be claimed as causal because level of VIP reactance-inducing level was not a manipulated variable in the original study from which this study data was obtained. At the most it may be claimed that high *levels of reactance-inducing statements* in VIPs were observed to coincide with short time to subsequent arrest and greater numbers of subsequent arrests for those priors and those with no priors over age 30.

The coding and analysis of VIP *levels of reactance-inducing statements* were conducted post-hoc. In such a case, the conservative interpretation of results (Weisberg,

1980) is that a higher the *level of reactance-inducing statements* and threat (reactance antecedents) was observed to coincide with a higher recidivism among recent prior offenders and those with no priors age 30 and older. The non-manipulation of VIP *level of reactance-inducing statements* placed a limitation on the strength of the claims that can be made in this study.

#### *Marginal sample size for recent prior offenders*

The small sample size of recent prior offenders placed a limitation on generalization of results. Only 5.6% of the sample, 47 participants, had DWI arrests prior to the study. This size sample was adequate for analysis when these 47 participants were analyzed in the same group. However, in order to measure and contrast effects of different levels of the intervention, the sample of 47 was banded into three intervention groups: (1) DWI School Only,  $n = 23$ , (2) DWI School plus Low reactance-inducing VIP,  $n = 7$ , and (3) DWI School plus High-reactance VIP,  $n = 17$ . Results from this segmentation of the sample were significant at  $p < .01$  (a Fisher's exact test that is not sensitive to low  $n$  yielded same results as a loglinear logit regression). The results were also interesting (high-reactance VIPs were observed to increase the number of recidivisms and the odds of recidivism in the first four years by nineteen times) yet generalization from the sample to a general population is restricted.

The sample size for recent prior offenders was insufficient for a fully saturated regression model. In logistic regression, full saturation means that because all the important predictors are included, the model is able to produce regression coefficients that fully represent the observed values for each cell. For logistic regression there should be no more than 20% of cells with fewer than five cases. In the logistic regression

conducted on *time to recidivism* and *number of subsequent arrests* by intervention level for recent prior offenders, interpretation of results is limited, as 33% of cells were comprised of only two cases.

#### *Nonrepresentative sample*

Only 80% of those mandated to DWI school did attend (this is a common problem with MADD VIPs according to Shinar and Compton, 1995), and within that group only 70% of the DWI school attendees elected to participate in the study. This means that the sample obtained for the study was comprised of only .56 of those who were mandated by Metropolitan Court to attend DWI school, arguably those who were more functional and altruistic of DWI offenders. Only those offenders who were functional enough to attend DWI school and altruistic enough to volunteer for the study were enrolled as study participants. The sample was therefore not representative.

Further, DWI School, where participants were recruited, is a first-offender intervention and should not theoretically contain prior offenders. Prior offenders in the present study were likely in DWI school because they were pled down to first offense. Being pled down to a first offense occurs more often when a prior offender has a better, more expensive, attorney than other repeat offenders in the general population. Being able to afford a more expensive attorney may be an indication of higher socioeconomic status for those repeat offenders in the present study. This bias constrains interpretations of prior offender outcomes.

Non-randomness of sample limits generalizeability of results. As discussed above, study participants all had equal opportunity to be included in the study, however only

80% of those mandated by Metropolitan Court to DWI school actually attended. Of those who attended, only 70% self-selected themselves to participate and were enrolled.

The limitation of a nonrandom sample is sufficient to cast a doubt upon the generalizeability of the results. Even so, the results are interesting and suggest a benefit of conducting future MADD VIP research on a randomly selected sample.

*Do intervening factors bias DWI demographics?*

*Ethnicity*

In 1993, the year prior to the original MADD VIP study, the New Mexico Traffic Safety Bureau (NM TSB) implemented a statewide sobriety checkpoint program called "Operation DWI." Between 1994 and 2007, the present study observed higher risk factors for one or more subsequent DWI arrests for Hispanics, Native Americans, and Blacks.

*Racial profiling* regards the use of stereotypes that bias police officers' judgment in favor of stopping and detaining people of color. People of color refer to this bias as being stopped for "driving while black" (Driving While Black," 1999) or "driving while brown." Because it is highly controversial, racial profiling, whether it exists or not, casts a shadow upon the appropriateness of using ethnicity as a predictor of DWI arrests.

Deliberation among New Mexico government, industry, and academic leaders continues over which statistical techniques and benchmarks will establish whether or not profiling exists (Tillyer, Engel, & Wooldredge, 2008; Weich & Angulo, 2000). The mayor of Albuquerque continues to oversee a task force that studies the issue of racial profiling in the community where the present study was conducted (Haussamen, 2009). It is outside of the scope of this study to identify whether locations of DWI check points or other factors such as racial profiling were biased in favor of arresting minorities for DWI.

However, the controversy over racial profiling in the region and during the time data were collected presents a limitation on the present findings that relate ethnicity to DWI recidivism.

#### *Age and Gender*

In the present study, participant offenders were not matched with similar demographic VIP presenters. This type of matching, however, may make a difference in VIP efficacy. Shinar and Compton (1995) found that matching victims with offenders based on age and gender, particularly teen boys, improved the VIP intervention outcome.

#### *Future Research*

##### *Mixed effects experimental study with random selection*

A future study may improve on the present study by manipulating VIP levels of emotional intensity and randomly assigning participants to a non-VIP comparison group and high and low *levels of reactance-inducing statements* in VIPs (between-groups design). An improved study would also include pre and post tests (within-groups design). The between and within groups design is called a mixed effects study design. Such a design would enable a causal interpretation of the results seen in the present study. A future study would benefit from a random selection of participants in equal numbers from representative pools of those with no prior arrests and those with prior arrests. With such a random selection, the sample would be representative and generalizations could be made from the study results.

Because an earlier prior arrest index date will identify more prior offenders within the current sample population, the future analysis may find higher levels of significance and effect sizes between *priors* versus *no priors* than in the present study. However, no

conclusions may be drawn regarding *priors* versus *no priors* until data are reanalyzed with an earlier prior arrest date. It may be fruitful to investigate three groups: no priors, no recent priors, and recent priors.

For first time offenders under age 30 in the present study the odds ratio of success is significant ( $OR = 1.9$ ,  $n = 233$  individuals) for DWI School success compared to high-reactance VIPs. Similar odds ratios were found in a meta-analysis when comparing low reactance-inducing drug courts ( $1.6 < OR < 1.9$ ,  $n = 55$  studies) compared to non-drug court interventions (Wilson, Mitchell, & MacKenzie, 2006). The similarities and differences between these comparison groups is a subject for future research.

#### *Larger sample size for prior arrest participants*

Future research may benefit from a larger sample size for participants with prior arrests. Age is recommended as a covariate. Although age was not found to be a predictor for priors, in a future study a larger sample size for *prior* DWI offenders may result in an effect of *age* because an interaction was observed for age with VIP *levels of reactance-inducing statements* for those with *no* priors. If a future study tests for two predictor variables: *age* and *level of reactance-inducing statements*, then minimum recommended sample size is  $n = 150$ . An ideal sample size is  $n = 300$  or 150 participants for each group of priors/no priors. An earlier CTS index date would more accurately detect those with *prior* DWI arrests because it would detect *priors* farther back into the past.

In the present study, there was no distinction made between prior offenders who were *high-risk drinkers who drive* versus *high-risk drivers who drink*. Voas (2000) makes this distinction as a means to illustrate a broad continuum of different risk types who become repeat offenders. The present study does not subtype DWI offenders into clinical

subpopulations. The small sample of recent prior offenders ( $n = 47$ ) precluded such subdivision. However, in a future study a sample size of  $n = 600$  would allow for those with prior arrests to be divided into two risk type subgroups: *high-risk drinkers* versus *high-risk drivers*.

#### *Matching victims and offenders by age and gender*

A future study matching victims and offenders on age and gender, with separate conditions for low-reactance and high-reactance VIPs, would test the interaction effect between age and gender versus high/low reactance-inducing VIPs.

#### *Investigation of causes of deaths among participants*

Deaths and reasons for death might be worthwhile to investigate when group condition may increase or decrease risky behavior such as drunk driving and affect study outcomes. In the present study, attrition due to participants' deaths was not recorded. The reasons for death, such as drunk-driving-crash-related, or not, were not known.

An investigation into number of participant deaths and causes of death would require use of participant identifiers. This research did not have access to participant identifiers. The data used in this study had been stripped of those identifiers in accordance with IRB (Institutional Review Board for Human Subjects Protection) recommendations. A future study might use participant identifiers to search public obituary records for possible deaths and cause of deaths for participants. There are two causes of deaths that would be of interest in a future study: deaths from natural causes and non DWI crashes, and deaths from DWI crashes.

### *Proposal for analysis of data using Repeated Measures Cox Regression*

Repeated Measures Cox Regression considers the time to a single event such as time to first recidivism. It also considers the number of subsequent events, such as number of subsequent arrests and the length of time intervals between subsequent arrests. Repeated Measures Cox Regression combines these three outcome considerations to provide one outcome measure of recidivism. Repeated Measures Cox Regression was employed with an early data set, and conducted in a command line version of SAS, which is a software used for data analysis. Results were not significant. Future research that further explores the present data set may include Repeated Measures Cox Regression. At the present time, other methods, looking at *time to recidivism* and *number of subsequent arrests* as separate dependent variables, provided sufficient and significant results. Repeated Measures Cox Regression analyses would have added sensitivity but also complexity to the analyses. Results were obtained without using RM, reducing complexity of the analysis. For future research, it may be worthwhile to conduct a separate study on recidivism using RM.

### *Summary*

Statistically significant results suggest that MADD VIPs' message backfired and created an effect opposite to that intended because of highly emotional, confrontational, and threatening message qualities. Higher levels of emotion and threat, high *reactance-inducing antecedent levels*, in the archetypal VIP message were observed to coincide with shorter *time to recidivism* and higher *number of subsequent arrests*. This finding supports the proposition that threatening and emotional entreaties exacerbate the undesired behavior, as suggested by *reactance theory* (Brehm, 1966).

The present study supports and extends the results of a 2-year follow-up by Woodall, Delaney, Rogers, Wheeler, Rao, Polascek, and May (2008). They found that MADD VIP participants' recidivism rates were 30% higher than their DWI School comparison group, trending toward significance at  $p = .0583$ . This message effects extension offers an explanation for MADD VIP failure. The present study observed an association between high reactance-inducing VIPs and increased DWI recidivism.

This study offers a unique approach to message effects analysis and testing of theoretical message constructs. It investigates reactance antecedents in an experimental longitudinal messages effects field trial. It offers new perspectives on message effects study design, persuasive message design, and DWI intervention design with recommendations for best practices in MADD VIP presentations.

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## APPENDIX 1: PRE-POST MADD VIP INSTRUMENT

### Pretest

Please be open and honest and answer the questions completely. Please do not put your name on this questionnaire. Your answers are anonymous- no one will know you respond to the questions below. This is a survey of your opinions and views- not a test - so there are no right or wrong answers.

I. The following scale consists of a number or words that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent you feel this way right now.

1= very slightly or not at all 2=a little 3=moderately 4=quite a bit 5=extremely  
 FOR EXAMPLE: If you feel not at all interested in the Victim's impact Panel right now, then write the number 1 in the blank next to the word "INTERESTED." If you feel extremely interested in the panel right now, then write the number 5 next to the word "INTERESTED".

<u>      </u> Interested	<u>      </u> Irritable	<u>      </u> Distressed
<u>      </u> Alert	<u>      </u> Inspired	<u>      </u> Determined
<u>      </u> Excited	<u>      </u> Ashamed	<u>      </u> Upset
<u>      </u> Strong	<u>      </u> Nervous	<u>      </u> Guilty
<u>      </u> Scared	<u>      </u> Attentive	<u>      </u> Hostile
<u>      </u> Jittery	<u>      </u> Afraid	<u>      </u> Proud
<u>      </u> Enthusiastic	<u>      </u> Active	

II. Please indicate your agreement or disagreement with each statement below. Please mark only one answer for each question or statement.

1. Drinking and driving is very likely to lead to accidents, injury, and even loss of life.

<u>      </u> strongly agree	<u>      </u> moderately agree	<u>      </u> neither agree nor disagree	<u>      </u> moderately disagree	<u>      </u> strongly disagree
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2. Riding in a car with someone who has been drinking is very dangerous/

<u>      </u> strongly agree	<u>      </u> moderately agree	<u>      </u> neither agree nor disagree	<u>      </u> moderately disagree	<u>      </u> strongly disagree
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3. In the future, if I do drink alcohol, I will still drive myself.

<u>      </u> strongly agree	<u>      </u> moderately agree	<u>      </u> neither agree nor disagree	<u>      </u> moderately disagree	<u>      </u> strongly disagree
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4. In the future, I will always use my seatbelt when driving.
- |                          |                            |                                      |                               |                             |
|--------------------------|----------------------------|--------------------------------------|-------------------------------|-----------------------------|
| <u>strongly</u><br>agree | <u>moderately</u><br>agree | <u>neither agree</u><br>nor disagree | <u>moderately</u><br>disagree | <u>strongly</u><br>disagree |
|--------------------------|----------------------------|--------------------------------------|-------------------------------|-----------------------------|
5. In the future, I will not drink alcohol and then drive.
- |                          |                            |                                      |                               |                             |
|--------------------------|----------------------------|--------------------------------------|-------------------------------|-----------------------------|
| <u>strongly</u><br>agree | <u>moderately</u><br>agree | <u>neither agree</u><br>nor disagree | <u>moderately</u><br>disagree | <u>strongly</u><br>disagree |
|--------------------------|----------------------------|--------------------------------------|-------------------------------|-----------------------------|
6. Drinking and driving is a very dangerous thing to do.
- |                          |                            |                                      |                               |                             |
|--------------------------|----------------------------|--------------------------------------|-------------------------------|-----------------------------|
| <u>strongly</u><br>agree | <u>moderately</u><br>agree | <u>neither agree</u><br>nor disagree | <u>moderately</u><br>disagree | <u>strongly</u><br>disagree |
|--------------------------|----------------------------|--------------------------------------|-------------------------------|-----------------------------|

Posttest

I. The following scale consists of a number or words that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent you feel this way right now.

1= very slightly or not at all 2=a little 3=moderately 4=quite a bit 5=extremely

_____ Interested	_____ Irritable	_____ Distressed
_____ Excited	_____ Ashamed	_____ Upset
_____ Strong	_____ Nervous	_____ Guilty
_____ Scared	_____ Attentive	_____ Hostile
_____ Enthusiastic	_____ Active	_____ Proud
_____ Afraid	_____ Determined	_____ Jittery
_____ Inspired	_____ Alert	

II. As you did before please indicate your agreement or disagreement with each statement below. Please mark only one answer for each question or statement.

1. Drinking and driving is very likely to lead to accidents, injury, and even loss of life.

_____ strongly agree	_____ moderately agree	_____ neither agree nor disagree	_____ moderately disagree	_____ strongly disagree
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2. Riding in a car with someone who has been drinking is very dangerous/

_____ strongly agree	_____ moderately agree	_____ neither agree nor disagree	_____ moderately disagree	_____ strongly disagree
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3. In the future, if I do drink alcohol, I will still drive myself.

_____ strongly agree	_____ moderately agree	_____ neither agree nor disagree	_____ moderately disagree	_____ strongly disagree
----------------------	------------------------	----------------------------------	---------------------------	-------------------------

4. Tonight's Victim Impact Panel has had a strong impact on me.

_____ strongly agree	_____ moderately agree	_____ neither agree nor disagree	_____ moderately disagree	_____ strongly disagree
----------------------	------------------------	----------------------------------	---------------------------	-------------------------

5. In the future, I will always use my seatbelt when driving.
- |                          |                            |                                      |                               |                             |
|--------------------------|----------------------------|--------------------------------------|-------------------------------|-----------------------------|
| <u>strongly</u><br>agree | <u>moderately</u><br>agree | <u>neither agree</u><br>nor disagree | <u>moderately</u><br>disagree | <u>strongly</u><br>disagree |
|--------------------------|----------------------------|--------------------------------------|-------------------------------|-----------------------------|
6. In the future, I will not drink alcohol and then drive.
- |                          |                            |                                      |                               |                             |
|--------------------------|----------------------------|--------------------------------------|-------------------------------|-----------------------------|
| <u>strongly</u><br>agree | <u>moderately</u><br>agree | <u>neither agree</u><br>nor disagree | <u>moderately</u><br>disagree | <u>strongly</u><br>disagree |
|--------------------------|----------------------------|--------------------------------------|-------------------------------|-----------------------------|
7. Drinking and driving is a very dangerous thing to do.
- |                          |                            |                                      |                               |                             |
|--------------------------|----------------------------|--------------------------------------|-------------------------------|-----------------------------|
| <u>strongly</u><br>agree | <u>moderately</u><br>agree | <u>neither agree</u><br>nor disagree | <u>moderately</u><br>disagree | <u>strongly</u><br>disagree |
|--------------------------|----------------------------|--------------------------------------|-------------------------------|-----------------------------|
8. During the past six weeks, how often did you drink alcohol? (circle one answer)
- |                       |                         |
|-----------------------|-------------------------|
| a. every day          | e. 2 or 3 times a month |
| b. 4 or 5 days a week | f. about once a month   |
| c. 2 or 3 days a week | g. not at all           |
| d. once a week        |                         |

9. Think of all the times you have had a drink in the past six weeks. How much did you usually drink each time? (circle one answer)
- a. 9 or more cans of beer, glasses of wine, or drinks
  - b. 6 to 8 cans of beer, glasses of wine or drinks
  - c. 3 to 5 cans of beer, glasses of wine or drinks
  - d. 1 to 2 cans of beer, glasses of wine or drinks
  - e. less than one beer, glass of wine, or drink or none at all
10. During the past six weeks, how often did you drink alcohol and drive? (circle one answer)
- a. every day
  - b. 4 or 5 days a week
  - c. 2 or 3 days a week
  - d. once a week
  - e. 2 or 3 times a month
  - f. about once a month
  - g. not at all
11. During the past six weeks, how often did you ride in an automobile with a driver who had been drinking? (circle one answer)
- a. every day
  - b. 4 or 5 days a week
  - c. 2 or 3 days a week
  - d. once a week
  - e. 2 or 3 times a month
  - f. about once a month
  - g. not at all
12. You came to the Victim Impact Panel tonight because:
- a. you are a first time DWI offender by the court to attend.
  - b. You are a second time DWI offender ordered by the court to attend.
  - c. You are a third time DWI offender ordered by the court to attend
  - d. You are a fourth time DWI offender ordered by the court to attend
  - e. You had a fifth time DWI offender ordered by the court to attend
  - f. You were ordered by the court to attend for a different reason. Please specify\_\_\_\_\_
  - g. You accompanied a spouse or friend to tonight's panel, but you are not a DWI offender.
13. Please list below three things that you liked MOST about tonight's Victim Impact Panel:
14. Please list below three things that you liked LEAST about tonight's Victim Impact Panel:

15. Please indicate below what you learned from tonight's Victim Impact Panel.

Finally, a few more questions:

A. are you: (circle one)

1. male 2. female

B. Your age \_\_\_\_\_(in years)?

C. What is your monthly income? (circle one)

1. under \$500 2. \$500-\$1000 3. \$1001 -1500 5. \$2001 - 2500 6. \$2501- 3000  
7. \$3000 or more

D. What is your occupation or your job? \_\_\_\_\_

E. Circle the answer that best describes you:

1. HISPANIC, SPANISH, CHICANO, MEXICAN, CUBAN, LATIN AMERICAN

2. AMERICAN INDIAN/NATIVE AMERICAN

3. WHITE/ANGLO AMERICAN

4. ASIAN AMERICAN

5. BLACK/AFRICAN AMERICAN

6. OTHER \_\_\_\_\_

Thank you very much for participating.

**APPENDIX 2: VIP INTENSITY OF REACTANCE-INDUCING STATEMENTS**

**HISTOGRAMS OF STATEMENTS' INTENSITY BY FREQUENCY**

