

Exploring Personality Traits and Susceptibility to Social Influence Among Student Change-  
Agents: Implications for Participation in a Campus-Wide Safety Initiative  
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(ABSTRACT)

This study explored the impact of commitment tactics and individual differences in personality on change-agent participation in a peer-to-peer intervention. The intervention involved approaching bicyclists on campus, discussing the importance of helmet use, and rewarding them with a coupon for a discounted helmet if they signed a promise to wear one.

Change-agent volunteers ( $n = 82$ ) were trained in one of three commitment conditions to explore their relative impact on approaching a set number of bicyclists. Specifically, change-agents were asked to commit to a personal goal of number of targets they would approach in private, in public to a small group of people, or in public to a large group of people. In addition, change-agents completed measures of the “Big Five” personality traits and susceptibility to social influence tactics to explore their potential influence on intervention performance variables.

No statistically significant differences were found in goal attainment between the commitment conditions. However, 10% more of the change-agents making a public, group commitment met their goal when compared to those who made an individual, private commitment. No significant relation was found between the Big Five personality traits and the number of bicyclist targets approached. However, the Big Five predicted 19% of the variance in the rate of obtaining signed promise cards from bicyclists.

Of the susceptibility to social influence variables, only the Ingratiation score was shown to be useful for predicting change-agent effort, accounting for 18% of the variance in the number of targets approached.

The peer-to-peer intervention was not successful in increasing bicycle helmet use on campus. Limitations of the intervention in comparison to a successful helmet program are discussed.

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## TABLE OF CONTENTS

Abstract.....	ii
Acknowledgements.....	iii
Table of Contents.....	v
List of Tables.....	ix
List of Figures.....	xi
Introduction.....	1
The Present Study.....	2
Commitment as a Social Influence Tactic.....	3
Incentives.....	4
Feedback.....	5
Verbal vs. Written Commitment.....	5
Public vs. Private Commitment.....	5
Individual vs. Group Commitment.....	6
Hypotheses Based on Training Condition and Consistency Scores.....	7
Personality Traits: The Five Factor Model.....	8
Agreeableness.....	9
Conscientiousness.....	9
Extraversion.....	11
Neuroticism.....	11
Openness.....	12
Hypotheses Based on Personality Variables.....	12
Choosing a Target Behavior.....	13
Preliminary Study 1.....	14
Method.....	14
Observation Checklist.....	14
Observation Sites.....	14
Observation Sessions.....	15
Results.....	15
On Campus.....	15
Off Campus.....	15

Discussion.....	15
Preliminary Study 2.....	16
Method.....	16
Measure.....	16
Recruitment.....	16
Results.....	17
Participants.....	17
Bicycling-Related Beliefs.....	17
Self-Reported Helmet Use.....	20
Perceived Barriers to Helmet Use.....	20
Discussion.....	21
Choosing an Intervention Task.....	22
Methodology.....	22
Participants and Setting.....	22
Intervention Task.....	23
Helmet Pledge/Commitment.....	23
Bicycle Tagging.....	24
Training and Measures.....	24
Demographic Questionnaire.....	25
International Personality Item Pool.....	25
Social Influence Survey.....	27
Goal-Setting .....	30
Bicyclist Follow-Up Survey.....	31
Independent and Dependent Variables.....	31
Independent Variables.....	31
Training Condition.....	31
Individual Scores on IPIP Scales.....	32
Individual Scores on SIS Scales.....	32
Goal Attainment.....	32
Dependent Variables.....	32
Goal Attainment .....	32

Number of Targets Approached.....	32
Rate of Obtaining Signed Promise Cards.....	32
Results.....	32
Descriptive Statistics of Dependent Variables and Goal Setting.....	32
Number of Targets Approached.....	32
Number of Promise Cards Signed.....	32
Rate of Obtaining Signed Promise cards.....	32
Goal-Setting and Completion.....	33
Hypothesis Testing.....	34
Exploratory Analyses.....	39
Intervention Effectiveness at Increasing Helmet Use on Campus.....	41
Bicycle Tags.....	42
Helmet Purchases.....	42
Bicyclist Follow-Up Survey.....	43
Discussion.....	43
Training Conditions and Consistency.....	43
Personality Traits.....	45
Social Influence Variables.....	46
Lack of Intervention Effectiveness for Increasing Helmet Use on Campus.....	47
Conclusions.....	50
References.....	52
Appendix A: IRB Approval Letters .....	62
Appendix B: Preliminary Study 1 Materials .....	67
Appendix C: Preliminary Study 2 Survey .....	82
Appendix D: Preliminary Study 2 Survey Responses for the Full Sample.....	90
Appendix E: Recruitment Materials.....	93
Appendix F: Tables of Demographic Information by Training Condition.....	95
Appendix G: Change-agent Log and Intervention Script.....	101
Appendix H: Informed Consent Document.....	104
Appendix I: Study Instrument.....	107
Appendix J: Training Presentation for Change-agents .....	116

Appendix K: Team Building Exercise for Small Team Condition .....	132
Appendix L: Bicyclist Follow-Up Survey .....	134
Appendix M: Observation Checklist and Map of Observation Locations .....	137
Appendix N: Curriculum Vita for Douglas M. Wiegand .....	140



## LIST OF TABLES

Table 1: FFM Personality Traits and Their Facets.....	10
Table 2: Bicyclists' Responses to Survey Items.....	18
Table 3: Self-Reported Helmet Use for the Past Ten Times Riding a Bicycle.....	20
Table 4: Descriptive Statistics and Alpha Levels for Personality Scales.....	26
Table 5: Means and Standard Deviations for Three Training Conditions and Personality.....	26
Table 6: Results of ANOVAs for Comparisons of Training Conditions on Personality Variables.....	27
Table 7: Descriptive Statistics and Alpha Levels for Social Influence Scales .....	28
Table 8: Means and Standard Deviations for Three Training Conditions and Social Influence Variables.....	29
Table 9: Results of ANOVAs for Comparisons of Training Conditions on Social Influence Variables.....	29
Table 10: Comparison of Experimental Conditions.....	31
Table 11: Prevalence (%) of Goal Selection Among Training Conditions.....	33
Table 12: Prevalence (%) of Goal Attainment Among Training Conditions.....	33
Table 13: Stepwise Regression for Personality Traits Predicting Personal Goal Set.....	34
Table 14: Stepwise Regression for Social Influence Variables Predicting Personal Goal Set.....	34
Table 15: Prevalence (%) of Personal Goals Met and Not Met Among Public vs. Private Commitment Conditions.....	35
Table 16: Prevalence (%) of Personal Goals Met and Not Met Among Small vs. Large Team Conditions.....	35
Table 17: Prevalence (%) of Personal Goals Met and Not Met Among Individual vs. Large Team Conditions.....	36
Table 18: Mean Consistency Scores by Goal Attainment Status.....	36
Table 19: ANOVA Results for Big Five Personality Traits Predicting Number of Bicyclists Approached.....	37
Table 20: Coefficients for Big Five Personality Traits Predicting Number of Bicyclists Approached.....	37

Table 21: ANOVA Results for Big Five Personality Traits Predicting the Rate of Obtaining Signed Promise Cards from Bicyclists.....	38
Table 22: Coefficients for Big Five Personality Traits Predicting the Rate of Obtaining Signed Promise Cards from Bicyclists.....	38
Table 23: Mean Personality Scores by Goal Attainment Status.....	39
Table 24: Stepwise Regression for Big Five Personality Predicting Total Number of Targets Approached.....	40
Table 25: Stepwise Regression for Social Influence Variables Predicting Total Number of Targets Approached.....	40
Table 26: Stepwise Regression for Personality Traits, Social Influence Variables, Goal, Gender, and Training Condition in Predicting Total Number of Targets Approached.....	41
Table 27: Average Helmet Use by Project Phase.....	41

## LIST OF FIGURES

Figure 1: Percent Helmet Use – Fall 2005.....	16
Figure 2: Percentage of Bikers Observed Wearing a Helmet – Spring 2006.....	42

## INTRODUCTION

When implementing a community-based behavior-change intervention, it is often beneficial to recruit and train individuals as change-agents to advocate your cause (Geller, Berry, Ludwig et al., 1990; McKenzie-Mohr & Smith, 1999; Rogers, 1995). A *change-agent* interacts with members of the community (or targeted population) to advocate target behavior(s) using various methods of interpersonal influence (Rogers, 1995). Research indicates change-agents have been successful in influencing a wide array of health, safety and community-related behaviors, including safety-belt use (Berry, Geller, Calef, & Calef, 1992), safe sexual behavior (Kelly et al., 1992), recycling and conservation behavior (Burn & Oskamp, 1986; Cobern, Porter, Leeming, & Dwyer, 1995; Leeming, Porter, Dwyer, Cobern, & Oliver, 1997; McKenzie-Mohr, 2000), occupational safety (Roberts & Geller, 1995), and bicycle helmet use (Ludwig, Buchholz, & Clarke, 2005).

In the community-psychology literature, most studies involving change-agents evaluate the impact of the intervention technique or process implemented by change-agents, or characteristics of the targets of the intervention. However, a few studies have focused on the change-agents themselves (Roberts & Geller, 1995; Porter, 1998) and evaluated methods to influence their behavior (Ludwig & Geller, 1999). These studies are described below.

Roberts and Geller (1995) measured three psychological constructs (optimism, self-esteem, and group cohesion) they believed would predict helping behavior among workers at a fiber-manufacturing plant. Their dependent variable was distribution of “thank-you cards” participants could use to reward their coworkers for emitting helpful or safe behavior at work. This study had a very low participation rate (only 4 workers of 25 distributed thank-you cards), but t-tests showed those who gave cards scored significantly higher on measures of self-esteem and work group cohesiveness than those who did not distribute cards.

In a related study, Porter (1998) measured constructs related to Geller’s (1991, 1995) *Actively Caring* model (extraversion, optimism, personal control, self esteem, belongingness, and self-efficacy) to predict change-agent activity and success towards intervening on community members for fire safety. Change-agent participants (n = 107) were asked to approach households and speak with residents about fire safety and ask them to sign a promise card to engage in fire-safe behaviors (e.g., installing/checking fire alarms). The number of households approached (i.e., agent activity) was a dependent variable, as was the number of successful interventions (i.e.,

number of commitment cards signed). These dependent variables were made dichotomous using a median split to produce a “high” and “low” group for each. Results indicated extraversion scores significantly predicted agent activity (69.9% of variance explained) and self-esteem scores significantly predicted agent success (59.6% of variance explained). None of the other constructs measured predicted variance in change-agent behavior beyond what was predicted by these variables.

Ludwig and Geller (1999) designed an interesting study with pizza delivery drivers whereby participants from one store acted as change-agents in a community safety program to encourage their customers to use a safety-belt when driving while participants from a control store did not participate in such a program. Unobtrusive behavioral observations were recorded for drivers from both stores to measure their personal safety-belt use. Both groups of drivers had similar baseline safety-belt use (experimental 57%,  $n = 2,253$  observations; control 53%,  $n = 992$  observations).

However, during the intervention phase, those drivers who acted as change-agents had significantly higher safety-belt usage (75%,  $n = 2,076$  observations) than those who did not act as change-agents (58%;  $n = 570$  observations). One potential explanation of the differences in safety-belt use is that drivers acting as change-agents felt pressure to “practice what they preached” by being consistent in their verbal (advocating safety-belt use) and physical behavior (personal safety-belt use). The Ludwig and Geller (1999) study is unique since the focus was on the impact of being involved as a change-agent on the behavior being advocated instead of focusing on the targets’ behavior.

There is still much to be learned about using change-agents to promote behavior (Porter, 1998). For example, can training sessions be designed to use social influence tactics to influence change-agents’ participation in the intervention? Do meaningful individual differences exist between active versus inactive change-agents, and if so, what are they? By exploring these issues, it is possible intervention promoters (i.e., change agencies; Rogers, 1995) can systematically tailor their recruitment and training strategies to attract these individuals and motivate them to carry out an intervention (e.g., Francies, 1983).

### The Present Study

The present study focuses on change-agent participation in performing a peer-to-peer intervention to increase bicycle helmet use on a university campus. Specifically, change-agents

were trained to advocate helmet use to bicyclists on the Virginia Tech campus and to ask them to sign a promise card to wear a helmet. This study focuses on the training conditions change-agents were exposed to and individual differences in personality and how they account (or fail to account) for participation in the intervention process.

The aims of this research were twofold, including both a situational approach and an individual differences approach to explore change-agents' participation in the intervention. First, change-agents were exposed to one of three commitment scenarios to meet a personal goal for the number of targets they would approach for the intervention. Whether or not they met that goal (and thus abided by their commitment) was then evaluated to determine the relative influence of the three commitment scenarios. Second, individual differences in personality traits and self-reported susceptibility to social influence tactics (e.g., Cialdini, 2001; Dula, Lehman, & Geller, 2006) were explored with regard to various performance variables (i.e., number of targets approached, rate of obtaining signed promise cards, and personal goal attainment). The sections below describe the study rationale, including the independent variables and the decisions regarding the specific problem area and intervention technique chosen as a focus for change-agent efforts.

### *Commitment as a Social Influence Tactic*

The notion that people have a strong desire to be consistent in their thoughts and behaviors has been popular among social psychologists since the advent of balance theory (Heider, 1958) and cognitive dissonance (Festinger, 1957) nearly half a century ago. Since then, applied research has shown the principle of consistency is useful for influencing a wide range of behavior (Cialdini & Trost, 1998; Cialdini & Goldstein, 2004). A popular influence tactic based on the principle of consistency is obtaining one's commitment to perform a behavior.

*Commitment* is defined as the "pledging or binding of an individual to behavioral acts" (Kiesler & Sakamura, 1966, p. 349). Commitment strategies involve asking someone to make a statement (written or verbal) or to sign an agreement to perform a particular behavior (Geller, 1990; Geller & Lehman, 1991), assuming that once the promise is made, the link between the promise and related behavior will be strengthened (Katzev & Wang, 1994).

Perhaps the first study which observed commitment as a social influence tactic was Lewin's (1947) research on group processes and decision making regarding adoption of a novel

cooking task (as cited in Katzev & Wang, 1994). Lewin presented information on inexpensive, nutritious, yet unusual meals (e.g., beef hearts, kidneys) to groups of housewives. One group only received information on the alternative meals, while another group received the same information and was then asked to discuss the meals amongst themselves. In this information plus discussion group, the women were also asked to raise their hand (a form of public commitment) if they planned on serving one of the meals at home during the following week.

Lewin followed up with the participants a week later to find that while only 3% of the women in the information condition reported serving one of the meals, 32% of the information plus discussion plus commitment condition had. Granted, it can not be determined whether the difference was attributable to the discussions, the commitment, or the combination of the two. Nonetheless, this finding inspired future social psychological research on commitment strategies and their influence on behavior (Katzev & Wang, 1994).

Since Lewin's work, commitment strategies have been used to influence prosocial behavior, such as intervening to stop a thief (Moriarty, 1975; Shaffer, Rogel, & Hendrick, 1975), and participating in community-service programs (Cioffi & Garner, 1996); proenvironmental behavior such as energy and resource conservation (Becker, 1978; Pallak & Cummings, 1976; Shippe & Gregory, 1982); use of public transportation (Bachman & Katzev, 1982); recycling (Burn & Oskamp, 1986; Katzev & Pardini, 1987; DeLeon & Fuqua, 1995; Werner et al., 1995); wearing personal protective equipment at work (Streff, Kalsher, & Geller, 1993), and the use of vehicle safety belts (Geller, Kalsher, Rudd, & Lehman, 1989; Geller & Lehman, 1991) and bicycle helmets (Ludwig et al., 2005). Each of these studies supported the commitment tactic as an effective technique for influencing behavior, however, their methods varied somewhat. Commitment could be combined with incentives and/or feedback, given verbally or in writing, obtained in public or private, individual or group settings. The effects of each of these methods are described below as referenced in the Katzev and Wang (1994) review article.

*Incentives.* Geller and colleagues (Geller, Kalsher, Rudd, & Lehman, 1989; Geller & Lehman, 1991) combined commitment and incentive strategies to increase safety-belt use in a variety of settings. In a review of strategies to increase employee safety-belt use in corporate settings, Geller, Rudd, Kalsher, Streff, and Lehman (1987) found those programs which included a commitment-only strategy had greater residual impact compared to those that involved only external rewards. Bachman and Katzev (1982) investigated the effects of commitment only,

incentive only (free bus tickets), and commitment plus incentive conditions on bus riding behavior in comparison with an information only control group. All three of the experimental groups increased bus-riding behavior over baseline more than the control group. The interesting finding was the individuals in the commitment-only condition rode the bus as often as those in the other two groups. Based on these findings, it seems as though gaining one's commitment to perform a behavior is just as powerful, if not more powerful, than enticing them with incentives.

*Feedback.* Becker (1978) implemented four commitment conditions to influence townhouse tenants to reduce their energy conservation. Participants in each of the conditions made a verbal commitment to reduce their energy consumption. One group was asked to decrease their energy use by 2% (easy goal) while another group was asked to reduce it by 20% (challenging goal). Half of the participants in each of these groups received feedback on their efforts while the others did not. The group which had the challenging goal and included feedback was the only one to significantly reduce their energy use.

Becker (1978) concluded that setting a goal too low was not motivating to the participants. In addition, he concluded feedback was important for increasing behavior change. Note, however, this is the only study referenced here where feedback was included. The others showed commitment only as a viable method of influencing behavior.

*Verbal vs. written commitment.* Pardini and Katzev (1983-84) compared the effects of "weak" commitment (verbal only) and "strong" commitment (written) on curbside recycling behavior. They found that both types of commitment increased recycling behavior more than an information-only control group. However, after the intervention phase, a follow up found the strong commitment group maintained their recycling behavior, while the weak commitment group had returned to their baseline levels of recycling.

*Public vs. private commitment.* Pallak and Cummings (1976) explored the effects of public versus private commitment on household residents' conservation of natural gas (Experiment 1) and electricity (Experiment 2). In the private commitment condition, participants were told the study's results would be published in the local paper, but their names would not be included. In the public commitment condition, participants were told their names would be included in the local paper article announcing the study's results. Those in the public commitment condition conserved significantly more energy than those in the private commitment condition. Pallak, Cook, and Sullivan (1980) reported a one-year follow-up study



to find those in the public condition continued to save energy at a higher rate than those in the private condition.

Shippee and Gregory (1982) took the Pallak et al. studies one step further. They included an information-only control group, a private commitment condition (where results of the study would be published in the paper with no names), and two public commitment conditions where the names of individuals would be published in the newspaper article. In one of the public commitment groups (i.e., the “mild” commitment), individuals were told only their names would appear in the article. In the “strong” public commitment group, the participants were told their names would be included in the paper along with the amount of energy they saved (or consumed). The commitment groups saved significantly more energy than the control group. However, an interesting finding was those in the mild commitment condition saved more energy than those in the strong commitment condition. Perhaps those in the strong commitment group felt threatened by public exposure of their efforts and compensated for this by self-handicapping (Berglas & Jones, 1978), or by decreasing their efforts as to have an excuse to protect their egos (i.e., “I didn’t reduce my energy consumption because I didn’t put forth the effort”).

*Individual vs. group commitment.* Wang and Katzev (1990) conducted two experiments to explore the effect of obtaining commitment in a group setting. In their first experiment, they implemented a recycling program at a retirement home (baseline), and then several weeks later asked members of a retirement home to sign a group commitment to recycle. After four weeks, they found the group had recycled at a significantly higher rate than during baseline. At follow-up several weeks after the intervention/commitment period, the residents were still recycling at a rate higher than baseline.

In a second experiment, Wang and Katzev (1990) compared the effects of obtaining commitment in an individual versus a group setting. They asked college students living in dorms to participate in a paper recycling program. Participants in the individual condition were approached separately and asked to sign a commitment to participate in the program. Those in the group condition were informed of the program during a hall meeting and were asked to discuss among themselves whether they wanted to participate. After the discussion, they signed a group commitment.

Those in the individual commitment condition showed a significantly higher amount of paper recycling than those in the group condition. In addition, those in the individual

commitment condition were recycling significantly more than controls at follow-up. Wang and Katzev (1990) concluded the group of college students was less cohesive than the retirement home residents, who tended to spend more time together and had fewer activities to choose from. This was their explanation for finding mixed results for individual versus group commitment conditions in their two studies.

### *Hypotheses Based on Training Condition and Consistency Scores*

Based on the information presented above, obtaining a person's commitment to perform a behavior is a useful social influence tactic. In this regard, three training conditions were implemented in the present research to investigate several of the aforementioned variations of this tactic. In the first condition (i.e., Individual), individuals made a private, written commitment to obtain a personal goal for effort expended (i.e., number of targets approached). In the second condition (i.e., Small Team), participants were placed in small teams and made individual and group goal commitments which were both written and verbal, and expressed in public. In the third condition (i.e., Large Team), a large group of individuals was addressed as a team (volunteers from the same class), where they publicly made individual commitments which were both written and verbal. In addition, participants in this condition made a group commitment to meet a team goal they set in terms of the total number of targets to be approached.

With these three conditions, differences between private and public commitment can be explored. In addition, the group commitment conditions allow comparisons of a commitment effect among those in a small group versus a large group setting. The Wang and Katzev (1990) studies on individual versus group commitments reviewed above suggest group commitment may be a more powerful influence tactic than individual commitment when the group is relatively small and cohesive. However, if the group is large and less cohesive (and thus invites social loafing; Latané, Williams, & Harkins, 1979), individual commitment seems to have a stronger influence on effort. Research in group dynamics outside the realm of commitment tactics supports this notion that greater cohesiveness within a group is associated with greater group performance (Hogg, 1987; Mullen & Cooper, 1991).

Based on the research cited above, the following hypotheses are proposed:

**H1:** The proportion of change-agents meeting their personal goals for number of targets approached will be greater for those who made a public commitment compared to those who made a private commitment.

**H2:** The proportion of change-agents meeting their goal will be greater for those who make a public commitment to a small group when compared to those who make a public commitment to a large group.

**H3:** The proportion of change-agents meeting their goal will be greater for those in the Individual condition when compared to those in the Large Team condition.

In addition, participants completed survey items designed to measure the extent to which they felt the need to be consistent in their attitudes and behaviors. It is expected those who felt a stronger need to be consistent (as evidenced by higher scores on the Consistency measure) will be more likely to meet their personal goals than those who did not feel such a need (as evidenced by lower scores on the Consistency measure). Therefore, the following hypothesis is made:

**H4:** The mean consistency score will be greater for those change-agents who meet their personal goal compared to those who do not meet their goal.

#### *Personality Traits: The Five Factor Model*

In personality psychology, the Five-Factor Model (FFM; a.k.a., the *Big Five*) refers to a taxonomy of personality traits conceptualized by natural language and is generally assessed by questionnaire (John, 1990). It is a classification structure which shows how personality traits and their facets are empirically associated (Srivastava, 2006).

Using factor analysis, researchers believe they have boiled down the essence of personality to five superordinate dimensions (Digman, 1990; Goldberg, 1981, 1993; John, 1990; McCrae & Costa, 1999). Though researchers vary somewhat in the labels they give to these traits (John, 1990), the most common labels are Agreeableness, Conscientiousness, Extraversion, Neuroticism, and Openness to experience (Costa & McCrae, 1992; McCrae & Costa, 1999).

The modern conceptualization of the FFM has generated scores of research since the early 1990s, and has quickly become “one of the most accepted models [of personality] in contemporary psychology” (McCrae, 2001, p.108). Some of the overall strengths of this model are its replicability (Goldberg, 1981, 1990; John, 1990; Larsen & Buss, 2005; Norman, 1963; John & Srivastava, 1999); cross-cultural agreement (Goldberg, 1993; John & Srivastava, 1999;

McCrae et al., 1998; McCrae & Costa, 1997); consistency with different rating scales (Funder, Kolar, & Blackman, 1995; McCrae & Costa, 2003; Watson, Hubbard, & Wiese, 2000); developmental stability (Carmichael & McGue, 1994; Costa & McCrae, 1988; Viken, Rose, Kaprio, & Koskenvuo, 1994; McCrae et al., 2002); and predictive validity (Barrick & Mount, 1991; Mount, Barrick, & Stewart, 1998; Graziano & Eisenberg, 1997; Hogan & Ones, 1997; McCrae, 1996; Roberts & Hogan, 2001; Watson & Clark, 1997).

Given these strengths and the general appeal of this model of personality, it seemed like a useful starting point for addressing individual differences among change-agents. Much of the early work on the FFM focused on the factors themselves, defining them and assessing their measurement and consistency. Thus, proponents of the FFM encourage future researchers to focus on the predictive validity of the model using real-world outcomes (Carver & Scheier, 2003). As several of the traits focus on interpersonal style and social characteristics, the FFM should differentiate between change-agents who are active and successful versus those who achieve less. Each of the personality traits of the FFM is described below, along with evidence of its relevance to the present study. See Table 1 for a summary of the five factors and their respective facets.

*Agreeableness.* The agreeableness trait is associated with trust, straightforwardness, altruism, compliance, compassion, warmth, modesty, and tender-mindedness (McCrae & John, 1992). Research has shown Agreeableness predicts work-related performance in jobs where interpersonal interaction or working in groups is a key feature (Graziano & Eisenberg, 1997; John & Srivastava, 1999; Mount, Barrick, & Stewart, 1998). This is perhaps due to the association between Agreeableness and compliance; groups need members who can agree on tasks and methods to meet their goals in order to be successful (Festinger, 1950). Agreeableness is also predictive of prosocial behavior, such as helping others and donating to charity (Graziano & Eisenberg, 1997; John & Srivastava, 1999). In a study on adolescent interpersonal relations, Agreeableness showed a protective element in that Agreeable people were less likely to be victimized by their peers (Jensen-Campbell et al., 2002). This may be due to difficulty finding something to criticize the individual about, given they are generally described as likeable, compliant, kind, compassionate, and helpful (Graziano & Eisenberg, 1997).

*Conscientiousness.* The Conscientiousness trait is associated with competence, order, dutifulness, achievement striving, morality, self-discipline, and deliberation (McCrae & John,

Table 1

FFM Personality Traits and Their Facets (Costa & McCrae, 1992)

Personality Trait	Facets
Agreeableness	Trust (forgiving) Straightforwardness (not demanding) Altruism (warm) Compliance (not stubborn) Modesty (not show-off) Tender-mindedness (sympathetic)
Conscientiousness	Competence (efficient) Order (organized) Dutifulness (not careless) Achievement striving (thorough) Self-discipline (not lazy) Deliberation (not impulsive)
Extraversion	Gregariousness (sociable) Assertiveness (forceful) Activity (energetic) Excitement-seeking (adventurous) Positive emotions (enthusiastic) Warmth (outgoing)
Neuroticism	Anxiety (tense) Angry hostility (irritable) Depression (not contented) Self-consciousness (shy) Impulsiveness (moody) Vulnerability (not self-confident)
Openness	Ideas (curious) Fantasy (imaginative) Aesthetics (artistic) Actions (wide interests) Feelings (excitable) Values (unconventional)

1992). Conscientiousness was originally thought to be the only general predictor of job performance in terms of personality (Barrick & Mount, 1991), yet researchers have criticized this notion stating job types need to be differentiated for the other personality traits to show their relations (Hogan, Hogan, & Roberts, 1996). Others believe this conclusion was premature since the earlier work did not rely on consistent measurement of the Big Five and suffered from other methodological limitations (Hurtz & Donovan, 2000). Nonetheless, Conscientiousness continues to be considered a leading predictor of overall job performance (Barrick & Mount, 2005).

Research has also shown Conscientiousness to be predictive of academic performance among high school and college students (Hogan & Ones, 1997). People who score high on Conscientiousness tend to set higher goals for themselves and work harder to achieve those goals than those who score low on this trait (Schultz & Schultz, 2005). Conscientiousness has also been supported as a valid predictor of success and job performance in professional, managerial, and sales jobs (Barrick & Mount, 1996; Barrick, Mount, & Strauss, 1993; Stewart, Carson, & Cardy, 1996).

*Extraversion.* The extraversion trait is associated with warmth, gregariousness, assertiveness, activity, excitement seeking, and positive emotions (McCrae & John, 1992). Extraversion predicts success in sales and management positions (Barrick & Mount, 1991; Mount, Barrick, & Stewart, 1998; John & Srivastava, 1999). Extraverts are socially skilled and exude confidence (Chaplin, Phillips, Brown, Clanton, & Stein, 2000), which aids in their persuasive abilities (Watson & Clark, 1997). Extraversion is positively associated with the number of close friends and dating partners one has (Jensen-Campbell et al., 2002; Watson &

Clark, 1997), which is also indicative of their social skills and likeability. Watson and Clark (1997) have also found Extraversion predicts positive affect, which may be explained by Extraverts reaping greater rewards and benefits from life due to the energy and ambition they put into meeting their personal goals and seeking pleasurable activities.

*Neuroticism.* The Neuroticism trait is associated with anxiety, hostility, depression, self-consciousness, impulsiveness, and vulnerability (McCrae & John, 1992). Neuroticism is predictive of poor work performance in group settings or where interpersonal interaction is necessary (John & Srivastava, 1999; McDaniel & Frei, 1998; Mount, Barrick, & Stewart, 1998). While Conscientiousness is often credited as the only personality trait predictive of general job performance, a meta-analysis by Ones, Viswesvaran, and Schmidt (1993) found that integrity

tests, which include facets of Conscientiousness and Neuroticism, predict supervisor ratings of job performance in a variety of work-related settings. Neuroticism is also predictive of one's vulnerability to depression (John & Srivastava, 1999), which can affect one's motivation and confidence (APA, 1994).

*Openness.* The Openness trait is associated with fantasy, creativity, open-mindedness, aesthetics, feelings, actions, ideas, and values (McCrae & John, 1992). Research has shown it is predictive of creative performance (McCrae, 1996). Openness has been declared the “fuzziest” and most controversial of the FFM in that it is the most inconsistent and least understood (McCrae & John, 1992). It also tends to be the least studied trait in the FFM (McCrae, 1996).

### *Hypotheses Based on Personality Variables*

Based on the information presented above, it makes sense that change-agents who score differently on the scales of a FFM measure will show varying effort towards the intervention task, and may also have varying levels of success. For example, Agreeableness and Extraversion are traits associated with social interaction. The research cited above suggests change-agents who are outgoing and likeable would approach more targets and have a higher success rate in completing the intervention task (i.e., obtaining signed promise cards) than change agents who are introverted and/or not-likable.

Conscientious individuals are hard working, driven, and successful in sales positions, so it makes sense they would approach more targets and have more success with implementing the intervention than individuals who score low on Conscientiousness. Individuals who score high on Neuroticism may lack the confidence to approach strangers, and may act awkward socially when they do. Thus, change-agents scoring low on Neuroticism will likely approach more targets and have more success implementing the intervention than change-agents who score high on Neuroticism. The trait of Openness does not necessarily link to social interaction or motivation, thus change-agent effort and success is not predicted to vary as a function of this variable.

In summary, the following hypotheses are proposed regarding the change-agents and the FFM of personality:

**H5:** Personality as measured by the FFM will be significantly related to the total number of bicyclists approached.

**H6:** Personality as measured by the FFM will be significantly related to the rate of obtaining signed promise cards from bicyclists.

**H7:** Personality scores will be significantly different for change-agents who meet their goal (and thus fulfill their commitment) versus those who do not meet their goal.

### Choosing a Target Behavior

Bicycling-related injuries and fatalities are a significant problem in the United States. According to the Centers for Disease Control and Prevention (CDCP; 2002), each year more than 500,000 people in the U. S. are injured while riding bicycles. This is most likely an underestimate, as research has indicated that as many as 66% of bicycling injuries go unreported (Dewar, 1978; Lind, & Wollin, 1985). Additionally, between 1994-2003 an average of 670 fatalities have resulted from bicycle crashes, more than three quarters of which are adult riders over the age of 16 (Insurance Institute for Highway Safety, 2004).

Of the bicyclists killed between 2000-2003, 85-90% were reportedly not wearing a helmet (Insurance Institute for Highway Safety, 2004). The CDCP (1995) reports that head injuries account for 62% of bicycle-related fatalities, 33% of bicycle-related emergency room visits and 67% of bicycle-related hospital admissions. Other researchers (Dannenberg, Gielen, Beilenson, Wilson, & Joffe, 1993; Thompson, Rivara, & Thompson, 1989; Wasserman, Waller, Monty, Emery, & Robinson, 1988) report head injuries are responsible for as many as 70-85% of bicycling-related deaths. Further, research conducted by the Johns Hopkins Injury Prevention Center shows bicyclists hospitalized with a head injury are 20 times as likely to die as those without (Snell Memorial Foundation, 2005).

Helmet use is reported as the most successful prevention method for reducing the occurrence of head injury in a bicycle crash. According to the CDCP (2002), bicycle helmets reduce the risk of head injury by as much as 85%, the risk of brain injury by 88%, and the risk of facial injury by 65%. In a recent meta-analysis, Attewell, Glase, and McFadden (2001) analyzed 16 studies of bicycle-related head injuries occurring between the years 1987-1998 to find helmet use was associated with 60% fewer head injuries, 58% fewer brain injuries, and 47% fewer facial injuries when compared to non-use.

Despite the evidence for helmet efficacy, helmet use is surprisingly low. For example, in a survey of 1,020 U.S. cyclists, Rodgers (2000) found 43% reported “never” or “almost never”



wearing a helmet. Of the cyclists between the ages of 16-24 in this sample (n=190), 71.6% reported never or almost never wearing a helmet when riding. In a survey of college student bicyclists (N=241) from three Midwestern universities, Everett, Price, Bergin, and Groves (1996) found 62% to report “I am not a helmet wearer and I do not intend to wear one”. Similarly, in a survey of 390 college students in the Pacific Northwest, 49.3% of bicyclists reported never wearing a helmet (Page, Follett, Scanlan, Hammermeister, & Friesen, 1996).

Taking all this information into account, the current researcher made informal observations of bicyclists on the Virginia Tech campus to note helmet use seemed surprisingly low. Contact with administrative staff at the local hospital (Montgomery Regional) revealed that between the years 2000-2005, the emergency room had records of treating 482 individuals due to bicycle crashes, many of which were head injuries (D. Sinclair, personal communication, August 25, 2005).

To further justify choosing helmet use as the behavior to target by the change-agents in this study, two preliminary studies were performed to measure helmet use on campus through behavioral observation (Preliminary Study 1) and to assess attitudes, opinions, and behaviors regarding helmet use via a campus-wide survey (Preliminary Study 2). Results from these pilot studies were also used to develop the training materials for the main study.

### Preliminary Study 1

Preliminary Study 1 facilitated the development of the methodology for observing and recording bicycling behaviors on the Virginia Tech campus and in the surrounding community, and provided an opportunity to obtain baseline data. While the study focused on a variety of bicycling behaviors, only helmet use is reported here. This study was approved by the Virginia Tech Institutional Review Board (IRB; see Appendix A for the approval letter).

### *Method*

*Observation checklist.* An observation checklist (see Preliminary Study 1 Materials in Appendix B) was developed to assist trained research assistants record observations of individual bicyclists on the Virginia Tech campus and in the Blacksburg community. Appendix B also includes the observation protocol for selecting and recording observations, as well as instructions on how to collect reliability data.

*Observation sites.* Observations were recorded from two on-campus and two off-campus sites (see Appendix B for a map of locations). The on-campus sites were: 1) in front of the Newman Library overlooking the sidewalk between College Avenue and where Kent St. and Drillfield Drive meet; and 2) the intersection of Washington St. and West Campus Drive, near the newly installed roundabout. The off-campus sites were: 1) the intersection of the bicycle trail on Country Club Drive and the Huckleberry Trail; and 2) Tom's Creek Road near the cross street of Newman Lane.

*Observation sessions.* Sessions were scheduled for 60-90 minute blocks between 7:45am – 7:30pm. The on-campus sessions were scheduled to overlap with class breaks using the university timetable. The off-campus sessions were scheduled in the early morning and early evening to observe commuters as well as individuals riding for recreation/exercise.

### *Results*

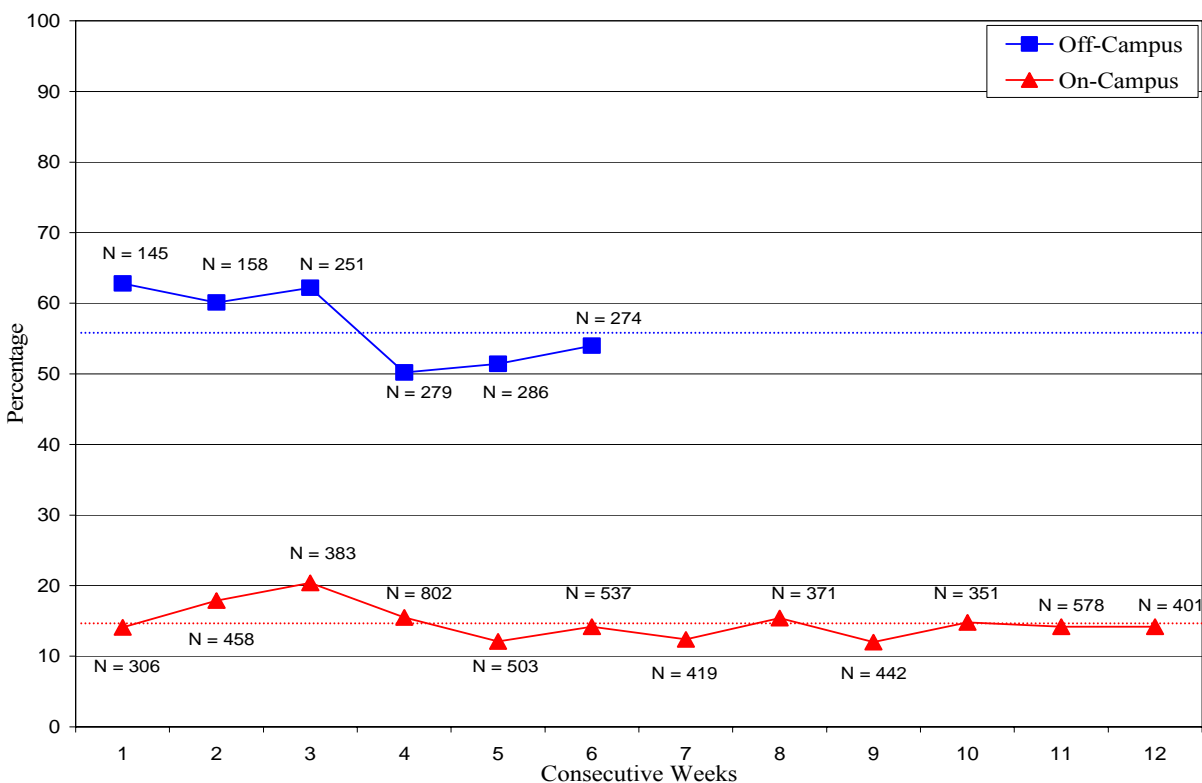
*On campus.* Figure 1 shows line graphs of helmet use means by consecutive week. The two on-campus sites yielded over 5,000 observations from August 22, 2005 – November 11, 2005. The percentage of mean helmet use was 14.8% ( $n = 5,551$ ), with agreement between independent observers at 99.1% ( $n = 1,819$ ).

*Off campus.* The two off-campus sites yielded nearly 1,400 observations for a period of six consecutive weeks (August 22, 2005 – September 30, 2005). Average helmet use was 56.8% ( $n = 1,393$ ), with inter-observer agreement at 97.0% ( $n = 509$ ). By visually inspecting these data, it was determined the average helmet use was much higher off campus than on. Given this, resources were then reallocated to focus on bicycling behaviors on-campus after Week 6.

### *Discussion*

It is clear helmet use was significantly lower on-campus than in the community. Therefore, it was decided to focus on campus biking for the main study since the need for improvement was greater than in the community. Also, focusing on campus allowed data collection resources to be dispersed more widely across the site, enabling a more representative sample.

Figure 1 Percent Helmet Use - Fall 2005



### Preliminary Study 2

The purpose of Preliminary Study 2 was to obtain information from Virginia Tech students, faculty, and staff regarding their bicycling behavior and beliefs regarding bicycling safety; particularly helmet use. In addition, questions were asked to identify major reasons for riding a bicycle and barriers to owning and wearing a helmet. This study was approved by the Virginia Tech IRB (see Appendix A for the approval letter).

#### *Method*

*Measure.* A brief online survey (see Preliminary Study 2 Survey, Appendix C) was developed for Virginia Tech students, faculty, and staff, as well as Blacksburg residents, in order to obtain perceptions about bicycling safety. If participants were cyclists, they also completed questions regarding their bicycling behavior.

*Recruitment.* The survey was advertised with flyers which were distributed throughout the Blacksburg community and on the Virginia Tech campus. In addition, the university directory was used to generate a list of 1,328 randomly-selected email addresses of students and

faculty/staff. An email message was sent to this list which briefly stated the purpose of the survey and indicated participants would be entered into a raffle for a \$25 gift certificate to a restaurant of the winner's choice.

### *Results*

*Participants.* A total of 420 participants (58.8% females), ranging in age from 17-68 completed the online survey ( $M = 27.6$ ,  $SD = 12.35$ ). In terms of university affiliation, 62.6% ( $n = 263$ ) of the participants were undergraduates, 24.8% ( $n = 104$ ) were faculty/staff, and 12.2% ( $n = 51$ ) were graduate students. Ethnicity was measured in a "check all that apply" manner, and was representative of the university population. The majority of participants (86.3%,  $n = 352$ ) reported Caucasian, while 5.9% ( $n = 24$ ) reported Asian, 2.7% ( $n = 11$ ) African American, 1.7% ( $n = 7$ ) Latino, and 0.2% ( $n = 1$ ) were Native American/American Indian. Approximately 3% ( $n = 13$ ) of respondents indicated "Other" for ethnic background.

Sixty percent of the participants ( $n = 252$ ) indicated they have ridden a bicycle at least once in the past year. Of those, 53% ( $n = 132$ ) were female, and the mean age was 27.7 with a range of 17 to 68. Eighty-nine percent ( $n = 215$ ) reported their ethnicity as Caucasian, 5.3% ( $n = 13$ ) Asian, 1.2% ( $n = 3$ ) African American, 1.2% ( $n = 3$ ) Hispanic, 0.4% ( $n = 1$ ) Native American/American Indian, and 3.3% ( $n = 8$ ) chose the "Other" option. Seventy-six percent ( $n = 190$ ) of bicyclists reported being a student, while the remaining 24.3% ( $n = 61$ ) reported being faculty/staff.

*Bicycling-related beliefs.* Respondents were asked to rate their beliefs regarding various bicycling-relevant statements on a scale ranging from "strongly agree" to "strongly disagree". Table 2 depicts the frequencies of responses reported by individuals claiming to ride a bicycle at least occasionally ( $n = 252$ ). A table depicting the frequencies of responses from the full sample ( $n = 420$ ) is included in Appendix D. Several findings are highlighted below.

A majority of respondents (76.5%,  $n = 192$ ) reported at least some agreement with the statement "it is important to wear a helmet when biking on campus". Even more respondents (98.8%,  $n = 248$ ) agreed helmets are effective in preventing head injuries. A majority of individuals (64.5%,  $n = 162$ ) agreed that bicycle crashes are common.

Unfortunately, many people reported they find helmets uncomfortable (52.4%,  $n = 132$ ) and inconvenient (50.2%,  $n = 126$ ), and would feel "silly" wearing one (42.1%,  $n = 106$ ).

Table 2  
Bicyclists' Responses to Survey Items (n = 252; n-sizes in parentheses)

Statement	%SA	%A	%AS	%N	%DS	%D	%SD
It is important to <i>always</i> wear a helmet when riding a bike	32.3 (81)	23.5 (59)	27.1 (68)	5.2 (13)	6.0 (15)	5.2 (13)	0.8 (2)
It is important to wear a helmet when biking <i>on campus</i>	32.7 (82)	21.9 (55)	21.9 (55)	10.8 (27)	6.0 (15)	6.0 (15)	0.8 (2)
It is important to wear a helmet when biking <i>on the road with traffic</i>	67.1 (169)	19.4 (49)	9.5 (24)	2.0 (5)	1.2 (3)	0.8 (2)	0 (0)
It is important to wear a helmet when biking <i>on a sidewalk</i>	28.1 (70)	26.1 (65)	18.9 (47)	12.9 (32)	8.4 (21)	5.6 (14)	0 (0)
It is important to wear a helmet when biking <i>on a bike trail</i>	37.1 (93)	29.5 (74)	13.5 (34)	8.0 (20)	7.2 (18)	4.4 (11)	0.4 (1)
Helmets are effective in preventing head injuries	64.9 (163)	27.5 (69)	6.4 (16)	0.8 (2)	0.4 (1)	0 (0)	0 (0)
People who wear a helmet when biking look ridiculous	4.8 (12)	7.6 (19)	17.9 (45)	17.5 (44)	7.2 (18)	25.9 (65)	19.1 (48)
Bicycle helmets are uncomfortable	5.6 (14)	21.0 (53)	25.8 (65)	17.9 (45)	8.3 (21)	16.7 (42)	4.8 (12)
“Cool” people do not wear helmets when biking	0.8 (2)	3.2 (8)	6.8 (17)	12.7 (32)	9.2 (23)	33.9 (85)	33.5 (84)
Bicycle helmets come in a variety of colors and styles	49.8 (125)	38.6 (97)	8.0 (20)	2.4 (6)	1.2 (3)	0 (0)	0 (0)
Bicycle helmets look “cool”	4.0 (10)	8.0 (20)	12.7 (32)	38.6 (97)	19.5 (49)	13.5 (34)	3.6 (9)
Wearing a helmet when bicycling is dangerous	0.8 (2)	0 (0)	0.8 (2)	1.2 (3)	3.6 (9)	23.0 (58)	70.6 (178)
I would (or do) feel silly wearing a helmet when bicycling	5.6 (14)	11.5 (29)	25.0 (63)	9.5 (24)	6.7 (17)	19.4 (49)	22.2 (56)
Safety is not really an issue when riding a bicycle	0 (0)	0.8 (2)	3.6 (9)	2.8 (7)	11.5 (29)	34.5 (87)	46.8 (118)

SA= strongly agree; A=agree; AS=agree somewhat; N=neutral; DS=disagree somewhat; D=disagree, SD=strongly disagree

Table 2, cont.

Bicyclists' (n = 252) Responses to Survey Items (n-sizes in parentheses)

Statement	%SA	%A	%AS	%N	%DS	%D	%SD
It is unlikely that I would get in a bicycle accident	2.0 (5)	10.4 (26)	19.1 (48)	13.9 (35)	17.5 (44)	21.5 (54)	15.5 (39)
It is unlikely that I would be seriously injured in a bicycle accident	0.8 (2)	8.0 (20)	15.9 (40)	12.0 (30)	19.9 (50)	25.5 (64)	17.9 (45)
Bicycle helmets are inconvenient	3.2 (8)	13.9 (35)	33.1 (83)	9.2 (23)	13.9 (35)	17.1 (43)	9.6 (24)
It should be illegal to ride a bicycle on the road without a helmet	19.0 (48)	18.7 (47)	17.9 (45)	13.1 (33)	10.7 (27)	11.1 (28)	9.5 (24)
It is my choice whether or not I wear a helmet when bicycling	27.8 (70)	33.7 (85)	19.0 (48)	8.3 (21)	4.4 (11)	3.6 (9)	3.2 (8)
My own behavior in traffic does not influence my likelihood of crashing	0.8 (2)	3.2 (8)	2.8 (7)	3.6 (9)	11.5 (29)	30.2 (76)	48.0 (121)
I would be embarrassed to be seen wearing a bicycle helmet	0.4 (1)	5.6 (14)	13.1 (33)	10.8 (27)	10.8 (27)	34.3 (86)	25.1 (63)
Only people who are serious bicyclists should wear a helmet	0.8 (2)	3.2 (8)	5.6 (14)	5.2 (13)	13.5 (34)	36.7 (92)	35.1 (88)
I would want someone I care about to wear a helmet when s/he rides a bicycle	40.9 (103)	27.4 (69)	21.0 (53)	6.7 (17)	2.8 (7)	1.2 (3)	0 (0)
Bicycle accidents/crashes are not very common	0.4 (1)	5.6 (14)	13.1 (33)	16.3 (41)	19.1 (48)	29.5 (74)	15.9 (40)
If I owned a helmet, I would wear it when riding a bicycle	25.5 (64)	26.7 (67)	17.9 (45)	10.4 (26)	10.8 (27)	8.4 (21)	0.4 (1)

SA= strongly agree; A=agree; AS=agree somewhat; N=neutral; DS=disagree somewhat; D=disagree, SD=strongly disagree

Nonetheless, 70.1% (n = 176) of respondents reported they would wear a helmet when bicycling if they owned one, and 89.3% (n = 225) agreed they would want someone they care about to wear a helmet when bicycling.

*Self-reported helmet use.* Respondents were asked to indicate the number of times they wore a helmet in the last ten times they rode a bicycle. Only respondents who indicated they have ridden a bicycle at least once in the past year were included in these analyses (n = 235). Helmet use was recoded into four categories: 0%, 10-40%, 50-70%, 80-90%, and 100% helmet use. A Chi-Square analysis showed no significant difference in self-reported helmet use by gender,  $\chi^2(4) = 6.42, p = .17$ . A Chi-Square analysis did show a significant difference in self-reported helmet use between students and faculty/staff, however,  $\chi^2(4) = 36.7 (p < .001)$ , with faculty/staff reporting more use of bicycle helmets than students. Table 3 shows the frequencies of self-reported helmet use for the entire sample of cyclists, categorized by students or faculty/staff.

Table 3

Self-Reported Helmet Use for the Past Ten Times Riding a Bicycle (n-sizes in parentheses)

Affiliation	Percentage of Helmet Use				
	0	10-40%	50-70%	80-90%	100%
Students (n = 177)	49.2 (87)	13.6 (24)	12.4 (22)	9.0 (16)	15.8 (28)
Faculty/Staff (n = 58)	24.1 (14)	6.9 (4)	5.2 (3)	8.6 (5)	55.2 (32)
Total (n = 235)	43.0 (101)	11.9 (28)	10.6 (25)	8.9 (21)	25.5 (60)

*Perceived barriers to helmet use.* Respondents were given a list of potential barriers to helmet use and were asked to indicate all that applied to them. The barriers included: I do not own a helmet; I don't ride far or long enough to need a helmet; helmets are uncomfortable; helmets are inconvenient; I'm concerned I'll look stupid; I don't want to carry a helmet when I get to my destination; helmets obscure my vision; a helmet would mess up my hair; and a helmet would leave a red mark on my forehead. An "other" option was also included where the

participants could insert their own perceived barrier. However, when reviewing these responses (n=33), each could be categorized into the barriers defined in the survey.

A stepwise regression was performed to determine which perceived barriers accounted for self-reported helmet use. When performed for the student sub-sample (n = 173), “I do not own a helmet” entered the model first, accounting for 28.5% of the variance in self-reported helmet use. This was followed by “I don’t want to carry a helmet when I get to my destination”, which accounted for an additional 10.7% of the variance. “Helmets are uncomfortable” entered third, accounting for an additional 3% of the variance. Finally, “I don’t ride far or long enough to need a helmet” entered last, accounting for 2.3% of the variance, totaling 43.5% of the variance in self-reported helmet use accounted for by the regression model.

Another stepwise regression was performed to determine which perceived barriers accounted for self-reported helmet use among faculty and staff members (n = 56). “I do not own a helmet” entered the model first, accounting for 48.5% of the variance in self-reported helmet use. “It would mess up my hair” entered the model second, accounting for an additional 21.9% of the variance. “I don’t ride far or long enough to need a helmet” entered last, accounting for an additional 5.8% of the variance, totaling 76.2% of the variance in self-reported helmet use accounted for by the regression model.

### *Discussion*

The results of the pilot studies described above verified the researcher’s belief that bicycle helmet use on campus is a worthwhile target behavior for intervention. Preliminary Study 2 also showed helmet ownership to be an issue. Further, these results were very helpful in developing the change-agent training materials. It seems essential to convince change-agents the behavior they are promoting is important and their efforts would most likely be welcomed by the individuals targeted. Since many of the beliefs and attitudes reported in Pilot Study 2 were favorable regarding bicycle helmet use, change-agents should feel more comfortable and confident in approaching their target population. With the target behavior chosen, the next step was to choose an intervention process which would be relatively simple, brief, and effective for promoting bicycle-helmet use.



### Choosing an Intervention Task

In reviewing the literature on interventions to increase bicycle-helmet use, one study stood out as a potential model for the current study. Ludwig, Buchholz, and Clarke (2005) designed an intervention whereby change-agents approached peers on a university campus to talk to them about bicycle safety and ask them to sign a promise card to wear a helmet in exchange for a coupon for a free bicycle helmet.

Fifteen change-agents were successful in getting a total of 379 promise cards signed, 259 (68.3%) of which were then used to redeem a helmet at a local bicycle shop. In addition, behavior observations indicated a rise in helmet use on campus from 26.1% at baseline ( $n = 1,330$  observations) to 49.3% ( $n = 1,769$  observations) at the end of the five-week intervention period. It is important to note the intervention included a sizable social marketing campaign which may have boosted the effectiveness of the intervention.

The current study's intervention task was modeled after the change-agent approach and the request for commitment exemplified in Ludwig et al.'s research. This task was chosen for several reasons: 1) it involves change-agents interacting with peers; 2) it is a relatively simple; 3) it is based on empirically supported principles from social psychology; and 4) it was successful for a sample similar to the target population of the current study (Ludwig et al.'s study was completed at a midsized university in the southeastern U.S.). Given the success of the Ludwig et al. study, this final hypothesis is made:

**H17:** Overall helmet use as determined by behavioral observations will increase significantly from baseline to the end of the intervention phase.

## METHODOLOGY

### *Participants and Setting*

Participants were 82 undergraduates (54.9% female) enrolled in at least one psychology class at Virginia Tech with an age range of 18 to 22 ( $M = 19.53$ ,  $SD = 1.15$ ). A Chi-Square test revealed no significant difference in gender proportions among training conditions,  $X^2(4) = 5.01$ ,  $p = .29$ . First-year students made up the majority of the sample (48.8%;  $n = 40$ ), followed by second-year (24.4%;  $n = 20$ ), third-year (15.9%;  $n = 13$ ), fourth-year (8.5%;  $n = 7$ ), and fifth-year students (1.2%;  $n = 1$ ). In terms of ethnicity, 82.9% ( $n = 68$ ) reported they were Caucasian,

8.5% (n = 7) Asian, 6.1% (n = 5) African American, 1.2% (n = 1) “Other”, and 1.2% (n = 1) did not respond. This ethnic breakdown is generally representative of the university population. Thirty-three percent (n = 27) of participants reported being psychology majors.

Primary recruitment for this study was performed on Sona Systems, an electronic resource designed to enable undergraduates enrolled in psychology classes to participate in research projects for extra credit (see Appendix A for IRB approval letter). The study was also advertised during class lecture periods (see Appendix E for the recruitment materials). The study was described as an opportunity for participants to learn how to use social influence tactics to improve the safety of their peers riding bicycles on campus.

Participants recruited through Sona Systems were randomly assigned to one of two training groups: one in which participants were considered Individual change-agents (n = 27), or one in which participants were grouped together in Small Teams of four to five individuals (n = 25). A third group was formed by students enrolled in a class where the instructor offered extra credit for participation and allowed the training to occur during a class meeting time. This was announced in advance and students who were not interested in volunteering were allowed to skip this class period. Participants in this group were addressed as members of an existing Large Team (n = 30). Appendix F includes tables with demographic information based on training condition. The intervention task is described below, followed by a description of the study procedures (training and measures used).

### *Intervention Task*

*Helmet pledge/commitment.* Participants were trained as change-agents (see below) to complete the intervention task. The task involved approaching bicyclists on campus, briefly explaining the project and the importance of wearing a helmet while bicycling (backed with educational facts/statistics), and asking the bicyclist to sign a behavioral contract (“promise card”) indicating s/he would consistently wear a helmet for two months in exchange for a coupon which could be used to purchase a high-quality helmet at cost (\$7.50, compared to a retail cost of approximately \$20) from a local bicycle store.

Change-agent participants recorded information regarding their interactions with bicyclists in an intervention log, which included a script for interacting with bicyclists (see Appendix G). One log entry was made for each bicyclist approached, regardless if they were

willing to speak with the change-agent. The following information was recorded: a) date; b) location of intervention attempt; c) bicyclist gender; d) whether the bicyclist was wearing a helmet when approached; e) rejection (if the bicyclist ignored the change-agent or otherwise was not interested, this would be marked “yes” and data would no longer be collected on this bicyclist); f) whether the bicyclist reported owning a helmet (if not wearing one when approached); g) whether the bicyclist allowed the change-agent to attach a tag to his/her bicycle (see below); and finally, h) whether the bicyclist signed the promise card. The log also had a space for additional comments about the intervention to be recorded, and bicyclists had the opportunity to provide their email address if they were interested in participating in an online survey regarding the intervention process for entry into a cash raffle (discussed below).

*Bicycle tagging.* As mentioned above, all bicyclists who allowed a change-agent to speak to them (regardless of whether they sign the pledge) were asked if they would allow a colorful plastic tag (.75” x 9.75”) to be placed on the bottom of their seat (or somewhere else visible). They were told the tag would let other change-agents know they had already been spoken with so they would not be approached again. The tags were two different colors. Red tags indicated the individual did not sign the pledge, and green indicated they had. The different colors were used to gather that level of information during the unobtrusive bicycle-helmet behavioral observations performed on campus (see below).

### *Training and Measures*

A single hour-long training session was held for each group in a classroom setting. All three training sessions were essentially the same, with the exception of goal-setting (different for each condition, see below), the addition of a brief “team-building” exercise for the Small Team condition, and statements about the Large Team being a cohesive group representing their class and instructor.

Each training session began with a brief description of the study and activities, and participants read and signed an informed consent document (see Appendix H). Participants then completed a battery of measures which included a brief demographic questionnaire, a short version of the International Personality Item Pool (Goldberg et al., 2006; IPIP, 2006), the Social Influence Survey (Dula, Geller, & Lehman, 2006), and a brief goal-setting measure (see

Appendix I for the full study instrument). Each of these measures are described in more detail below.

*Demographic questionnaire.* The demographic questionnaire asked participants to report their gender, age, ethnicity, year in college, and major, as described above. It also asked questions relating to bicycle and helmet use and reasons for participating in the current study.

When asked how often they ride a bicycle, 11.1% (n = 9) reported “never”, 45.1% (n = 37) reported “rarely”, 29.3% (n = 24) reported “seasonally”, 3.7% (n = 3) reported “monthly”, 6.1% (n = 5) reported “weekly”, 3.7% (n = 3) reported “daily”, and 1.2% (n = 1) did not respond. Seventy percent (n=57) of participants reported riding a bicycle in the previous 12 months.

Of those reporting to ride a bicycle in the past 12 months (n = 57), 38.6% (n = 22) reported “never” wearing a helmet, 35.1% (n = 20) reported wearing a helmet “rarely”, 15.8% (n = 9) reported “often”, and 10.5% (n = 6) reported “always”.

Participants were also asked to indicate their reasons for participating in the study, which were provided in a “circle all that apply” format, with an open-ended option to provide “other” responses. A majority of respondents (93.8%, n = 76) indicated they were participating for credit, 33.3% (n = 27) because they felt it “sounded interesting”, 24.7% (n = 20) because they felt it “sounded easy”, 21% (n = 17) because they “wanted to make a difference” and 11.1% (n = 3) indicated an “other”. Of the three open-ended comments, two indicated specific interest in bicycle safety, and one indicated s/he wanted to help the experimenter.

*International Personality Item Pool (IPIP).* A short version (50-items) of the IPIP was used to assess the Big-Five personality traits of Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism. Each of the traits was measured by ten items set to a five-point Likert scale ranging from “Very Inaccurate” to “Very Accurate”. Reliability analyses indicated all five of the personality scales had alpha levels of .85 or higher, with the exception of Openness, which had an alpha level of .77 (see Table 4 for descriptive statistics and alpha levels using the full sample).

The full sample of 82 individuals completed all the items necessary to calculate composite scores for the five personality traits. Each composite score is the sum of the responses to ten items per trait (minimum score of 10, maximum 50), using reverse scoring when necessary. The instrument in Appendix I indicates which items were reverse scored. Thus, the higher the composite score, the stronger the trait.

The mean Agreeableness score was 41.8 ( $SD = 5.56$ ), with a range of 26 to 50. The mean Conscientiousness score was 36.6 ( $SD = 6.33$ ) with a range of 23 to 50. The mean Extraversion score was 37.7 ( $SD = 6.66$ ) with a range of 19 to 50. The Neuroticism scale had a mean of 25.8 ( $SD = 7.54$ ) with a range of 11 to 49. Finally, the Openness scale had a mean of 37.6 ( $SD = 4.86$ ) with a range of 27 to 50. While there were no floor effects for these scales, all but Neuroticism had a ceiling effect where the maximum score of 50 was obtained for some participants. Specifically, 3.7% ( $n = 3$ ) scored the highest possible for Agreeableness, 1.2% ( $n = 1$ ) for Conscientiousness, 2.4% ( $n = 2$ ) for Extraversion, and 1.2% ( $n = 1$ ) for Openness.

Table 4

Descriptive Statistics and Alpha Levels for Personality Scales (N = 82)

Variables	M	SD	Range	$\alpha$
Agreeableness (10 items)	41.83	5.56	26-50	.854
Conscientiousness (10 items)	36.55	6.33	23-50	.849
Extraversion (10 items)	37.73	6.66	19-50	.887
Neuroticism (10 items)	25.76	7.55	11-49	.894
Openness (10 items)	37.62	4.86	27-50	.774

One-way ANOVAs were performed to compare personality scale means between training conditions, but there were no significant findings for any of the five traits (see Tables 5 and 6).

Table 5

Means and Standard Deviations for Three Training Conditions and Personality

Variable	Individual		Small Team		Large Team	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
Agreeableness	41.56	5.81	41.96	4.65	41.97	6.17
Conscientiousness	35.59	6.05	37.16	6.64	46.90	6.43
Extraversion	38.52	5.94	37.64	6.92	37.10	7.18
Neuroticism	27.96	7.31	23.44	5.82	25.70	8.60
Openness	37.30	4.98	38.32	4.57	37.33	5.07

Table 6

Results of ANOVAs for Comparisons of Training Conditions on Personality Variables

	SS	df	MS	F	Sig.
<b>Agreeableness</b>					
Between Groups	3.02	2	1.51	.05	.95
Within Groups	2500.59	79	31.65		
<b>Conscientiousness</b>					
Between Groups	37.73	2	18.86	.46	.63
Within Groups	3210.58	79	40.64		
<b>Extraversion</b>					
Between Groups	28.90	2	14.45	.32	.73
Within Groups	3565.20	79	45.13		
<b>Neuroticism</b>					
Between Groups	265.70	2	132.85	2.41	.10
Within Groups	4347.42	79	55.03		
<b>Openness</b>					
Between Groups	17.54	2	8.77	.37	.69
Within Groups	1891.74	79	23.95		

*Social Influence Survey (SIS)*. This 42-item survey measures individuals' susceptibility to Cialdini's (2001) social influence principles of Consistency, Scarcity, Authority, Conformity, Liking, and Reciprocity. Each of the six influence dimensions were measured by seven items set to a five-point Likert scale ranging from "Very Inaccurate" to "Very Accurate". Reliability analyses of the social influence scales showed mixed results. The Conformity and Scarcity scales had unacceptable alpha levels (.58 and .56, respectively), and were therefore excluded from any further analyses. These alpha levels are consistent with preliminary studies testing the SIS (Dula et al., 2006). The Reciprocity scale had an alpha level of .695, which rounds to the generally accepted level of .70 (Pedhazur & Schmelkin, 1991), and was therefore included in further analyses below. The remaining social influence scales had acceptable alpha levels

greater than .70 (see Table 7 for descriptive statistics and alpha levels for the social influence scales using the full sample).

The full sample of 82 individuals completed all the items necessary to calculate composite scores for the six social influence scales. Each composite score is the sum of the responses to seven items per trait (minimum score of 7, maximum 35), using reverse scoring when necessary. Thus, the higher the composite score, the stronger the susceptibility to that particular facet of social influence.

The mean Authority score was 23.6 ( $SD = 5.08$ ) with a range of 12 to 34. The Consistency scale had a mean score of 29.7 ( $SD = 3.4$ ) with a range of 23 to 35. The Ingratiation scale mean was 22.5 ( $SD = 4.75$ ) with a range of 10 to 33. The mean Reciprocity score was 29.8 ( $SD = 3.24$ ) with a range of 23 to 35. Two of the scales (Consistency and Reciprocity) had ceiling effects. Eleven percent ( $n = 9$ ) scored the highest possible on Consistency, while 9.8% ( $n = 8$ ) scored the highest possible for Reciprocity.

Table 7

Descriptive Statistics and Alpha Levels for Social Influence Scales (N=82)

Variables	M	SD	Range	$\alpha$
Authority (7 items)	23.62	5.08	12-34	.807
Conformity (7 items)	15.57	3.45	9-23	.578
Consistency (7 items)	29.68	3.40	23-35	.804
Ingratiation (7 items)	22.45	4.75	10-33	.789
Reciprocity (7 items)	29.77	3.24	23-35	.695
Scarcity (7 items)	20.28	3.59	12-29	.555

One-way ANOVAs revealed no significant differences in any of the four social influence scale mean scores between training conditions (see Tables 8 and 9).

Table 8

Means and Standard Deviations for Three Training Conditions and Social Influence Variables

Variable	Individual		Small Team		Large Team	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
Authority	22.85	4.83	24.24	5.64	23.80	4.88
Consistency	29.22	3.07	30.08	3.11	29.77	3.93
Ingratiation	22.37	5.28	22.16	4.03	22.77	4.94
Reciprocity	29.41	3.64	30.08	2.93	29.83	3.20

Table 9

Results of ANOVAs for Comparisons of Training Conditions on Social Influence Variables

	SS	df	MS	F	Sig.
<u>Authority</u>					
Between Groups	26.51	2	13.26	.51	.60
Within Groups	2060.77	79	26.09		
<u>Consistency</u>					
Between Groups	9.88	2	4.94	.42	.66
Within Groups	923.87	79	11.70		
<u>Ingratiation</u>					
Between Groups	5.28	2	2.64	.12	.89
Within Groups	1821.02	79	23.05		
<u>Reciprocity</u>					
Between Groups	6.07	2	3.04	.28	.75
Within Groups	846.53	79	10.72		



Following completion of the questionnaire battery, the experimenter delivered an educational, instructional, and open-discussion based PowerPoint training presentation which included the following information: 1) national and local statistics on bicycling-related head injuries; 2) statistics on helmet effectiveness; 3) selected results from the pilot studies (discussed above); 4) rationale for the intervention approach (based on social influence, effective at a similar school); 5) tips for approaching and speaking with bicyclists about the study, along with open discussion to get participant input; 6) step-by-step instructions on completing the change-agent logs; and 7) a discussion of goal setting with completion of a goal-setting measure (see Appendix J for the training presentation).

*Goal-setting.* Following the training presentation, participants were asked to indicate (on the last page of the questionnaire battery) a personal goal for how many bicyclists they would approach for intervention. This was prefaced with a statement by the experimenter that approaching ten bicyclists should be used as an anchor point when deciding on a personal goal, and that the personal goal should reflect a commitment to the experimenter. The goal-setting measure was presented as a categorical variable with the following choices: Less than Five; At Least Five; Exactly Ten; At Least Ten; and More than Ten. Those who chose “Less than Five” or “More than Ten” were asked to indicate a specific number.

The goal-setting task varied by training condition (see Table 10 for a comparison of training conditions). In the Individual condition, participants recorded their personal goal and did not share it with others. In the Small Team condition, small teams were formed (ranging from 4 to 5 participants each), and a brief team-building/ice-breaking task was completed (see Appendix K). This task included introducing themselves to each other; deciding on a team name; finding something about themselves that they all had in common (besides going to Virginia Tech or having the same major); and setting a team goal for how many bicyclists they would collectively approach for intervention. They were required to share their personal goals within their team when deciding on their collective goal. Each team then announced their team name, what they had in common, and their team goal to the larger training group. Their individual goals were only shared within the small-group setting.

The Large Team group was told they were to consider themselves a large team, and they would be representing their class. Participants in this condition were asked to set a team goal, keeping in mind if each person met the anchor goal of ten approaches, their team goal would be

300. After some discussion (some individuals wanted a higher team goal), the Large Team group decided to make 300 approaches their team goal. Each person was then asked to stand up and announce their personal goal to their classmates and the experimenter.

Table 10

Comparison of Experimental Conditions

	Individuals	Small Teams	Large Team
<u>Description</u>	27 individuals trained as independent change-agents	25 individuals divided in six teams	30 individuals trained as a large team
<u>Training &amp; Goal-Setting</u>	Standard training presentation Privately set personal goal No team goal	Standard training presentation Publicly set personal goal Team goal set in addition to personal goal	Standard training presentation Publicly set personal goal Team goal set in addition to personal goal

*Bicyclist Follow-Up Survey*

An on-line follow-up study was conducted with bicyclists who provided their email address when approached by change-agents during the present study. These students were told of the follow-up survey regardless of whether they chose to sign the helmet pledge, and were offered the incentive of being entered in a \$20 cash raffle if they decided to participate in the survey. The survey, located in Appendix L, asked multiple-choice and open-ended questions regarding bicyclists' impressions of the intervention, whether they believed it influenced them to wear a helmet, and why they did or did not obtain the helmet coupon and purchase a helmet.

Independent and Dependent Variables

*Independent Variables*

*Training condition.* Involvement in one of three training/commitment conditions: Individual, Small Team, or Large Team.

*Individual scores on IPIP scales.* Individual scores on the FFM personality traits as measured by the IPIP.

*Individual scores on SIS scales.* The focus was on the Consistency scale of the SIS, though the other scales in the SIS were considered in supplementary analyses.

*Goal attainment.* A dichotomous variable was created to represent whether participants attained their personal goal of number of targets approached.

#### *Dependent Variables*

*Goal attainment.* The dichotomous variable of goal attainment (yes vs. no) was considered the main dependent variable in the analyses testing commitment strategies.

*Number of targets approached.* The total number of targets approached were tallied using the change-agent logs. This is independent of whether the target chose to listen to the intervention message or sign the promise card. This measure is considered synonymous with the effort change-agents put forth.

*Rate of obtaining signed promise cards.* This was the percentage of targets approached who agreed to sign the promise card as evidenced by the change-agent logs.

## RESULTS

### *Descriptive Statistics of Dependent Variables and Goal-Setting*

*Number of targets approached.* A total of 609 bicyclist targets were approached by a change-agent. The mean number of approaches per change-agent ( $n = 82$ ) was 7.43 ( $SD = 6.35$ ); the median was 7; and the mode was 0, ranging from 0 to 32. Of those who approached at least one target ( $n = 60$ ), the mean number of targets approached was 10.2 ( $SD = 5.95$ ); the median was 10; and the mode was 10, ranging from 1 to 32.

*Number of promise cards signed.* Of the 609 targets approached, 58% ( $n = 353$ ) signed the promise card to wear a helmet. The mean number of signed promise cards obtained per change-agent ( $n = 60$ ) was 6 ( $SD = 3.8$ ); the median was 5; and the mode was 5, with a range of 0 to 20.

*Rate of obtaining signed promise cards.* Change-agents' rate of obtaining signed pledge-cards was calculated by the proportion of targets approached who signed the promise card. The average rate of obtaining signed promise cards was 58.9% ( $SD = 24.6$ ), and the mode was 50%.

*Goal-setting and completion.* A majority of participants (51.2%,  $n = 42$ ) indicated their goal was to approach at least ten targets. Thirty percent ( $n = 25$ ) of participants indicated their goal was to approach more than ten targets. Eleven percent ( $n = 9$ ) indicated their goal was to meet the anchor goal of approaching exactly ten targets, while 7.3% ( $n = 6$ ) of participants indicated their goal was to approach at least five targets. No participants set a goal of approaching less than 5 targets. There was no significant difference in goal setting between training conditions,  $X^2(6) = 11.15, p = .08$  (Table 11).

Table 11

Prevalence (%) of Goal Selection Among Training Conditions

Goal Selection	Training Condition			$X^2(6)$	p
	<u>Individual</u>	<u>Small Team</u>	<u>Large Team</u>		
	( $n = 27$ )	( $n = 25$ )	( $n = 30$ )		
At Least 5	11.1	8.0	3.3	11.15	.08
Exactly 10	11.1	4.0	16.7		
At Least 10	33.3	52.0	66.7		
More than 10	44.4	36.0	13.3		

Thirty-three percent ( $n = 27$ ) of the participants met their goal of total targets approached. Chi-Square analysis revealed no significant difference in goal completion between training conditions,  $X^2(2) = .90, p = .64$  (Table 12).

Table 12

Prevalence (%) of Goal Attainment Among Training Conditions

Goal Status	Training Condition			$X^2(2)$	p
	<u>Individual</u>	<u>Small Team</u>	<u>Large Team</u>		
	( $n = 27$ )	( $n = 25$ )	( $n = 30$ )		
Goal Met	25.9	36.0	36.7	.90	.639
Goal Not Met	74.1	64.0	63.3		

A stepwise regression analyses was performed to examine the relation of the five personality traits to personal goal set (Table 13). Only Conscientiousness entered the model, accounting for 9% of the variance in goal set,  $p < .01$ .

Table 13

Stepwise Regression for Personality Traits Predicting Personal Goal Set

Variable	<u>B</u>	<u>SEB</u>	<u>β</u>	<u>t</u>	<u>p</u>
1. Conscientiousness	.039	.014	.295	2.76	.007

$R^2 = .087$ ;  $p = .007$

A stepwise regression analyses was performed to examine the relation of the four social influence variables to personal goal set (Table 14). Only Authority entered the model, accounting for 13% of the variance in goal set,  $p < .01$ .

Table 14

Stepwise Regression for Social Influence Variables Predicting Personal Goal Set

Variable	<u>B</u>	<u>SEB</u>	<u>β</u>	<u>t</u>	<u>p</u>
1. Authority	.060	.017	.358	3.43	.001

Note:  $R^2 = .128$ ;  $p = .001$

### *Hypothesis Testing*

**H1:** *The proportion of change-agents who met their goal will be greater for those who made a public commitment versus those who made a private commitment.*

The Small and Large Team conditions were combined into a single variable (public commitment). A Chi-Square analysis (see Table 15) showed no significant difference in goal attainment between change-agents in the public versus private commitment conditions,  $X^2(1) = .89$ ,  $p = .35$ .

Table 15

Prevalence (%) of Personal Goals Met and Not Met Among Public vs. Private Commitment Conditions

	Conditions		$X^2(1)$	p
	<u>Public (n = 55)</u>	<u>Private (n = 27)</u>		
Goal Met	36.4	25.9	.89	.35
Goal Not Met	63.6	74.1		

*H2: The proportion of change-agents who met their goal will be greater for those who made a public commitment to a small group versus those who made a public commitment to a large group.*

A Chi-Square analysis (Table 16) showed no significant difference in goal attainment between change-agents in the Small Team and Large Team conditions,  $X^2(1) = .00, p = .96$ .

Table 16

Prevalence (%) of Personal Goals Met and Not Met Among Small vs. Large Team Conditions

	Conditions		$X^2(1)$	p
	<u>Small (n = 25)</u>	<u>Large (n = 30)</u>		
Goal Met	36.0	36.7	.003	.96
Goal Not Met	64.0	63.3		

*H3: The proportion of change-agents who met their goal will be greater for those in the Individual condition versus those in the Large Team condition.*

A Chi-Square analysis (Table 17) showed no significant difference in goal attainment between change-agents in the Individual versus Large Team conditions,  $X^2(1) = .76, p = .38$ .

Table 17

Prevalence (%) of Personal Goals Met and Not Met Among Individual vs. Large TeamConditions

	Conditions		$X^2$ (1)	p
	<u>Individual (n = 27)</u>	<u>Large (n = 30)</u>		
Goal Met	25.9	36.7	.76	.38
Goal Not Met	74.1	63.3		

**H4:** *The mean Consistency score will be greater for those change-agents who met their personal goal versus those who do not meet their goal.*

An independent samples t-test showed no significant difference in mean Consistency scores when compared by change-agent's goal attainment status (see Table 18).

Table 18

Mean Consistency Scores by Goal Attainment Status

Variables	M	SD	df	t =	p =
Consistency					
Met Goal (n = 27)	30.0	3.6	80	-.59	.56
Did Not Meet Goal (n = 55)	29.5	3.3			

**H5:** Personality as measured by the FFM will be significantly related to the total number of bicyclists approached.

A linear regression was performed to see if the FFM would predict a significant portion of the variance in the total number of bicyclists approached. No significant findings were revealed (see Tables 19 and 20).

Table 19

ANOVA Results for Big Five Personality Traits Predicting Number of BicyclistsApproached

	<u>Sum of Squares</u>	<u>df</u>	<u>Mean Square</u>	<u>F</u>	<u>Sig.</u>
Regression	328.56	5	65.71	1.70	.15
Residual	2935.51	76	38.63		
Total	3264.06	81			

Predictors: (Constant), Openness, Extraversion, Neuroticism, Agreeableness, Conscientiousness

Table 20

Coefficients for Big Five Personality Traits Predicting Number of BicyclistsApproached

<u>Variable</u>	<u>B</u>	<u>SEB</u>	<u><math>\beta</math></u>	<u>t</u>	<u>p</u>
(Constant)	-7.63	8.01		-.95	.34
Agreeableness	.22	.15	.19	1.46	.15
Conscientiousness	.17	.14	.17	1.25	.22
Extraversion	.08	.11	.08	.72	.47
Neuroticism	.17	.10	.20	1.68	.10
Openness	-.20	.16	-.15	-.129	.20

Note:  $R^2 = .10$ ;  $p = .15$

**H6:** Personality as measured by the FFM will be significantly related to the rate of obtaining signed promise cards from bicyclists.

A linear regression was performed to see if the FFM would predict a significant portion of the variance in rate of signed promise cards obtained from bicyclists. This model predicted 19% of the variance in rate of obtaining signed promise cards, with Neuroticism and Openness having significant coefficients (see Tables 21 and 22).



Table 21

ANOVA Results for Big Five Personality Traits Predicting the Rate of Obtaining Signed Promise Cards from Bicyclists

	<u>Sum of Squares</u>	<u>df</u>	<u>Mean Square</u>	<u>F</u>	<u>Sig.</u>
Regression	6827.65	5	1365.53	2.57	.04
Residual	28752.62	54	532.46		
Total	35580.27	59			

Predictors: (Constant), Openness, Extraversion, Neuroticism, Agreeableness, Conscientiousness

Table 22

Coefficients for Big Five Personality Traits Predicting the Rate of Obtaining Signed Promise Cards from Bicyclists

Variable	<u>B</u>	<u>SEB</u>	<u><math>\beta</math></u>	<u>t</u>	<u>p</u>
(Constant)	2.14	33.74		.06	.95
Agreeableness	.86	.69	.19	1.24	.22
Conscientiousness	.70	.58	.19	1.20	.24
Extraversion	.65	.48	.18	1.37	.18
Neuroticism	1.29	.46	.41	2.83	.01
Openness	-1.68	.76	-.32	-2.21	.03

Note:  $R^2 = .19$ ;  $p = .04$

**H7:** Personality scores will be significantly different for change-agents who meet their goal (and thus fulfill their commitment) versus those who do not meet their goal.

Independent samples t-tests were performed to compare the personality scores for those who met their personal goal versus those who did not. No significant differences were found (See Table 23).

Table 23

Mean Personality Scores by Goal Attainment Status

Variables	M	SD	df	t =	p =
Agreeableness					
Met Goal (n = 27)	42.3	5.7	80	-.53	.60
Did Not Meet Goal (n = 55)	41.6	5.5			
Conscientiousness					
Met Goal (n = 27)	36.3	6.8	80	.25	.80
Did Not Meet Goal (n = 55)	36.7	6.1			
Extraversion					
Met Goal (n = 27)	37.7	7.4	80	.06	.95
Did Not Meet Goal (n = 55)	37.8	6.4			
Neuroticism					
Met Goal (n = 27)	26.9	8.9	80	-.92	.36
Did Not Meet Goal (n = 55)	25.2	6.8			
Openness					
Met Goal (n = 27)	36.93	5.87	80	.91	.37
Did Not Meet Goal (n = 55)	37.96	4.30			

***Exploratory Analyses***

Several linear regression analyses were performed to determine how much of the variance in the number of targets approached could be predicted by personality traits, social influence scores, and a combination of the two along with other predictor variables (e.g., size of goal). These results are described below.

When testing the five personality traits in a stepwise regression model on the criterion variable of number of targets approached, only Agreeableness entered the model, accounting for 5% of the variance in the total number of targets approached,  $p < .05$  (see Table 24).

Table 24

Stepwise Regression for Big Five Personality Predicting Total Number of Targets

<u>Approached</u>					
Variable	<u>B</u>	<u>SEB</u>	<u><math>\beta</math></u>	<u>t</u>	<u>p</u>
1. Agreeableness	.254	.124	.223	2.04	.04

Note:  $R^2 = .050$ ;  $p = .04$

A stepwise regression analysis was also performed to determine if the four social influence scores could explain a significant amount of variance in the number of targets approached. Only Ingratiation entered the model, accounting for 19% of the variance in the total number of targets approached,  $p < .001$  (see Table 25).

Table 25

Stepwise Regression for Social Influence Variables Predicting Total Number of Targets

<u>Approached</u>					
Variable	<u>B</u>	<u>SEB</u>	<u><math>\beta</math></u>	<u>t</u>	<u>p</u>
1. Ingratiation	.585	.134	.438	4.36	.000

Note:  $R^2 = .192$ ;  $p = .00$

A final stepwise regression analysis was performed whereby the five personality traits, four social influence scores, size of goal, gender, and training condition were possible predictors of the number of targets approached. Ingratiation entered the model first (Table 27), accounting for 19.2% of the variance in number of targets approached,  $p < .01$ . The personal goal set variable entered the model next, accounting for an additional 4% of the variance in number of targets approached for a total of 23.2% of the variance explained,  $p < .05$ . No other variables predicted a significant portion of the variance in the criterion.

Table 26

Stepwise Regression for Personality Traits, Social Influence Variables, Goal, Gender, and Training Condition in Predicting Total Number of Targets Approached

Variable	<u>B</u>	<u>SEB</u>	<u>β</u>	<u>t</u>	<u>p</u>
1. Ingratiation	.585	.134	.438	4.36	.000
2. Ingratiation	.557	.133	.417	4.20	.000
Goal Set	1.51	.745	.201	2.03	.046

Note:  $R^2 = .232$  for the model;  $p = .046$

*Intervention Effectiveness in Increasing Helmet Use*

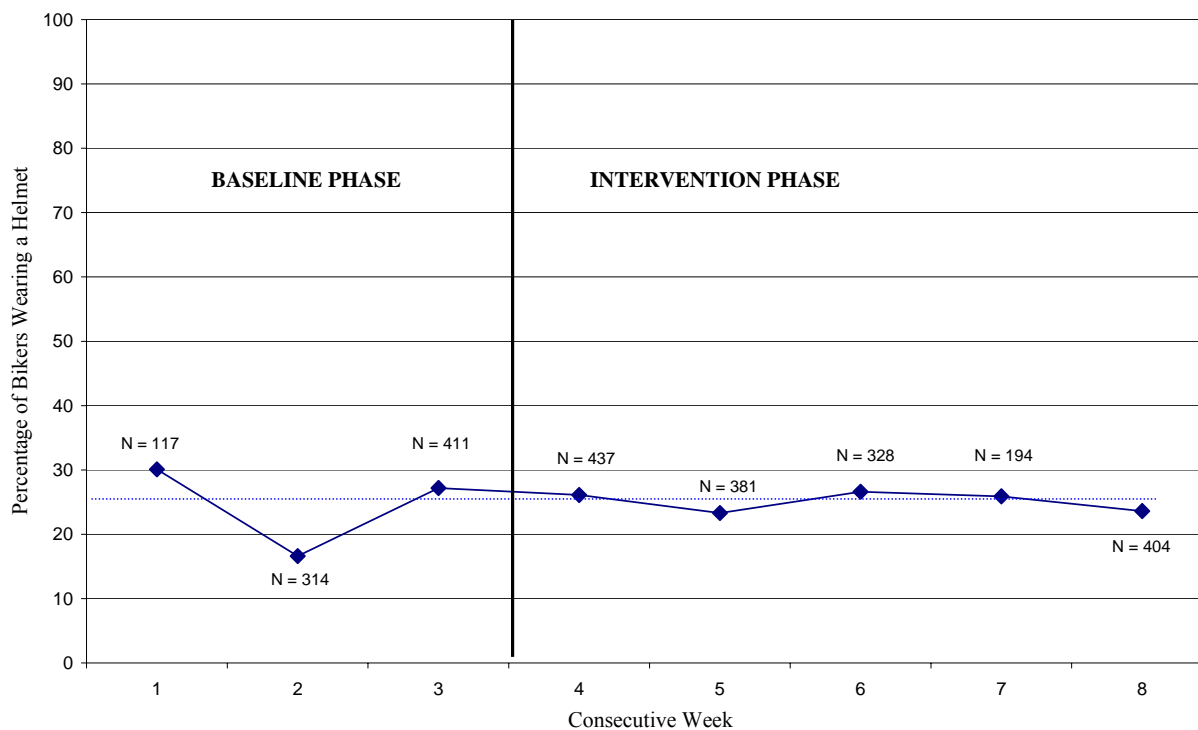
During the baseline condition, 1,248 observations of helmet use were recorded (see Appendix M for the observation checklist and map of observation locations). Of these, 24% of bicyclists ( $n = 300$ ) were wearing a helmet when observed. Interobserver agreement was 98.9% ( $n = 816$ ). During the intervention phase (following the training sessions), 1,259 observations were recorded. Of these, 26.3% ( $n = 331$ ) bicyclists were wearing helmets when observed (see Figure 2). Interobserver agreement was 98% ( $n = 629$ ). A t-test showed no significant difference between mean helmet use during baseline and intervention phases (see Table 27 and Figure 2).

Table 27

Average Helmet Use by Project Phase

Variables	M	SD	t (1, 2505) =	p =
Helmet Use				
Baseline ( $n = 1,248$ )	24.0	4.4	-1.52	.129
Intervention ( $n = 1,259$ )	26.3	4.6		

Figure 2. Percentage of Bikers Observed Wearing a Helmet - Spring 2006



*Bicycle tags.* Of the 1,259 intervention phase observations, only 12 instances of observing an intervention tag on a bicycle were recorded. Three of these observations were individuals who had the red tag indicating they chose not to sign the promise to wear a helmet. Of these, 33.3% ( $n = 1$ ) was wearing a helmet when observed. The other 9 bicyclists were observed with a green tag on their bicycle, indicating they had signed the promise to wear a helmet. However, only 66.6% of these individuals ( $n = 6$ ) were wearing a helmet when observed.

*Helmet purchases.* As noted above, 353 bicyclists signed the promise card and thus received a coupon to obtain a bicycle helmet at cost from a local bicycle store. Only 4% ( $n = 14$ ) coupons were used to purchase a helmet. Each coupon was labeled with the change-agent participant number and a code to link the coupon back to the bicyclist information recorded in the intervention log. Coupons from seven change-agents were used to purchase a helmet. Five of the coupons used came from a single change-agent. Another change-agent had three of his/her coupons redeemed, one had two coupons redeemed, and four change-agents had a single coupon redeemed.

*Follow-up survey.* Of the 609 bicyclists approached for this study, 103 (16.9%) provided their email address to be included in recruitment for the follow-up survey. These individuals were sent an e-mail during the Summer of 2006 introducing the survey and providing a link to website where it could be completed. The response rate was 25.2% (n = 26).

Overall, the project was well received by those who completed the survey. Sixty-five percent (n = 17) reported they thought the study was “a great idea,” 27% (n = 7) thought it was “an okay idea” and 8% (n = 2) chose the “neutral” option rather than the negative response options. Sixty-two percent (n = 16) of respondents reported they thought the change-agent who spoke with them handled the situation “very” well, 35% (n = 9) reported “somewhat well,” and 4% (n = 1) chose the “neutral” option. Sixty-five percent (n = 17) said the intervention made an impact on their decision of whether to wear a helmet.

Eighty-five percent (n = 22) of the respondents reported they signed the helmet pledge, yet only 23% (n = 6) of these 22 individuals went to the store to claim a helmet. When further probed about why they signed the promise (or chose not to), most of those who responded replied along the lines of “I wanted to be more safe” or “it sounded like a good idea”. Only one respondent replied to this probe in an obviously different manner, offering the response of “I have a hard time saying ‘no’”.

When probed about why they did not go to the store to pick up a helmet, 31% (n = 8) replied they did not go because they already owned a helmet, 39% (n = 10) replied they forgot or did not have time before leaving for the summer, 19% (n = 5) said they did go to get a helmet, and one individual said they thought it was just a ploy to gain business for the bike shop. Finally, those who signed the promise were asked what percentage of the time they wore a helmet after signed the pledge. Fifty-nine percent (n = 13) of the 22 individuals who signed the promise reported keeping their commitment to wearing a helmet 100% of the time. The remaining nine individuals reported 75% of the time or greater, with the most common response being 95% of the time.

## DISCUSSION

### *Training Conditions and Consistency*

The first three hypotheses proposed in this study focused on differences in training conditions, particularly the aspects of the commitment tactics employed, and their relative effects

on the dependent variable of goal attainment. Three conditions were developed to manipulate the manner in which participants made a commitment; a) in private, b) in public in a small group setting, and c) in public in a large group setting. Unfortunately, the goal setting aspect of the study presented a confounding variable. Individuals could set different goals, which make the results questionable. This limitation should be considered when interpreting the goal attainment analyses.

Analyses indicated no significant differences in goal attainment between the commitment conditions, and no significant difference between the private commitment and combined public commitment conditions. Therefore, none of the group-level hypotheses were supported. However, approximately 10% more of those in the public, group commitment conditions met their goal when compared to those in the individual, private commitment condition. While this is an interesting finding, one can not determine whether this difference is due to making a public commitment or making a group commitment given the manner in which the conditions were set up. Having a group where one makes an individual, public commitment (but no group commitment) would allow this comparison to be made.

It may be the case the conditions were not fundamentally dissimilar enough for a statistically significant effect to be found between conditions. Considering participants were anonymous, no follow-up was conducted and members of the Small Team and Large Team conditions received no public feedback regarding each person's performance. Each participant was essentially only held to their commitment to themselves. In other words, there was no accountability system to ensure the commitments were held. In the studies cited above (e.g., Pallak & Cummings, 1976; Pallak, Cook, & Sullivan, 1980; Shippee & Gregory, 1982), "public" commitments entailed the threat of participants' names being displayed publicly with the results of the study.

Therefore, it is believed the anonymity of participants and the lack of feedback in this study were limitations. Having participants commit to a behavior when there were no social consequences (e.g., appearing inconsistent to others) seems to have negated the impact of the team commitment conditions. In the two team conditions, sharing one's personal goal with others made that aspect of the study "public," but there was no threat to appearing inconsistent in front of others since they knew their actual performance would not be publicized. This seems to be the crucial element to the "private" versus "public" commitment comparison. Perhaps sharing

one's commitment with others made the commitment more salient to the individual, but it was not a powerful enough manipulation to influence one's subsequent performance. Again, if participants in any of the three conditions were inconsistent in their commitment and performance, they would be the only one to know.

This may also explain why a significant difference was not found among Consistency scores between those who met their personal goal and those who did not. Perhaps the Consistency scale measures a need to appear consistent to others as opposed to within oneself.

Another possibility for why no differences in goal attainment were found between conditions may have been small sample sizes. The number of participants in each condition may not have been large enough for any significant differences to be found. For example, 25.9% of change-agents in the private commitment condition ( $n = 27$ ) met their goal, thus abiding by their commitment, compared to 36.4% of those who made a public commitment ( $n = 55$ ). This is a difference of just over 10% in goal attainment, which seems notable, yet is not statistically significant. Future research should involve a larger sample and the inclusion of an accountability system to explore differences in private versus public commitment on performance.

### *Personality Traits*

The five traits which make up the FFM of personality were tested to see if they are related to change-agent behavior; specifically, the number of bicyclists change-agents approached, the rate of obtaining signed promise cards from bicyclists, and whether one met their personal goal.

Personality was not useful for predicting the number of bicyclists approached. It may be the case the sample size for this study was too small to find a significant effect. Or, it is also possible there was self-selection bias in that participants who volunteered for this particular study were essentially similar in these personality traits. Thus, restricted range on the personality scores may have reduced the magnitude of the relation between these variables and the criterion.

Another possibility is the IPIP may be too broad of a measure for predicting this particular behavior. A measure which is designed to measure the Big Five personality traits in the specific situation of intervening on another person may have shown stronger results. While entering the full FFM into a regression analysis did not significantly predict the number of bicyclists approached, Agreeableness did emerge as predicting 5% of the variance in this



criterion when a stepwise procedure was performed. This means that of the five personality traits associated with the FFM, Agreeableness surpasses the others in predicting the amount of effort change-agents put into the intervention process. However, this result may have been found by chance, and the percentage of variance accounted for is not very large.

Personality was useful for predicting variance in the rate of obtaining signed promise cards from bicyclists. Specifically, Neuroticism and Openness emerged as being significantly related to this outcome variable. The relation of Neuroticism to the rate of obtaining signed promise cards was positive, suggesting individuals who scored relatively high on Neuroticism tended to be more successful in persuading bicyclists to sign the promise card. One possibility for this finding is that highly Neurotic individuals may have been more successful in expressing concern or worry for the bicyclists' safety, thus influencing them to make the commitment to be preventive towards head injury prevention (Geller & Wiegand, 2005).

Openness was negatively associated with the rate of obtaining signed promise cards, suggesting those who score lower on Openness may be more persuasive in this type of situation. Perhaps individuals who score highly on Openness were more creative in attempting various approaches with bicyclists, and perhaps some of these approaches were not successful. It may be the case that being persistent with one's approach leads to a higher success rate, especially if one improves their confidence level with a single approach. Doing so could make the person more credible to their targets, thus increasing their persuasive ability. Of course, this is all quite speculative, and further research will need to be conducted to explore these possibilities.

No significant differences in personality scores were found between those who attained their goals and those who did not. However, as with the situation-level hypotheses explained above, goal-setting was a confounding variable which makes the comparison of those who met their goal versus those who did not very problematic. Having an equal goal for each participant would have made these comparisons much more valid, and stronger conclusions could be drawn.

### *Social Influence Variables*

Four aspects of social influence (Authority, Consistency, Ingratiation, and Reciprocity) were examined in exploratory analyses to see if they could account for variance in how many bicyclists were approached by individual change-agents. Ingratiation emerged as the most relevant social influence variable when only the social influence variables were included in a

stepwise regression model to predict the total number of bicyclists approached. In addition, when the personality variables, social influence variables, commitment condition, gender, and goal variables were included in a stepwise regression with the same dependent variable, Ingratiation was the first variable to enter the model, explaining the most variance in number of targets approached.

Ingratiation as a social influence tactic is based on the notion that people are more likely to comply with the requests of others they find likeable (Cialdini, 2001). For example, research has shown people tend to like others who compliment or flatter them (Drachman, DeCarufel, & Insko, 1978; Gordon, 1996).

Though it was not intentionally done to increase compliance with the experimenter's request of approaching bicyclists, in hindsight it seems ingratiation was part of the training session in all three conditions. The experimenter expressed appreciation for the participants volunteering, and labeled them as helpful, caring individuals several times during the training sessions. Perhaps these positive comments appealed to those individuals who scored highly on the Ingratiation measure and influenced their amount of participation.

#### *Lack of Intervention Effectiveness for Increasing Helmet Use on Campus*

As stated above, the intervention carried out by the change-agents for this study was based on a similar intervention by Ludwig et al. (2005). This prior study involved only 15 change-agents, who were able to have 379 promise cards signed, 259 (68.3%) of which were then used to redeem a helmet at no cost from a local bicycle shop. During this study, helmet use at Appalachian State University increased from 26.1% (n = 1,330 observations) at baseline to 49.3% (n = 1,769 observations) following a five-week intervention period.

Why was the Ludwig et al. (2005) intervention so much more successful than that implemented in the present study? Perhaps the most immediate reason could be the relative size of the two universities. The school where Ludwig completed his study is considerably smaller both in terms of geographical space and the number of students enrolled. It may be the case that Ludwig et al.'s intervention was completed with a greater proportion of the bicyclists on that campus, and that the project was more visible to the public.

While 609 bicyclists approached in the present study may seem like a high number, it is not a very large proportion of the total bicyclist population on campus. A rough estimate of the

number of bicyclists on campus was obtained from the universities parking services, which requires students to register their bicycles if they are to park them on campus. According to parking services, approximately 2,500 bicycles were registered during the time of the intervention. One must keep in mind this number is likely an underestimate since many students do not register their bicycles with the university despite the requirement that they do so. Thus, a very conservative estimate would be that only 25% of the bicyclists on campus were intervened upon by change-agents, and many of these individuals chose not to be influenced by the intervention. Therefore, the intervention did not reach a very large percentage of the target population.

A bicyclist follow-up survey was conducted to obtain bicyclists' impressions of the intervention and to determine the strengths and weaknesses of the intervention. However, the sample obtained for the follow-up study consisted mainly of individuals who had positive impressions of the intervention and who signed the promise card. When asked why they did not use the coupon to purchase a helmet, the most common answers were "I already own a helmet" and "I forgot or ran out of time before leaving town for the summer".

A larger sample size would have been desirable for this follow-up study. Specifically, it would have been informative to learn more about why people did not sign the promise card and opinions for why the intervention was not successful. Since the follow-up survey did not necessarily prove informative for why the intervention was not successful, some speculations are made below, making comparisons between the prior Ludwig et al. study and the present study.

A major reason why the Ludwig et al. study was so successful may be due to the extensive social marketing campaign for helmet use on campus which happened before, during, and after the change-agents at Appalachian State began approaching bicyclists. Ludwig and colleagues held focus groups to develop a creative and attractive project logo/slogan, which was then printed on materials and distributed throughout the campus. For example, pamphlets with information about bicycling safety and head trauma were packaged in bicycle water bottles bearing the pro-helmet message, which were then distributed by change-agents as they had individual discussions with bicyclists on campus. Stickers were also distributed to bicyclists wearing helmets, who were encouraged to put them on their helmets to show support for the project.

In addition, the 279 helmets distributed at Appalachian State were exactly the same style and color, and each had the project logo sticker on them when they were distributed. Doing so may have drawn more attention to the helmets, and may have even created a “fad” on campus. Research has shown that social marketing campaigns are very effective in aiding large scale behavior-change interventions (McKenzie-Mohr, 2000). The present study did not include a social marketing campaign.

Another difference between the Ludwig et al. study and the present study is the change-agents in the former were volunteers from the university bicycling club. It is likely these individuals wear a helmet frequently themselves, as opposed to the present sample of change-agents, most of whom reported very low helmet use. In addition, the bicycle club agents may have been more motivated to make a difference than the change-agents recruited from the psychology department pool for the present study. Being bicyclists themselves, they may have had more personal stories to share with their targets and may have been viewed as more “expert” on the topic they were presenting. In addition, these change-agents were given the incentive of a \$25 gift certificate if they approached at least 10 bicyclists. The researcher in the present study was limited in resources and could only offer students extra credit for participating in the study. Further, University policy would not allow the researcher to base a reward contingency on the number of bicyclists approached.

There were also differences in the training for change-agents between the Ludwig et al. study and the present study. Ludwig held a two-hour training session, which is double the time allotted to the training sessions for the present study. This longer training session may have allowed the change-agents to build relatively more cohesion among the group and to engage in role-modeling exercises above and beyond what was completed in the present study’s training sessions.

A final difference which may explain the different success rates of these studies in increasing helmet use on campus is that Ludwig et al. were able to provide students with *free* helmets if they signed the pledge, while the present study offered students a discounted helmet. It is important to note the Ludwig et al. study was grant funded, thus providing the researchers with resources that were not available to the present researcher.

### *Conclusions*

This study was conceptualized as an opportunity to investigate the effects of situational and personality variables on change-agent performance in conducting a peer-to-peer intervention process. No significant results were obtained when exploring the situational differences in making a private versus public commitment on goal attainment. However, shortcomings in the design of the experimental conditions may have reduced the possibility of finding an effect. Specifically, had the participants believed their performance would be made public, therefore exposing whether they were consistent in their commitments and behavior, the “public” commitment conditions may have influenced more goal attainment for those individuals. Also, the fact that change-agents may have set different individual goals made the comparisons problematic, and solid conclusions can not be drawn given this confound variable.

Several interesting results were found from examining individual differences in personality and susceptibility to social influence. The FFM of personality was not useful for predicting the number of bicyclists approached by the change-agents, but did exhibit some predictive ability for the rate of obtaining signed promise cards (and perhaps then, one’s success rate in being persuasive). Specifically, Neuroticism and Openness were significantly related to this outcome variable.

Susceptibility to Ingratiation as a social influence tactic also emerged as a valid predictor of change-agents’ effort in performing the intervention. Taking this into consideration with the Agreeableness finding, one can make the argument that change-agents who are seeking the approval of others may be best suited for implementing prosocial interventions such as the one described in this study. Experimenters or change-agencies can tailor their recruitment and training strategies to attract individuals who are Agreeable by noting the positive and/or prosocial aspects of the intervention process, stressing it is an important cause to support.

During change-agent training, the experimenter can further appeal to Agreeable individuals by reinforcing their decision to volunteer and stressing the importance of individuals’ effort in carrying out the intervention for the success of the program and the benefit of the population targeted by the intervention. In addition, by labeling the change-agents as helpful, “good” people, and by expressing sincere appreciation for their efforts, the experimenter can appeal to those who are influenced by ingratiating tactics.

While the findings regarding individual differences in personality and susceptibility to social influence are promising in terms of gaining an understanding of those states and traits which are associated with change-agent participation, the overall outcome of the intervention (i.e., the lack of impact of the intervention on helmet use) was disappointing. However, by comparing the specifics of the intervention completed in this study to that of the prior Ludwig et al. study, one can see crucial elements which need to be included for such an intervention to have a significant impact. For example, it is recommended that a comprehensive social marketing campaign be implemented in tandem with the peer-to-peer intervention process, and that change-agents be selected from groups or organizations that have a vested interest in the target behavior (e.g., members of the bicycle club or philanthropic organizations). Further, the use of greater incentives for both the change-agents (e.g., a cash incentive) and the targets of the intervention (e.g., a free helmet as opposed to a discounted helmet) may improve the success of such an intervention.

This study took a broad approach toward investigating individual differences in change-agents relative to their participation in the intervention process. There is still much to be learned about the individual differences between active, successful change-agents and inactive, unsuccessful change agents. In addition, future studies may consider researching social influence tactics which are useful for gaining the compliance of change-agents beyond the consistency tactic employed in the present study. By learning more about change-agent volunteers and methods which can improve or motivate their participation in a community-based intervention, researchers may have greater success in influencing important behaviors such as bicycle helmet use.

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Appendix A  
IRB Approval Letters



**Institutional Review Board**

Dr. David M. Moore  
 IRB (Human Subjects) Chair  
 Assistant Vice President for Research Compliance  
 CVM Phase II- Duquenois Dr., Blacksburg, VA 24061-04-2  
 Office: 540/231-3991; FAX: 540/231-6023  
 email: moore@vt.edu

DATE: August 3, 2005

**MEMORANDUM**

TO: E. S. Geller Psychology 0436  
 Douglas Wiegand Psychology 0436

FROM: David Moore 

SUBJECT: **IRB Exempt Approval:** "Bicycle Helmet Study" IRB # 05-471

I have reviewed your request to the IRB for exemption for the above referenced project. I concur that the research falls within the exempt status. Approval is granted effective as of August 3, 2005.

Virginia Tech has an approved Federal Wide Assurance (FWA00000572, exp. 7/20/07) on file with OHRP, and its IRB Registration Number is IRB00000667.

cc: File

Department Reviewer: David W. Harrison



**Institutional Review Board**

Dr. David M. Moore  
 IRB (Human Subjects) Chair  
 Assistant Vice President for Research Compliance  
 CVM Phase II, D. Clark and Dr., Blacksburg, VA 24061-6442  
 Office: 540/231-4991; FAX: 540/231-6033  
 email: moordm@vt.edu

DATE: August 3, 2005

**MEMORANDUM**

TO: E. S. Geller Psychology 0436  
 Douglas Wiegand Psychology 0436

FROM: David Moore 

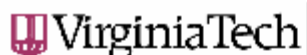
SUBJECT: **IRB Exempt Approval:** "Bicycle Helmet Study (Phase II)" IRB # 05 473

I have reviewed your request to the IRB for exemption for the above referenced project. I concur that the research falls within the exempt status. Approval is granted effective as of August 3, 2005.

Virginia Tech has an approved Federal Wide Assurance (FWA00006572, exp. 7/20/07) on file with OHRP, and its IRB Registration Number is IRB000006657.

cc: File

Department Reviewer: David W. Harrison



Office of Research Compliance  
 Institutional Review Board  
 1880 Pratt Drive (0497)  
 Blacksburg, Virginia 24061  
 540/231-4991 Fax: 540/231-0959  
 E-mail: moored@vt.edu  
 www.irb.vt.edu

PWAD0000572 (expires 7/20/07)  
 IRB # is IRB00000667.

DATE: March 17, 2006

MEMORANDUM

TO: E. S. Geller  
 Douglas Wiegand

Approval date: 3/17/2006  
 Continuing Review Due Date: 3/2/2007  
 Expiration Date: 3/16/2007

FROM: David M. Moore 

SUBJECT: IRB Expedited Approval: "Peer Intervention to Increase Bicycle Helmet Use on a University Campus", IRB # 06-171

This memo is regarding the above-mentioned protocol. The proposed research is eligible for expedited review according to the specifications authorized by 45 CFR 46.110 and 21 CFR 56.110. As Chair of the Virginia Tech Institutional Review Board, I have granted approval to the study for a period of 12 months, effective March 17, 2006.

As an investigator of human subjects, your responsibilities include the following:

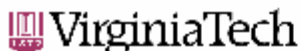
1. Report promptly proposed changes in previously approved human subject research activities to the IRB, including changes to your study forms, procedures and investigators, regardless of how minor. The proposed changes must not be initiated without IRB review and approval, except where necessary to eliminate apparent immediate hazards to the subjects.
2. Report promptly to the IRB any injuries or other unanticipated or adverse events involving risks or harms to human research subjects or others.
3. Report promptly to the IRB of the study's closing (i.e., data collecting and data analysis complete at Virginia Tech). If the study is to continue past the expiration date (listed above), investigators must submit a request for continuing review prior to the continuing review due date (listed above). It is the researcher's responsibility to obtain re-approval from the IRB before the study's expiration date.
4. If re-approval is not obtained (unless the study has been reported to the IRB as closed) prior to the expiration date, all activities involving human subjects and data analysis must cease immediately, except where necessary to eliminate apparent immediate hazards to the subjects.

**Important:**

If you are conducting federally funded non-exempt research, this approval letter must state that the IRB has compared the OSP grant application and IRB application and found the documents to be consistent. Otherwise, this approval letter is invalid for OSP to release funds. Visit our website at <http://www.irb.vt.edu/pages/newstudy.htm#OSP> for further information.

cc: File  
 Department Reviewer: David W. Harrison

*Invent the Future*



Office of Research Compliance  
 Institutional Review Board  
 1880 Pratt Drive (0497)  
 Blacksburg, Virginia 24061  
 540/231-4991 Fax: 540/231-0959  
 E-mail: moored@vt.edu  
 www.irb.vt.edu  
 FWA00000572 expires 7/20/07  
 IRB # is IRB00000667

DATE: July 24, 2008

MEMORANDUM

TO: E. S. Geller  
 Douglas Wiegand

Approval date: 3/17/2008  
 Continuing Review Due Date: 3/2/2007  
 Expiration Date: 3/16/2007

FROM: David M. Moore 

SUBJECT: IRB Amendment 1 Approval: "Peer Intervention to Increase Bicycle Helmet Use on a University Campus", IRB # 06-171

This memo is regarding the above referenced protocol which was previously granted approval by the IRB on March 17, 2006. You subsequently requested permission to amend your IRB application. Since the requested amendment is nonsubstantive in nature, I, as Chair of the Virginia Tech Institutional Review Board, have granted approval for requested protocol amendment, effective as of July 24, 2006. The anniversary date will remain the same as the original approval date.

As an investigator of human subjects, your responsibilities include the following:

1. Report promptly proposed changes in previously approved human subject research activities to the IRB, including changes to your study forms, procedures and investigators, regardless of how minor. The proposed changes must not be initiated without IRB review and approval, except where necessary to eliminate apparent immediate hazards to the subjects.
2. Report promptly to the IRB any injuries or other unanticipated or adverse events involving risks or harms to human research subjects or others.
3. Report promptly to the IRB of the study's closing (i.e., data collecting and data analysis complete at Virginia Tech). If the study is to continue past the expiration date (listed above), investigators must submit a request for continuing review prior to the continuing review due date (listed above). It is the researcher's responsibility to obtain re-approval from the IRB before the study's expiration date.
4. If re-approval is not obtained (unless the study has been reported to the IRB as closed) prior to the expiration date, all activities involving human subjects and data analysis must cease immediately, except where necessary to eliminate apparent immediate hazards to the subjects.

cc: File  
 Department Reviewer: David W. Harrison

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## APPENDIX B

### Preliminary 1 Study Materials

# Bicycle Project Training Manual



**Center for Applied Behavior Systems  
Department of Psychology  
Virginia Tech  
(540) 231-8145  
dwegand@vt.edu**

## **Project Overview**

The purpose of Phase I of this study is to develop an efficient and reliable method of observing, recording and tracking bicycle-related behavior in Blacksburg during the Fall 2005 semester. Observation sessions will occur at two campus and two off-campus locations between August 22 and approximately mid-October. Locations, times, and observation methods will be changed/revised during this period, based on what the data tell us. In addition, various focus groups and online surveys will be conducted to inform the development of the Phase II intervention, including the name and logo of the project.

Phase II will begin in March 2006. Baseline observations will be conducted for a period of 2-3 weeks, followed by a multi-component intervention based on applied behavior analysis, social psychology, and social marketing principles. Observations of bicycle behavior will be conducted at both an experimental (Virginia Tech) and control (Appalachian State or Radford) campus/community during Phase II. During the intervention phase at Virginia Tech, trained peer agents will provide bicyclists with information regarding the benefits of wearing a bicycle helmet, as well as information from a community-wide survey supporting positive social norms regarding helmet use (e.g., “most people would want someone they care about to wear a helmet when cycling”). Peer agents will also encourage bicyclists to make a pledge to wear a helmet each time they ride a bicycle. If the bicyclists sign the pledge card they will be given a coupon for a free/discounted helmet (or other safety equipment) at a local bicycle shop. The intervention components may be revised before the Spring 2006 semester based on what is learned during Phase I of the study, as well as the recommendations of a committee of 5 faculty members.

Overall, this study is lead by Doug Wiegand, and is serving as his dissertation project. Alyson Woleslagle (alysonw@vt.edu) is a Research Assistant in the Center for Applied Behavior Systems. She is leading Phase I of this project as an undergraduate research project. Funding for this project is being sought from the Virginia Department of Motor Vehicles, the Graduate Student Assembly of Virginia Tech, and other organizations.

## **Overview of the Bicycle Project Data Collection**

Observation periods occur in four stages: 1) scheduling, 2) field observations, 3) calculating summaries of daily safety behaviors and interobserver reliability, and 4) filing the data.



- 1. Scheduling.** Sign-up sheets for observation sessions will be distributed at bicycle project meetings and regular CABS meetings, and will be available in CABS on the project update board. Once you sign up for an observation session, you are responsible for fulfilling that obligation. If for some reason you cannot complete a session at a time you committed to, it is your responsibility to find a replacement within a reasonable amount of time before that session. Daily observations will occur at two on-campus and two off-campus locations during 60-90 minute blocks between 7:45am and 7:00pm.
- 2. Field observations.** For exploratory purposes, research assistants will record bicycle type, riding surface, gender, helmet use, foot apparel, presence of a backpack/bag, whether the cyclist is traveling with or against traffic, and hand signal and stopping behavior at intersections when applicable. During the intervention phase, observations will also be made to determine whether the cyclist is “marked” as part of the intervention. Cyclists who agree to participate in our intervention will be encouraged to put a ribbon or some other identifier on their bicycle so we can tell who has been intervened upon.

Research assistants will scan the observation area for bicycle traffic, and will complete observations for as many cyclists as possible during their session. Please refer to the protocol located in this manual when recording observations. Inter-rater reliability will be collected intermittently (approximately 33% of data collection sessions) by having two independent observers at the same site. The pair of observers will pick a spot on the road/sidewalk/trail and then agree on the bicycle to be observed. At this point they will make independent recordings of the behaviors mentioned above without discussing what they observed.

- 3. Calculating daily safety behaviors and reliability.** After collecting the observation data, the person designated as the primary observer will make calculations for each category of behavior and enter that information in the “Observation Summary Log.” If two observers were present during an observation session, the primary observer will also calculate the reliability of the observations and enter this information in the “Reliability Log.” Instructions for the Summary and Reliability Logs are located in this manual, along with examples.
- 4. Filing data.** Once you have calculated and entered daily summaries (and reliability when necessary), the primary observer will file the completed observation sheets in the project binder located in CABS. Once this is done the primary observer’s responsibilities are fulfilled

for that session. As is the CABS policy, all observation sheets should be returned to CABS as soon as possible, at the latest within 24 hours after the observations are recorded.

**What is needed to make field observations:**

- 1) A clipboard,
- 2) 2 pens/pencils,
- 3) A map of your field observation location (in this manual),
- 4) Observation sheets (take *at least* 3 sheets per observer)

*All of these materials are available in CABS and should always be taken with you when you make field observations.*

## Bicycle Project Field Observation Protocol

**Name:** Please write your name and CABS data collection number in the space provided. Data collector numbers are located on the bulletin board in CABS.

**Date:** Enter the date when you started the observation session using the following format: **YYMMDD**. For example, August 1, 2005 would be written as **050801**. Always use two places for year, month, and day.

**Primary and Reliability:** If you are the only observer, circle **P** for “primary”. When there are two observers, the primary observer should be the most experienced field observer. The other person should circle **R** for “reliability”. The primary observer has the responsibility of calling out the observation number for all observations, keeping both observers on the same line of the data sheet. The primary observer is also responsible for completing the Observation Summary and Reliability Logs at the end of the observation session.

**Page:** Write the current page number in the first space and the total number of pages for the entire observation session in the second space. Please complete as many observations as possible during your session.

**Location:** Circle the number of the location you are observing from. **1** = Library; **2** = W. Campus Drive; **3** = Huckleberry Trail; **4** = Foxridge Trail

**Time Frame:** Enter the times you began and finished the observation session. Both times should be coded as **HHMM** using military time. To calculate military time add 12 to the hour after 12 noon, so 4:00 p.m. would be coded as **1600**. 7:45am would be coded **0745**. Do not place a colon between hour and minute.

**Weather:** Code the weather when you start the observation session by circling the appropriate descriptor. **C** = Clear: no precipitation, **R** = Rainy: any type of falling precipitation that is not frozen, **S** = Snow: frozen precipitation, including freezing rain, sleet, hail, or snow. If the weather conditions change during the session, place the new weather condition in the margin to the right of the first observation when the change occurred. Changes in weather conditions should be coded as **W: (new descriptor)**.

**Bike Type:** Code the type of bicycle being observed. **M** = Mountain (straight handlebars, thick tires); **R** = Road (curly handlebars, like a “10-speed”); **O** = Other bicycle types (e.g., BMX, beach cruiser, tandem, etc.).

**Surface:** Code the surface the bicycle is on. **R** = Road; **S** = Sidewalk; **T** = Trail

**Gender:** Code the gender of the bicyclist. Circle **M** = Male; **F** = Female. If you cannot determine gender, do not mark anything for this field.

**Helmet:** Indicate whether the individual is wearing a properly fastened helmet. **Y** = Yes; **N** = No; **X** = Helmet worn, but not properly fastened or worn. See p. 13 of this manual for pictures of how a helmet is properly (and improperly) worn.

**Shoes:** Indicate whether the individual is wearing proper shoes. **S** = Safe (i.e., closed-toe shoes, such as tennis shoes or cycling shoes); **A** = At-Risk (i.e., barefoot or wearing flip-flops, sandals, or any other open-toed shoes).

**Pack:** Indicate whether the individual is wearing a backpack, bag, or if their bicycle has a pack attached to it. **P** = Person is wearing a backpack/bag; **B** = Bag is attached to bicycle; **N** = No pack on cyclist or bike.

**Traffic:** Indicate what direction the individual is traveling relative to traffic. **W** = With traffic; **A** = Against traffic.

**Hand Signal:** Circle **R** if the individual uses a hand signal for making a right turn at an intersection or for merging into traffic. Circle **L** if they use a hand signal to turn or merge to the left. If the individual turns or merges without using a hand signal, circle **N**. If the individual does not turn or merge, circle  $\emptyset$ .

**Stop:** Circle **Y** if the individual comes to a complete stop (i.e., wheels stop moving) at an intersection with a stop sign or traffic signal, **N** if s/he does not. If this does not apply, circle  $\emptyset$ .

# Primary Observation Sheet Example

## CABS Bicycle Safety Observation Sheet

Name:			Date:			P/R		Page: ___/___	
Location: 1 2 3 4			Time Frame:			Weather: C R S			
	<b>Bike Type</b>	<b>Surface</b>	<b>Gender</b>	<b>Helmet</b>	<b>Shoes</b>	<b>Pack</b>	<b>Traffic</b>	<b>Signal</b>	<b>Stop</b>
1	M R O	R S T	M F	Y N X	S A	P B N	W A	R L N Ø	Y N Ø
2	M R O	R S T	M F	Y N X	S A	P B N	W A	R L N Ø	Y N Ø
3	M R O	R S T	M F	Y N X	S A	P B N	W A	R L N Ø	Y N Ø
4	M R O	R S T	M F	Y N X	S A	P B N	W A	R L N Ø	Y N Ø
5	M R O	R S T	M F	Y N X	S A	P B N	W A	R L N Ø	Y N Ø
6	M R O	R S T	M F	Y N X	S A	P B N	W A	R L N Ø	Y N Ø
7	M R O	R S T	M F	Y N X	S A	P B N	W A	R L N Ø	Y N Ø
8	M R O	R S T	M F	Y N X	S A	P B N	W A	R L N Ø	Y N Ø
9	M R O	R S T	M F	Y N X	S A	P B N	W A	R L N Ø	Y N Ø
10	M R O	R S T	M F	Y N X	S A	P B N	W A	R L N Ø	Y N Ø
11	M R O	R S T	M F	Y N X	S A	P B N	W A	R L N Ø	Y N Ø
12	M R O	R S T	M F	Y N X	S A	P B N	W A	R L N Ø	Y N Ø
13	M R O	R S T	M F	Y N X	S A	P B N	W A	R L N Ø	Y N Ø
14	M R O	R S T	M F	Y N X	S A	P B N	W A	R L N Ø	Y N Ø
15	M R O	R S T	M F	Y N X	S A	P B N	W A	R L N Ø	Y N Ø

# *Reliability* Observation Sheet Example

## CABS Bicycle Safety Observation Sheet

Name:			Date:			P/R		Page: ___/___	
Location: 1 2 3 4				Time Frame:			Weather: C R S		
	<b>Bike Type</b>	<b>Surface</b>	<b>Gender</b>	<b>Helmet</b>	<b>Shoes</b>	<b>Pack</b>	<b>Traffic</b>	<b>Signal</b>	<b>Stop</b>
1	M R O	R S T	M F	Y N X	S A	P B N	W A	R L N Ø	Y N Ø
2	M R O	R S T	M F	Y N X	S A	P B N	W A	R L N Ø	Y N Ø
3	M R O	R S T	M F	Y N X	S A	P B N	W A	R L N Ø	Y N Ø
4	M R O	R S T	M F	Y N X	S A	P B N	W A	R L N Ø	Y N Ø
5	M R O	R S T	M F	Y N X	S A	P B N	W A	R L N Ø	Y N Ø
6	M R O	R S T	M F	Y N X	S A	P B N	W A	R L N Ø	Y N Ø
7	M R O	R S T	M F	Y N X	S A	P B N	W A	R L N Ø	Y N Ø
8	M R O	R S T	M F	Y N X	S A	P B N	W A	R L N Ø	Y N Ø
9	M R O	R S T	M F	Y N X	S A	P B N	W A	R L N Ø	Y N Ø
10	M R O	R S T	M F	Y N X	S A	P B N	W A	R L N Ø	Y N Ø
11	M R O	R S T	M F	Y N X	S A	P B N	W A	R L N Ø	Y N Ø
12	M R O	R S T	M F	Y N X	S A	P B N	W A	R L N Ø	Y N Ø
13	M R O	R S T	M F	Y N X	S A	P B N	W A	R L N Ø	Y N Ø
14	M R O	R S T	M F	Y N X	S A	P B N	W A	R L N Ø	Y N Ø
15	M R O	R S T	M F	Y N X	S A	P B N	W A	R L N Ø	Y N Ø

## Completing the Observation Summary Log

The purpose of the observation summary log is to provide us with a summary of the data at a glance. Below are directions for completing the log.

**NOTE:** EACH ROW OF THE SUMMARY SHEET IS TO BE USED FOR **ONE** FIELD OBSERVATION SESSION.

**Date:** Write the date of your observation session. **YYMMDD**. For example, August 1, 2005 would be written 050801.

**Prim:** Write your data collection number (this is for the primary observer).

**Reliab?:** Was there a reliability observer with you during this session? Circle **Y** = Yes; **N** = No.

**Loc#:** Write the number of the location you collected data from. **1** = Drillfield; **2** = W. Campus Drive;  
**3** = Huckleberry Trail; **4** = Foxridge Trail

**Time:** What time did you begin collecting data? Indicate in military time, HHMM. To calculate military time add 12 to the hour after 12 noon, so 4:00 p.m. would be coded as **1600**. 7:45am would be coded **0745**.

**For the remaining blanks, please count the number of each response and write it in the appropriate blank.** For example, if you observed 46 males and 23 females, you would write 46 under **M** and 23 under **F**.

You will also calculate and enter percentages for the following variables: Gender (% Male), Helmet (% Helmet use), Shoes (% Safe), Pack (% Wearing pack), Traffic (% With traffic), Signal (% Signal), and Stop (% Stop).

Below is an example of how to calculate % Stop:

Divide the total number of Y's counted by the sum of the Y's and N's counted (NOTE: Do NOT include N/A's in this calculation), then multiply that number by 100. For example, if you have 4 Y's, and 5 N's, your % Signal would be calculated  $[4 \div (4 + 5)] \times 100 = 44.4\%$

**An example of the Observation Summary Log (based on the previous example of the observation sheet) is on the following page.**



## Completing the Bicycle Project Reliability Log

The Reliability Log was designed to keep track of reliability and provide feedback concerning individual observers' reliability. This sheet is used to calculate reliabilities for each observation session.

**NOTE:** EACH ROW OF THE SUMMARY SHEET IS TO BE USED FOR **ONE** FIELD OBSERVATION SESSION.

**\*\*WHEN CALCULATING RELIABILITY, MAKE SURE YOU ARE LOOKING AT THE SAME OBSERVATION NUMBER ON BOTH DATA SHEETS\*\***

**Date:** Write the date of your observation session. **YYMMDD**. For example, August 1, 2005 would be written **050801**.

**Prim:** Write your data collection number (this is for the primary observer)

**Rel:** Write the data collection number of the reliability observer (people's numbers are listed on the bulletin board in CABS).

**Loc#:** Write the number of the location you collected data from. **1** = Library; **2** = W. Campus Drive; **3** = Huckleberry Trail; **4** = Foxridge Trail

**For the remaining blanks, follow these instructions (Helmet Use will be used as an example):** Count the number of times you and the reliability person agreed on whether a helmet was worn or not. **MAKE SURE YOU LOOK AT THE SAME NUMBER ROW ON BOTH OBSERVATION SHEETS.** Put this number under the **A** column (Agree). Next, count the total number of observations you made, and put this number under the **T** column (Total; Note: if one of you skipped an observation, that counts as a disagreement if the other person observed it). Next, divide the number in the A column by the number in the T column, and then multiply this number by 100. This is your percent agreement, which goes in the **%A** column. For example, if you agreed on 56 observations, and you made 75 total observations, your percent agreement would be:  $56/75 \times 100 = 74.66\%$ .

**An example of a correct Reliability Log entry is on the following page. This is based on the example observation sheets in this manual.**





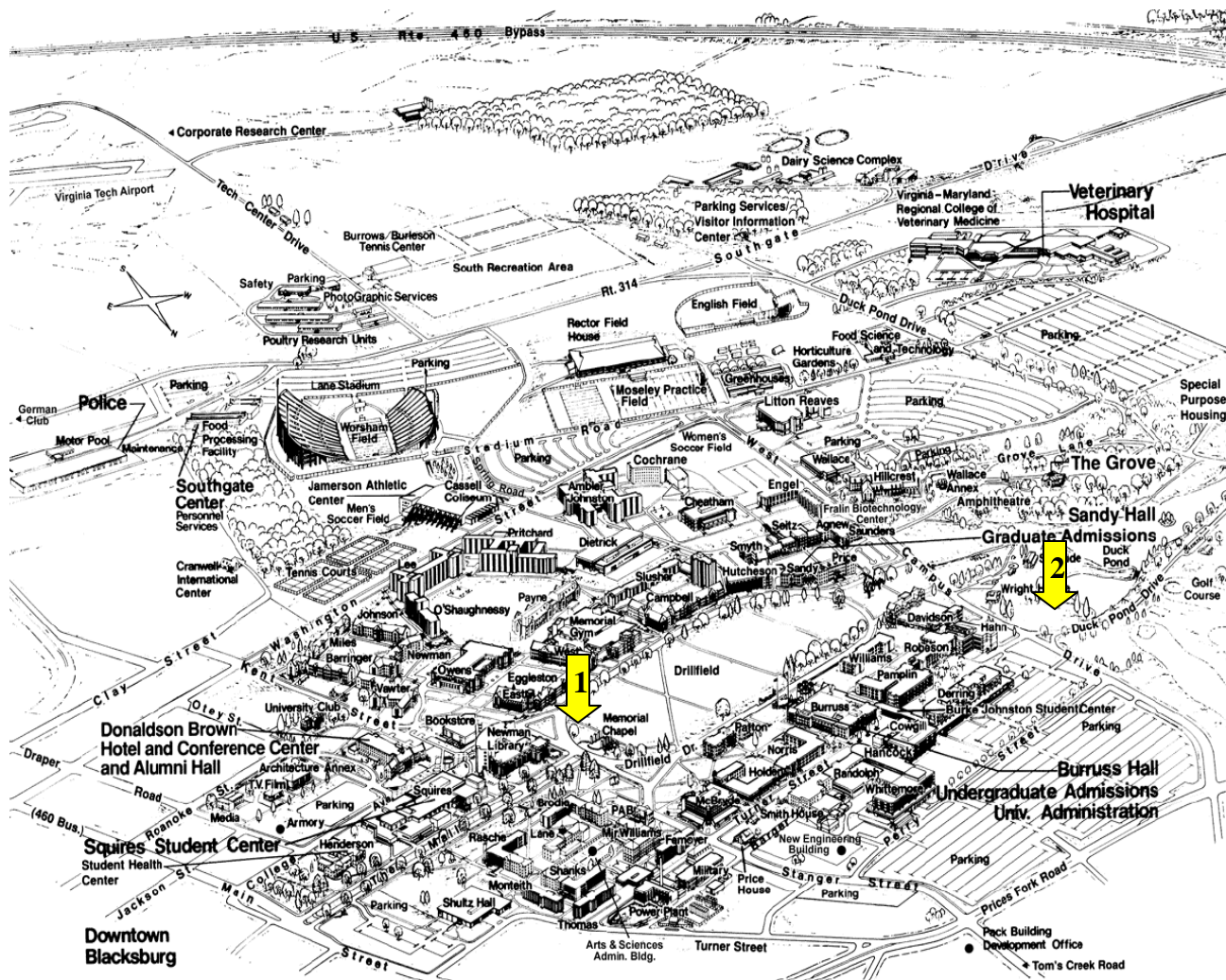
## Filing Bicycle Project Observations

After completing daily summary and reliability calculations the data should be placed in the appropriate binder located in CABS.

- 1) **Check observation sheets.** Check to be sure that the information at the top of the data sheet is completed, including your name/data collector number (and that of the reliability person, if applicable), the date, which sheets are primary and which are reliability, and page numbers.
- 2) **Staple observation sheets.** Staple all sheets for your observation session together. *Staple reliability observations separately from primary observations.*
- 3) **File data.** Place stapled data sheets in “Completed Bicycle Helmet Observations” binder in CABS. Primary observations are placed in front of reliability observations.

*Congratulations, you have finished your observation duties!!!!*

## Maps and Directions for Observation Locations



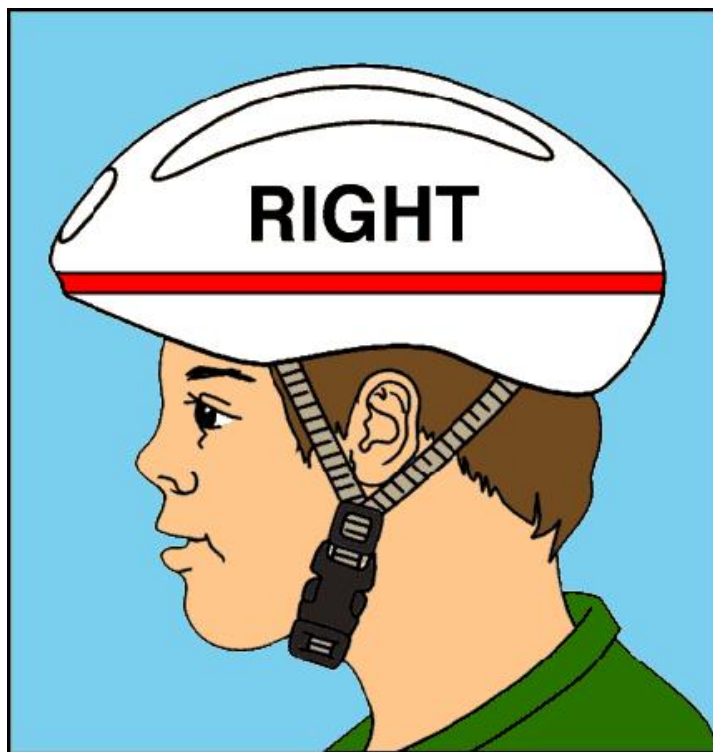
### Directions to location #3 (Huckleberry Trail):

Go South on Main St. and make a right on Country Club Dr. (light before Kroger/ABC Store). At the end of this road is Blacksburg Electric. Park in their lot, and follow the bike trail (which continues as if the street were still going). This trail intersects with the Huckleberry Trail if you follow it for about 100 yards or so. There's a gazebo there, as well as some benches.

### Directions to location #4 (Foxridge Trail):

Get on Price's Fork toward Radford, and make a left at the Heather Dr. light (you should see a sign for Foxridge). Go straight through the 3-way stop. As you continue driving, you'll see a pond on the left side of the road. There are benches in that area near the bike trail. Try to find the spot with the most bike traffic.

## Proper Helmet Fit



## Appendix C

### Preliminary Study 2 Survey

# Bicycle Survey

Welcome!

My name is Doug Wiegand. I am a graduate student studying bicycle safety through the Center for Applied Behavior Systems in the Psychology Department of Virginia Tech. I am inviting you to participate in a brief survey to help me get an understanding of college students' opinions and behaviors regarding bicycle helmet use. Your participation will help design interventions with the goal of increasing bicycle safety on the Virginia Tech campus. Below, I have tried to answer a few questions you might have regarding the survey:

**\*\*How long will it take?\***

The survey will take approximately 10-30 minutes to complete and will be completed entirely online. Please take as much time as you need to answer the questions as thoroughly as possible.

**\*\*Is it confidential?\***

Your answers will be entirely confidential and private. I will guard your privacy in this way—you will be asked to provide your email address so that I may enter you in the raffle (see below). Once your survey is complete, your email address will be saved electronically in a file which will be separate from your survey responses. This is so your identity is not connected to your responses. Once the study is complete and the raffle winner is announced, I will delete the file containing your email address. Even though your name will not be associated with your survey responses, this data will be stored in a password protected computer database until it is analyzed and subsequently destroyed.

**\*\*Are there any risks involved?\***

This study involves no more than minimal risk to you. In other words, there are no expected risks beyond that normally associated with completing a questionnaire online.

**\*\*Are there any benefits?\***

There are no expected benefits associated with this research, other than the opportunity to think about your personal experiences, thoughts, and feelings. Also, you will be contributing to the development of a program related to improving individuals' bicycling safety.

**\*\*What will I receive in return?\***

Your email address will be entered into a raffle for a \$25 gift certificate to the restaurant of your choice. The raffle winner will be contacted by email before the beginning of the Fall 2005 Semester.

**\*\*Is this voluntary?\***

Your participation is voluntary. You may decide at any time to discontinue the survey. There is no penalty for deciding not to complete the survey. Also, you may skip any question(s) you are not comfortable answering.

**\*\*What will my responses be used for?\***

The information from this research may be used for scientific or educational purposes. It

may be presented at meetings, published in books or professional journals, or used for other purposes Virginia Tech's Department of Psychology considers proper in the interest of education, knowledge, or research. However, your name will not be used or associated with any aspect of this research. This research project has been approved, as required, by the Institutional Review Board for Research Involving Human Subjects at Virginia Polytechnic Institute and State University, by the Department of Computer Science at Virginia Polytechnic and State University. IRB Approval Date: August 3, 2005; Expiration Date: July 2007 (IRB# 05-471).

Your participation is greatly appreciated!

**\*\*Study Contact Information\*\***

Should I have any questions about this research or its conduct, I may contact:

Dr. Scott Geller or Douglas Wiegand

540.231.8145 or [dwiegand@vt.edu](mailto:dwiegand@vt.edu)

Dr. D. Harrison, Chair of Human Subjects Committee, Psychology Department

540.231.4422 [dwh@vt.edu](mailto:dwh@vt.edu)

Dr. Jack Finney, Chair of Psychology Department

540.231.6670 [finney@vt.edu](mailto:finney@vt.edu)

David M. Moore, Chair of Internal Review Board

540.231.4991 [moored@vt.edu](mailto:moored@vt.edu)

By continuing with the survey below you agree that you have read and understand the purpose of this research and hereby give your voluntary consent to participate in the research.

The following questions are about you. Please answer as accurately as possible.

### **Demographic Information**

**Gender:** *Male/Female*

**Age:** *(open-ended)*

**Ethnicity** (check all that apply): *Caucasian, African American, Asian, Native American/American Indian, Native Hawaiian or Pacific Islander, Latino, Other (with open ended follow-up)*

**Year in School:** *n/a, 1, 2, 3, 4, 5, 5+, graduate student, faculty/staff*

### **Survey Items**

THE FOLLOWING QUESTIONS ASK ABOUT YOUR OPINIONS ON BICYCLE SAFETY. PLEASE ANSWER THEM AS ACCURATELY AS YOU CAN. THERE ARE NO “RIGHT” OR “WRONG” ANSWERS, SO PLEASE BE HONEST. YOU DO NOT HAVE TO OWN OR RIDE A BICYCLE TO ANSWER THESE QUESTIONS.

**Response Options:** *Strongly Agree, Agree, Agree Somewhat, Neutral, Disagree Somewhat, Disagree, Strongly Disagree*

1. It is important to ALWAYS wear a helmet when riding a bicycle.
2. It is important to wear a helmet when bicycling on campus.
3. It is important to wear a helmet when bicycling on the road with traffic.
4. It is important to wear a helmet when bicycling on a sidewalk.
5. It is important to wear a helmet when bicycling on a bike trail.



6. Helmets are effective for preventing head injuries.
7. People who wear a helmet when biking look ridiculous.
8. Bicycle helmets are uncomfortable.
9. “Cool” people do not wear a helmet when bicycling.
10. Bicycle helmets come in a variety of colors and styles.
11. Bicycle helmets look “cool”.
12. Wearing a helmet when bicycling is dangerous.
13. I would/do feel silly wearing a helmet when bicycling.
14. Safety is not really an issue when riding a bicycle.
15. It is unlikely that I would get in a bicycle accident.
16. It is unlikely that I would be seriously injured in a bicycle accident.
17. Bicycle helmets are inconvenient.
18. It should be illegal to ride a bicycle on the road without a helmet.
19. It is my choice whether or not I wear a helmet when bicycling.
20. My own behavior in traffic does not influence my likelihood of crashing.
21. I would be embarrassed to be seen wearing a bicycle helmet.
22. Only people who are serious bicyclists should wear a helmet.
23. Most people who are important to me would want me to wear a helmet when riding a bicycle.
24. I would want someone I care about to wear a helmet when s/he rides a bicycle.
25. Bicycle accidents/crashes are not very common.
26. If I owned a helmet, I would wear it when riding a bicycle.

## Bicycling Behavior

27. How often do you ride a bicycle on campus?

*Never, Rarely, Occasionally, Often, Every Day*

28. How often do you ride a bicycle off-campus?

*Never, Rarely, Occasionally, Often, Every Day*

29. If you do NOT wear a helmet when bicycling, please indicate reasons why you do not

(check all that apply to you):

- I always wear a helmet when bicycling*
- I do not ride a bicycle*
- I do not own a helmet*
- I don't ride far or long enough to need a helmet*
- Helmets are uncomfortable*
- Helmets are inconvenient*
- I'm concerned I'll look stupid*
- I don't want to carry a helmet when I get to my destination*
- Helmets obscure my vision*
- It would mess up my hair*
- It would leave a red mark on my forehead*
- Other (open-ended)*

30. Do you own a bicycle? *Yes/No*

31. Do you own a bicycle helmet? *Yes/No*

32. What type of bicycle do you ride most often?

- N/A*

- Mountain*
  - Road*
  - Hybrid*
  - BMX*
  - Other (open-ended)*
33. How many months out of the year do you ride a bicycle? (0-12)
34. On average, how many days a week do you ride a bicycle? (0-7)
35. During the last 10 times you rode a bicycle, how many occasions did you wear a helmet?  
(0-10)
36. Please indicate the reason(s) you ride a bicycle (check all that apply):
- N/A – I don't ride a bicycle*
  - Transportation*
  - Enjoyment*
  - Exercise*
  - Social Reasons*
  - It is a relatively inexpensive form of transportation*
  - Sense of accomplishment*
  - I identify with being a "cyclist"*
  - I do not own a car*
  - It is convenient*
  - It is better for the environment than driving a car*
  - Other (open-ended)*

37. If you do NOT own a bicycle helmet, please indicate the reason(s) why you do not own one (check all that apply):

- I do not ride a bicycle*
- They are too expensive*
- I never thought about it*
- I know I'd never wear it*
- I can not find the style or color I want*
- I am too embarrassed to buy one*
- Only serious cyclists need helmets*
- Other (open-ended)*

38. If a high quality helmet were made available to you for \$10 or less, how likely would it be that you would buy one?

*Very Likely, Somewhat Likely, Not Sure, Somewhat Unlikely, Very Unlikely*

## APPENDIX D

## Preliminary Study 2 Survey Responses for the Full Sample

<b>Statement</b>	<b>%SA</b>	<b>%A</b>	<b>%AS</b>	<b>%N</b>	<b>%DS</b>	<b>%D</b>	<b>%SD</b>
It is important to <i>always</i> wear a helmet when riding a bike	33.7 (140)	27.4 (114)	22.8 (95)	6.0 (25)	5.3 (22)	4.1 (17)	0.7 (3)
It is important to wear a helmet when biking <i>on campus</i>	35.8 (149)	24.8 (103)	18.3 (76)	9.6 (40)	5.5 (23)	5.0 (21)	1.0 (4)
It is important to wear a helmet when biking <i>on the road with traffic</i>	69.2 (287)	19.5 (81)	7.5 (31)	2.2 (9)	1.0 (4)	0.5 (2)	0.2 (1)
It is important to wear a helmet when biking <i>on a sidewalk</i>	30.8 (127)	28.9 (119)	18.0 (74)	10.4 (43)	7.0 (29)	4.4 (18)	0.5 (2)
It is important to wear a helmet when biking <i>on a bike trail</i>	40.8 (169)	28.7 (119)	13.0 (54)	7.7 (32)	5.1 (21)	4.3 (18)	0.2 (1)
Helmets are effective in preventing head injuries	64.7 (268)	28.5 (118)	5.6 (23)	0.5 (2)	0.5 (2)	0.2 (1)	0 (0)
People who wear a helmet when biking look ridiculous	5.3 (22)	9.1 (38)	18.8 (78)	17.5 (73)	9.4 (39)	25.0 (104)	14.9 (62)
Bicycle helmets are uncomfortable	5.6 (23)	19.8 (82)	25.6 (106)	24.6 (102)	8.0 (33)	12.6 (52)	3.9 (16)
“Cool” people do not wear helmets when biking	1.9 (8)	3.1 (13)	6.5 (27)	14.2 (59)	8.2 (34)	32.5 (135)	33.5 (139)
Bicycle helmets come in a variety of colors and styles	47.1 (195)	39.6 (164)	7.5 (31)	4.8 (20)	0.7 (3)	0.2 (1)	0 (0)
Bicycle helmets look “cool”	3.4 (14)	6.0 (25)	10.8 (45)	40.7 (169)	19.0 (79)	14.7 (61)	5.3 (22)
Wearing a helmet when bicycling is dangerous	0.5 (2)	0.2 (1)	0.7 (3)	1.0 (4)	2.9 (12)	25.7 (107)	69.1 (288)
I would (or do) feel silly wearing a helmet when bicycling	7.2 (30)	11.6 (48)	28.3 (117)	11.6 (48)	7.2 (30)	17.4 (72)	16.7 (69)
Safety is not really an issue when riding a bicycle	0.2 (1)	1.2 (5)	3.6 (15)	2.9 (12)	11.3 (47)	35.5 (148)	45.3 (189)
It is unlikely that I would get in a bicycle accident	3.4 (14)	12.1 (50)	16.9 (70)	15.7 (65)	17.1 (71)	21.7 (90)	13.0 (54)
It is unlikely that I would be seriously injured in a bicycle accident	2.4 (10)	10.6 (44)	14.2 (59)	12.3 (51)	17.1 (71)	27.7 (115)	15.7 (65)
Bicycle helmets are inconvenient	2.9 (12)	14.5 (60)	31.3 (130)	11.1 (46)	13.7 (57)	17.6 (73)	8.9 (37)
It should be illegal to ride a bicycle on the road without a helmet	21.1 (88)	19.4 (81)	15.8 (66)	12.9 (54)	10.1 (42)	12.7 (53)	7.9 (33)
It is my choice whether or not I wear a helmet when bicycling	25.7 (107)	34.3 (143)	18.9 (79)	6.5 (27)	5.3 (22)	4.6 (19)	4.8 (20)
My own behavior in traffic does not influence my likelihood of crashing	0.5 (2)	2.4 (10)	2.9 (12)	3.1 (13)	10.1 (42)	33.1 (138)	48.0 (200)
I would be embarrassed to be seen wearing a bicycle helmet	1.4 (6)	5.5 (23)	13.9 (58)	13.5 (56)	11.5 (48)	32.9 (137)	21.2 (88)
Only people who are serious bicyclists should wear a helmet	1.2 (5)	3.8 (16)	5.3 (22)	5.3 (22)	13.5 (56)	37.5 (156)	33.4 (139)

Most people who are important to me would want me to wear a helmet when I ride a bicycle	33.3 (138)	36.4 (151)	16.9 (70)	7.2 (30)	2.9 (12)	2.4 (10)	1.0 (4)
I would want someone I care about to wear a helmet when s/he rides a bicycle	41.7 (174)	28.8 (120)	18.0 (75)	8.2 (34)	1.9 (8)	1.0 (4)	0.5 (2)
Bicycle accidents/crashes are not very common	0.2 (1)	5.5 (23)	12.0 (50)	16.8 (70)	23.1 (96)	28.6 (119)	13.7 (57)
If I owned a helmet, I would wear it when riding a bicycle	22.8 (95)	30.0 (125)	19.5 (81)	10.1 (42)	9.1 (38)	7.5 (31)	1.0 (4)

SA= strongly agree; A=agree; AS=agree somewhat; N=neutral; DS=disagree somewhat; D=disagree, SD=strongly disagree

APPENDIX E

Recruitment Materials



## Sona Systems Posting

### Bicycle Helmet Intervention Study


Participants aged 18 and older are asked to participate in a study designed to increase bicycle helmet use on campus.

Participants will be asked to attend a 1-2 hour training session where they will complete a questionnaire and learn how to perform the intervention process (which involves social influence principles) on bicyclists on campus! After training, participants will be asked to spend up to 2 hours (on their own schedule) on campus performing the intervention process.

A total of 4 extra credit points may be earned for approximately 4 hours of total time commitment/effort.

This study involves approaching your peers on campus to speak with them and potentially make a difference with regards to bicycle safety at Virginia Tech. We would like motivated individuals who are not too shy to approach and speak with strangers to participate.

### Slide Advertisement Shown in Classrooms by Instructors




## POSITIVE CHANGE AGENTS NEEDED!

*Practice Actively Caring* by Intervening for the Safety  
of Your Peers!

Learn how to apply psychological principles to  
increase bicycle helmet use on campus

Up to 4 credits possible! It would involve:

- Attending a 60-75 minute training session (4/7/06)
- Spending up to 2 hours (on your own schedule) applying the intervention technique on campus



SIGN UP NOW ON SONA SYSTEMS!

## APPENDIX F

## Tables of Demographic Information by Training Condition

Table A. Gender by Group

	Individual		Small Group		Large Group		Total	
	N	%	N	%	N	%	N	%
Gender								
Male	14	51.9	13	52.0	9	30.0	36	43.9
Female	13	48.1	12	48.0	20	66.7	45	54.9
Missing	0	0	0	0	1	3.3	1	1.2
Total	27	100	25	100	29	100	82	100

Table B. Year in School by Group

	Individual		Small Group		Large Group		Total	
	N	%	N	%	N	%	N	%
Year in School								
1	16	40.0	14	35.0	10	25.0	40	48.8
2	4	20.0	6	30.0	10	50.0	20	24.4
3	5	38.5	3	23.1	5	38.5	15	15.9
4	2	28.6	1	14.3	4	57.1	7	8.5
5	0	0	1	100	0	0	1	1.2
Missing	0	0	0	0	1	100.0	1	1.2
Total	27	100	25	100	30	100	82	100

Table C. Age by Group

	Individual		Small Group		Large Group		Total	
	N	%	N	%	N	%	N	%
Age								
18	7	25.9	2	8.0	4	13.3	13	15.9
19	11	40.7	14	56.0	8	26.7	33	40.2
20	5	18.5	4	16.0	10	33.3	19	23.2
21	2	7.4	3	12.0	5	16.7	10	12.2
22	2	7.4	2	8.0	2	6.7	6	7.3
Missing	0	0	0	0	1	3.3	1	1.2
Total	27	100	25	100	30	100	82	100

Table D. Ethnicity by Group

	Individual		Small Group		Large Group		Total	
	N	%	N	%	N	%	N	%
Ethnicity								
Caucasian	25	92.6	22	88.0	21	70.0	68	82.9
African-American	1	3.7	0	0	4	13.3	5	6.1
Asian	0	0	3	12.0	4	13.3	7	8.5
Other	1	3.7	0	0	0	0	1	1.2
Missing	0	0	0	0	1	3.3	1	1.2
Total	27	100	25	100	30	100	82	100

Note that Latino, Native American, and Pacific Islander/Native Hawaiian were also included as choices, but were not selected by any participants

Table E. Academic Major by Group

	Individual		Small Group		Large Group		Total	
	N	%	N	%	N	%	N	%
Major								
Psych	8	29.6	6	24.0	13	43.3	27	32.9
Non-Psych	19	70.4	19	76.0	16	53.3	54	65.9
Missing	0	0	0	0	1	3.3	1	1.2
Total	27	100	25	100	29	100	82	100

Table F. Proportion of Participants Reporting to Ride a Bicycle in Past 1 Year

	Individual		Small Group		Large Group		Total	
	N	%	N	%	N	%	N	%
Ride Past Year								
Yes	22	81.5	18	72.0	17	56.7	57	69.5
No	5	18.5	7	28.0	12	40.0	24	29.3
Missing	0	0	0	0	1	3.3	1	1.2
Total	27	100	25	100	29	100	82	100

Table G. Response to Item “How Often Do You Ride a Bicycle?”

Response	Individual		Small Group		Large Group		Total	
	N	%	N	%	N	%	N	%
Never	1	3.7	4	16.0	4	13.3	9	11.0
Rarely	9	33.3	10	40.0	18	60.0	37	45.1
Seasonally	11	40.7	7	28.0	6	20.0	24	29.3
Monthly	3	11.1	0	0	0	0	3	3.7
Weekly	3	11.1	1	4.0	1	3.3	5	6.1
Daily	0	0	3	12.0	0	0	3	3.7
Missing	0	0	0	0	1	3.3	1	1.2
Total	27	100	25	100	30	100	82	100

Table H. Response to Item “When You Ride a Bicycle, How Often Do You Wear a Helmet?”

Response	Individual		Small Group		Large Group		Total	
	N	%	N	%	N	%	N	%
Never	11	50.0	4	22.2	7	41.2	22	38.6
Rarely	7	31.8	7	38.9	6	35.3	20	35.1
Often	3	13.6	5	27.8	1	5.9	9	15.8
Always	1	4.5	2	11.1	3	17.6	6	10.5
Total	22	100	18	100	17	100	57	100

Table I. Response to Item “Why Did You Sign Up for This Study?”

Response	Individual		Small Group		Large Group		Total	
	N	%	N	%	N	%	N	%
Credit	24	88.9	25	100	27	93.1	76	93.8
Sounded Interesting	11	40.7	12	48.0	4	13.8	27	33.3
Seemed Easy	8	29.6	6	24.0	6	20.7	20	24.7
I Want to Make a Difference	7	25.9	8	32.0	2	6.9	17	21.0
Other	3	11.1	0	0	0	0	3	3.7

Note: This item was in the “choose all that apply” format

APPENDIX G

Change Agent Log and Intervention Script





Virginia Tech  
Bicycle Helmet Pledge  
2006

Intervention Log and Instructions  
for Positive Change Agents



Thank you for Actively Caring for others!

Researchers: E. Scott Geller, Ph.D & Douglas Wiegand, MA  
Virginia Tech Department of Psychology  
Virginia Tech IRB # 06-171  
dwiegand@vt.edu

### Instructions

Please approach all bicyclists on campus - do so in a safe manner, such as when the person is walking their bike, at the bike rack, or riding slowly.

Tell them:

- You will only need a minute or so of their time

- You want to talk to them about a student-lead research project to increase bicycle safety on campus

- Many people who do not wear a helmet when bicycling on campus believe that a crash will not happen to them, and that campus is a safe place to ride. Unfortunately, that's not necessarily true.

- In the last five years, the local hospital has seen over 500 people in the ER due to bicycle crashes - keep in mind that these are only those who were injured badly enough to go to the hospital

- Wearing a helmet can decrease your chances of head injury by about 85% if you happen to be in a crash

- By signing the Helmet Pledge, you will be promising to wear a helmet each time you ride a bicycle for the next 2 months.

- If you sign, I will give you a coupon for a reduced price helmet at a local bike shop. There are two styles to choose from - one costs \$7.50, and the other is a substantial discount off a more expensive helmet

If the person does not want to sign, politely ask them why and write their response in the "Notes" section of the log.

For all people approached, ask if you can attach a tag on the bottom of their seat. This is to let other change agents know that the bicyclist has been approached so they are not interrupted again. Ask that they keep it on their bike until the semester is over.

## Virginia Tech Bicycle Helmet Pledge 2006

Date:

Location:

Rejection:    Y    N

Gender:        M    F

Helmet On:    Y    N

Own Helmet:   Y    N    (if not wearing one)

Accept Tag:    Y    N

NOTES:

#79-4

Helmets can save lives. By signing this pledge, I promise to wear a helmet each time I ride a bicycle for the next two months.

Signature

Date

Email (optional - for survey/raffle entry)

I signed the Virginia Tech Bicycle Helmet Pledge!  
Please show me my choices of discounted helmets!



1301 N. Main St. in Blacksburg --

Please redeem coupon within one week of receipt

#79-4

APPENDIX H

Informed Consent Document

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY  
INFORMED CONSENT FORM FOR PARTICIPANTS IN RESEARCH PROJECTS INVOLVING HUMAN  
SUBJECTS

**TITLE OF PROJECT:** Peer Intervention to Increase Bicycle Helmet Use on a University Campus

**RESEARCHERS:** Douglas M. Wiegand, M.A. & E. Scott Geller, Ph.D.

**PURPOSE:** The purpose of this study is to attempt to increase bicycle helmet use on the Virginia Tech campus by having peer intervention agents approach bicyclists and use principles of social influence to gain their commitment to wear a helmet.

**PROCEDURES:** If you choose to participate in this study, you will be asked to attend a 90-120 minute training session and to spend approximately 2 hours on campus approaching bicyclists following what you learn in training. During the training session, you will also be asked to complete a questionnaire.

**RISKS:** This study involves no more than minimal risk. In other words, there are no expected risks beyond that normally associated with completing a questionnaire and speaking with your peers on campus.

**BENEFITS:** There are no expected benefits associated with this research other than the opportunity to make a difference with regards to the safety of your peers. If you would like to learn of the study's results, you may contact the researchers using the information at the bottom of this document after December 2006.

**ANONYMITY OF PARTICIPANTS AND CONFIDENTIALITY OF RESPONSES:** The data from this study are collected in a manner that ensures you will remain completely anonymous. While you will be asked for your personal information (name and email), it will only be used for assigning class credit and to send you reminder emails regarding deadlines. Your personal information will be filed separate from your responses to the questionnaire as well as from your other study materials. Therefore, your answers will not be linked to your identity.

**COMPENSATION:** You will be compensated with 1 extra credit point per hour spent on this project. Completing the training session will earn you 2 credits. You will then earn an additional credit point for each hour you spend intervening on your peers (i.e., bicyclists) on campus following what is covered in the training session.

**FREEDOM TO WITHDRAW:** You may withdraw from this study at any time for any reason, without incurring any penalties of any type. Your participation is completely voluntary.

**USE OF RESEARCH DATA:** The information gained from this research project may be reported in aggregate for scientific or educational purposes. It may be presented at professional meetings, published/reproduced in professional journals or books, or used for any other relevant purposes the Virginia Tech Department of Psychology considers to be in the interest of education, knowledge, and/or research. If presented, no personally identifying information will be used.

**APPROVAL OF RESEARCH:** This research project has been approved by the Human Subjects Committee of the Department of Psychology and by the Institutional Review Board of Virginia Tech.

**By signing below, I acknowledge I have read the document above and agree to participate in this study. I understand this information will be kept confidential and I may withdraw from this study at any time without penalty. My questions have been answered to my satisfaction. I agree to be honest when completing the study questionnaire and when completing other study procedures.**

---

Signature

Date

Should you have any questions about this research process, you may contact:

Researchers: Douglas Wiegand, M.A.; [dwiegand@vt.edu](mailto:dwiegand@vt.edu); (540) 231-8145  
E. Scott Geller, Ph.D.; [esgeller@vt.edu](mailto:esgeller@vt.edu); (540) 231-6223

Chair of Human Subjects Committee in Psychology: David W. Harrison, Ph.D.; [dwh@vt.edu](mailto:dwh@vt.edu);  
(540) 231-4422

Chair of Institutional Review Board: David Moore, DVM; [moored@vt.edu](mailto:moored@vt.edu); (540) 231-4991

**\*\*You will be provided with a copy of this consent document for your records\*\***

APPENDIX I  
Study Instrument

# *Bicycle Helmet Study*

Virginia Tech Department of Psychology

Spring 2006



Researchers: E. Scott Geller, Ph.D. & Douglas M. Wiegand, M.A.

Virginia Tech IRB #06-171

## **Demographic Information**

Please complete the following questions about yourself by circling or writing your response.

1. My gender is: Male      Female

2. My age is \_\_\_\_\_ years

3. My ethnicity is (circle all that apply):

- A) Caucasian
- B) Black or African American
- C) Asian or Asian American
- D) Hispanic or Latino
- E) American Indian or Alaskan Native
- F) Native Hawaiian or Pacific Islander
- G) Other: \_\_\_\_\_

4. My year in college is:

- A) 1<sup>st</sup>
- B) 2<sup>nd</sup>
- C) 3<sup>rd</sup>
- D) 4<sup>th</sup>
- E) 5<sup>th</sup>
- F) 5+

5. My major is: \_\_\_\_\_

6. I have ridden a bicycle in the past 1 year:    Yes      No

7. How often do you ride a bicycle?

A) Never    B) Rarely    C) Seasonally    D) Monthly    E) Weekly    F) Daily

8. If you ride a bicycle, how often do you wear a helmet?

A) Never    B) Rarely    C) Often    D) Always    E) Not applicable – I don't ride

9. Why did you sign up for this study? (Circle all that apply):

A) Credit    B) Sounded interesting    C) Seemed easy    D) I want to make a difference    E) Other:

\_\_\_\_\_



## **Instructions**

On the following pages, there are phrases describing people's behaviors and thought about themselves. Please use the rating scale indicated at the top of each page to describe how accurately each statement describes **you**. Describe yourself as you generally are now, not as you wish to be in the future. Describe yourself as you honestly see yourself, in relation to other people you know of the same sex as you are, and roughly your same age. So that you can describe yourself in an honest manner, your responses will be kept in absolute confidence.

Please read each statement carefully, and then fill in the blank with the number that corresponds to the statement you wish to choose for each.

\*\*\*\*\*

Very Inaccurate	Moderately Inaccurate	Neither Inaccurate Nor Accurate	Moderately Accurate	Very Accurate
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>

1. I am "the life of the party". \_\_\_\_\_
2. I am interested in people. \_\_\_\_\_
3. I am always prepared. \_\_\_\_\_
4. I am relaxed most of the time. \_\_\_\_(-)\_\_\_\_
5. I have a rich vocabulary. \_\_\_\_\_
6. I feel comfortable around people. \_\_\_\_\_
7. I sympathize with others' feelings. \_\_\_\_\_
8. I pay attention to details. \_\_\_\_\_
9. I seldom feel depressed. \_\_\_\_(-)\_\_\_\_
10. I have a vivid imagination. \_\_\_\_\_
11. I start conversations. \_\_\_\_\_
12. I have a soft heart. \_\_\_\_\_
13. I get chores done right away. \_\_\_\_\_
14. I get stressed-out easily. \_\_\_\_\_

15. I have excellent ideas. \_\_\_\_\_
16. I talk to a lot of different people at parties. \_\_\_\_\_
17. I take time out for others. \_\_\_\_\_
18. I like order. \_\_\_\_\_
19. I worry about things. \_\_\_\_\_
20. I am quick to understand things. \_\_\_\_\_
21. I don't mind being the center of attention. \_\_\_\_\_
22. I feel others' emotions. \_\_\_\_\_
23. I follow a schedule. \_\_\_\_\_
24. I am easily disturbed. \_\_\_\_\_
25. I use difficult words. \_\_\_\_\_
26. I don't talk a lot. \_\_\_(-)\_\_\_
27. I make people feel at ease. \_\_\_\_\_
28. I am exacting in my work. \_\_\_\_\_
29. I get upset easily. \_\_\_\_\_
30. I spend time reflecting on things. \_\_\_\_\_
31. I keep in the background. \_\_\_(-)\_\_\_
32. I am not really interested in others. \_\_\_(-)\_\_\_
33. I leave my belongings laying around. \_\_\_(-)\_\_\_
34. I change my mood a lot. \_\_\_\_\_
35. I am full of ideas. \_\_\_\_\_
36. I have little to say. \_\_\_(-)\_\_\_
37. I insult people. \_\_\_(-)\_\_\_
38. I make a mess of things. \_\_\_(-)\_\_\_
39. I have frequent mood swings. \_\_\_\_\_

40. I have difficulty understanding abstract ideas. \_\_\_(-)\_\_\_
41. I don't like to draw attention to myself. \_\_\_(-)\_\_\_
42. I am not interested in other people's problems. \_\_\_(-)\_\_\_
43. I often forget to put things back in their proper place. \_\_\_(-)\_\_\_
44. I get irritated easily. \_\_\_\_\_
45. I am not interested in abstract ideas. \_\_\_(-)\_\_\_
46. I am quiet around strangers. \_\_\_(-)\_\_\_
47. I feel little concern for others. \_\_\_(-)\_\_\_
48. I neglect my duties. \_\_\_(-)\_\_\_
49. I often feel depressed. \_\_\_\_\_
50. I do not have a good imagination. \_\_\_(-)\_\_\_
51. I have a reputation for being true to my word. \_\_\_\_\_
52. When someone does me a favor, I want to return the favor. \_\_\_\_\_
53. When I meet new people at work, I do whatever it takes to win their favor. \_\_\_\_\_
54. I sometimes go along with the group decision, even when I think it's wrong. \_\_\_\_\_
55. I always try to follow the rules. \_\_\_\_\_
56. I would be likely to attend a grand opening of a store for the one-time only deals. \_\_\_\_\_
57. I am never jealous of other people. \_\_\_\_\_
58. When I pledge to do something, it gets done. \_\_\_\_\_
59. If a stranger helps me when I'm in need, I'm more likely to help another stranger in need.  
\_\_\_\_\_
60. When I meet people with power over me, one of my main goals is to get them to like me.  
\_\_\_\_\_
61. I would put up with some discomfort to fit in with my group. \_\_\_\_\_
62. It is more fun to break the rules. \_\_\_(-)\_\_\_

63. I like buying one-of-a-kind items and/or collectables. \_\_\_\_\_
64. I never complain when things don't go my way. \_\_\_\_\_
65. Once I have committed to something, I won't back out. \_\_\_\_\_
66. I treat others as I like to be treated. \_\_\_\_\_
67. I volunteer for jobs that will gain me the approval of others. \_\_\_\_\_
68. I speak up about my opinions, even when they are unpopular. \_\_\_(-)\_\_\_
69. I make fun of police. \_\_\_(-)\_\_\_
70. I like being the only one with an item that everyone wants. \_\_\_\_\_
71. I never have a bad day. \_\_\_\_\_
72. Being reliable is important to me. \_\_\_\_\_
73. When people complement me, I usually give them a complement. \_\_\_\_\_
74. I would do a job I disliked in order to gain respect or admiration from people who might be in a position to help me someday. \_\_\_\_\_
75. I will change my beliefs to agree with other people I like. \_\_\_\_\_
76. I believe in the statement, "Rules were made to be broken." \_\_\_(-)\_\_\_
77. I try to pack as many fun things as possible into the last day of a vacation. \_\_\_\_\_
78. I never criticize others behind their backs. \_\_\_\_\_
79. My friends know they can count on me. \_\_\_\_\_
80. When people are nice to me, I am more likely to be nice to them. \_\_\_\_\_
81. I avoid confrontations with others I work with because I might need a favor from them some day. \_\_\_\_\_
82. It's hard for me to make up my mind about a TV show until I know what others think.  
\_\_\_\_\_
83. When I get "no" for an answer after I ask permission to do something, I do it anyway, if I can get away with it. \_\_\_(-)\_\_\_

84. I like being the only one with an item that everyone wants. \_\_\_\_\_
85. I get angry every now and then. \_\_\_(-)\_\_\_
86. I keep my appointments. \_\_\_\_\_
87. If I receive a birthday card from someone, I make sure I give them a card for their birthday.  
\_\_\_\_\_
88. I do more than my fair share to impress others. \_\_\_\_\_
89. I would rather be myself than pretend to be someone I am not to please others. \_\_\_(-)\_\_\_
90. I obey laws even if I don't agree with them. \_\_\_\_\_
91. I would skip work if I thought it was going to be one of the last beautiful days of summer.  
\_\_\_\_\_
92. Those who are closest to me sometimes get upset with me. \_\_\_(-)\_\_\_
93. I finish what I start. \_\_\_\_\_
94. If I am shown true kindness, I try to be kind in return. \_\_\_\_\_
95. Being liked by others with influence over me is important. \_\_\_\_\_
96. It's better to get along than to rock the boat. \_\_\_\_\_
97. I sympathize with rebels. \_\_\_(-)\_\_\_
98. "Carpe Diem" (seize the day) is a motto I try to live by. \_\_\_\_\_
99. I sometimes do things I regret later. \_\_\_(-)\_\_\_

**STOP! THANK YOU FOR YOUR HONEST ANSWERS.**

**PLEASE DISCONTINUE UNTIL PROMPTED BY THE**

**RESEARCHER**

## Goal Setting

Please take a moment to think about the task and decide on a personal goal for yourself in terms of the number of bicyclists you will approach to ask to sign the helmet pledge. This is not the number of people you will actually get to sign the pledge, but the number of people you will ask to sign the pledge. As an anchor point, I would like everyone to consider the goal of approaching ten (10) bicyclists. The number of extra credit points you receive will not be determined by the number of people you approach, but rather in the time you spend in the field.

**Based on the anchor goal of approaching 10 bicyclists, please choose one of the following goals. You will be asked to share your goal with your team members.** [Note: This highlighted sentence varied by condition]

*Check your choice and fill in the blank where appropriate:*

\_\_\_\_\_ Approaching less than 5 bicyclists – if you choose this option, what is your goal? \_\_\_\_\_

\_\_\_\_\_ Approaching at least 5 bicyclists

\_\_\_\_\_ Approaching exactly 10 bicyclists

\_\_\_\_\_ Approaching at least 10 bicyclists

\_\_\_\_\_ Approaching more than 10 bicyclists – if you choose this option, what is your goal? \_\_\_\_\_

APPENDIX J

Training Presentation for Change Agents



## Peer Intervention to Increase Bicycle Helmet Use on Campus

Positive Change Agent Training  
April 7, 2006

Experimenters: Doug Wiegand & Scott Geller

### The Problem: Nationwide

- In the U.S., more than 500,000 bicycling-related injuries are reported each year
  - Survey research indicates that 66% of injuries go unreported
- An average of 670 fatalities occur each year
- Of the fatalities, 85-90% were not wearing a helmet



## The Problem: Blacksburg

- Since 2000, our local hospital has seen nearly 500 individuals in the emergency room as a result of a bicycle-related injury, most of which were head injuries
- These are only people whose injuries were severe enough for them to go to the E.R.
- How many of you have witnessed a bicycle crash on campus or know someone who has had one on campus?

## Helmet Effectiveness

- Bicycle helmets reduce the risk of head injury by as much as 85%,
- the risk of brain injury by 88%, and
- the risk of facial injury by 65%

## Virginia Tech – Fall 2005

- 3,109 observations of bicyclists on the Virginia Tech campus were recorded
- Average helmet use was 15.5%
- Why so low?

## Campus-Wide Survey (n=420)

- 84% agreed that it is important to always wear a helmet
- 99% agreed that helmets are effective in preventing head injuries
- 42% believe that bicycle crashes are common on campus
- 83% agreed that they would wear a helmet if they owned one

## Campus-Wide Survey (n=420)

- 49% of students reported that in the last 10 times they rode a bike, they wore a helmet 0 times.
- The main reason reported for this was not owning a helmet.
  - Many also indicated that bike helmets are too expensive
- Another reason was that they felt that a helmet was not needed because they were not riding far or for a long time



## How Can We Get Helmets to People?

- If someone is intervened upon by a peer, they are more likely to be influenced than if they see some sort of media advertisement
- A recent study at Appalachian State showed helmet use increased from 27.6% to 49.3% using an intervention which included:
  - Peer change agents
  - A commitment strategy

## Commitment Strategy

- People generally like to appear consistent to themselves and others
- Reciprocity is a factor, too
- Many studies have shown that people are more likely to comply with a request if they commit to it first

## Intervention Process: Pick Your Target

- Go on campus at a time you think there will be bicyclists riding around (set to your own schedule)
  - Choose your spots wisely (e.g., near bike racks)
  - Choose your times wisely (e.g., commuters)
- Get their attention and ask for a moment of their time
  - Ask if they've heard of the helmet pledge
  - Mention something about making improving bicycle safety on campus

## Intervention Process: Why Is Wearing a Helmet Important?

- Crashes are common on campus
- Many times crashes don't involve motor vehicles
- Wearing a helmet can greatly reduce the chances of suffering a head injury (ranging from bruises/concussions to brain damage to death)

## Other Reasons?

- Protect your investment (getting all this education is expensive)
- Show you're smart
- Set a good example for others, especially kids
- Sun protection

## Intervention Process: Express Concern

- Let them know that you care for their safety
- Tell them about the project
  - Student funded
  - Student supported
  - It's research – if it works, students at other schools may benefit, too

## Helmets!

- We have hundreds of helmets purchased from Bell (a leading company)
  - Bought at cost since we are operating as a non-profit group
- High-quality, comfortable, stylish helmets
- If you sign our pledge, we'll give you a coupon for one of these helmets at cost

## Helmets

- Many styles and colors to choose from
- \$7.50 with coupon – Pick it up at *East Coasters* on North Main St.
  - No profit is being made
- Helmets typically cost anywhere from \$25-\$100+

## Already Own a Helmet?

- Any impact to a helmet can weaken it
- You should replace your helmet every 3-5 years
- At this price, why not get one for later?
- Get it for a friend or family member

## What's the Commitment?

- Signing the pledge means an effort will be made to wear a helmet each time they ride a bike for the next 2 months
- Why 2 months?
  - Seems reasonable
  - If one makes an effort to wear a helmet for a short amount of time, they may form a habit



## Intervention Logs

- Completing and returning the logs is very important!
- One log per individual approached, even if they don't sign the pledge
- Please open your log packet and follow along

## Intervention Logs

- **DATE**: Fill in the date you approached the individual
- **LOCATION**: Where did you approach the individual?
  - Example: Williams Hall – Bike Rack
- **REJECTION**: Did they reject your approach? “Y” = Yes; “N” = No

## Intervention Logs

- **GENDER**: What is the gender of the individual approached? “M” = Male; “F” = Female
- **HELMET ON**: Was s/he wearing a helmet when approached? “Y” = Yes; “N” = No
- **OWN HELMET**: If s/he doesn't have a helmet with him/her, ask if they own a helmet. “Y” = Yes; “N” = No

## Intervention Logs: Tags

- Everyone approached should be offered a tag to attach to the bottom of their bike seat. “Y” = Tag Accepted; “N” = Tag Refused
- **Red tag** if they do not sign the pledge
- **Green tag** if they do sign the pledge
- Tags let us know they've been approached – even if they don't want to sign the pledge, having a tag on their bike will let others know not to approach them again

## Intervention Logs

- **NOTES:** Anything you can write down that will be useful
  - Comments made by the individual
  - Strategy you used that worked

## Signing the Pledge

- Have them sign and date the pledge card – you will keep the data and signature portion
- Ask them to provide their email if they'd like to participate in a brief online survey later (optional)
  - Entered in a raffle for \$25 cash
- Tear off coupon and give it to them **ONLY** if they sign the pledge
- They get the coupon, you keep the rest of the log

## Returning the Logs to Me

- When you have completed all the logs in your packet, or
- Have approached as many people as you are willing to approach
- Put packet in envelope provided and put it in the mail – if you lose the envelope, bring it to the psychology department main office

## Returning Logs to Me

- Very important to return the logs, even if you don't complete a single one!
- Put in mail by May 3, 2006
- If you'd like another packet, email me and I'll get one to you

## Role Playing

- Can I get a “bicyclist” volunteer?

Questions?

## Goal Setting

- Please look at the back page of your questionnaire
- Choose your goal in terms of how many people you will approach on campus
  - Anchor is 10 people approached

THANK YOU VERY MUCH!



APPENDIX K

Team Building Exercise for Small Team Condition

## **Bike Helmet Study Team Questions**

1. Please list each of your team members' participation numbers:

\_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

2. Find something that all of you have in common, besides going to Virginia Tech or being in a specific major.

3. How many of your team members ride a bicycle at least once in a while?

4. Please list the reasons why each of you decided to participate in this study.

5. Has anyone in your group been in or witnessed a bicycle crash? If so, how serious?

6. Come up with a team name for yourselves:

7. What is your combined team goal for number of bicyclists approached?

8. On a scale of 1-10 (1=Not at all; 10=Very), please list a rating for how likely EACH of you think it will be to meet your team goal.

\_\_\_\_\_; \_\_\_\_\_; \_\_\_\_\_; \_\_\_\_\_; \_\_\_\_\_



APPENDIX L

Observation Checklist and Map of Observation Locations

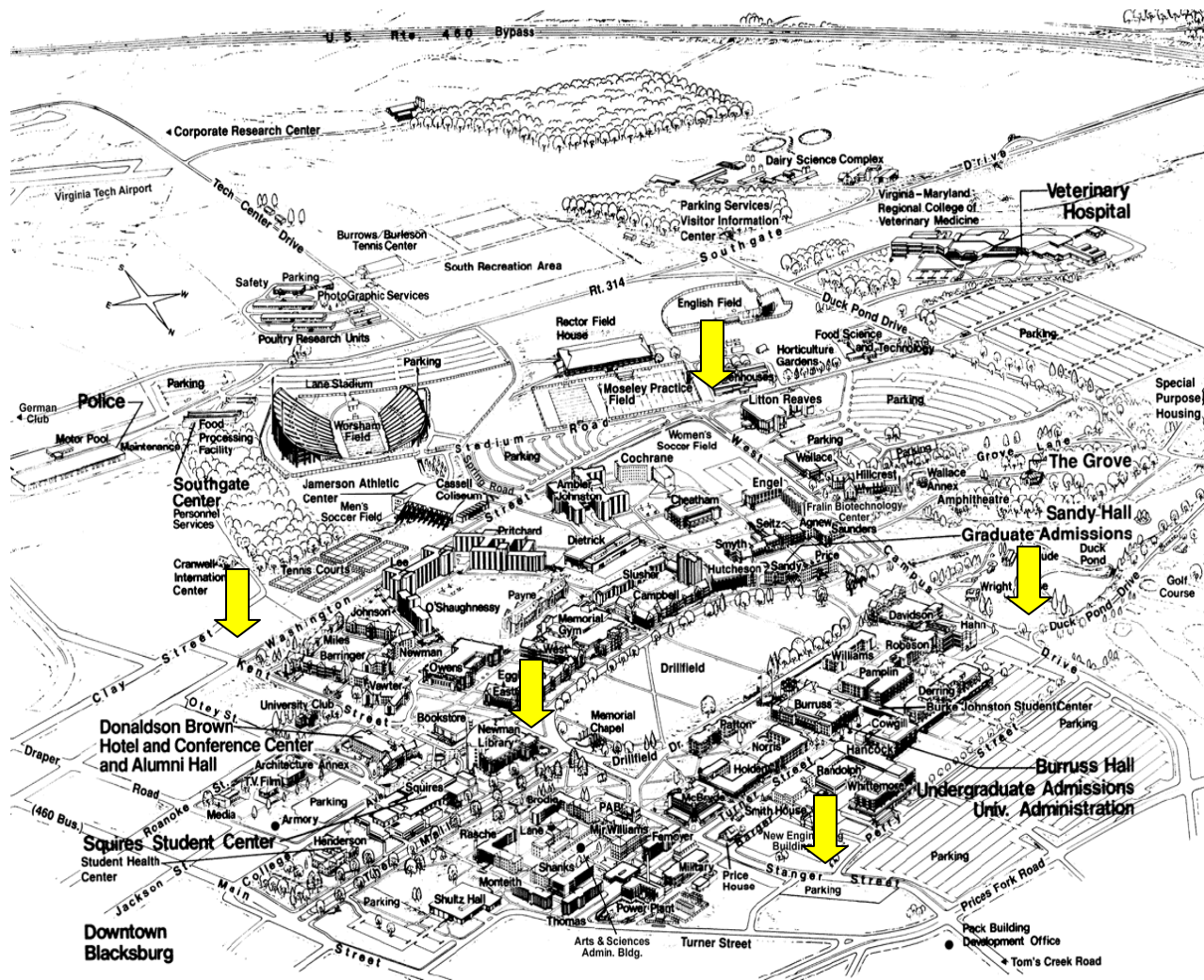
## CABS Bicycle Project Behavioral Observation Sheet - Spring 2006

<b>Name:</b>					<b>Date:</b>	<b>P/R</b>	<b>Page: ___/___</b>
<b>Location: 1 2 3 4 5</b>					<b>Time Frame:</b>		<b>Weather: C R S</b>

	<b>Helmet</b>	<b>Gender</b>	<b>Tag</b>
1	Y N X	M F	R G X
2	Y N X	M F	R G X
3	Y N X	M F	R G X
4	Y N X	M F	R G X
5	Y N X	M F	R G X
6	Y N X	M F	R G X
7	Y N X	M F	R G X
8	Y N X	M F	R G X
9	Y N X	M F	R G X
10	Y N X	M F	R G X
11	Y N X	M F	R G X
12	Y N X	M F	R G X
13	Y N X	M F	R G X
14	Y N X	M F	R G X
15	Y N X	M F	R G X
16	Y N X	M F	R G X
17	Y N X	M F	R G X
18	Y N X	M F	R G X
19	Y N X	M F	R G X
20	Y N X	M F	R G X

	<b>Helmet</b>	<b>Gender</b>	<b>Tag</b>
31	Y N X	M F	R G X
32	Y N X	M F	R G X
33	Y N X	M F	R G X
34	Y N X	M F	R G X
35	Y N X	M F	R G X
36	Y N X	M F	R G X
37	Y N X	M F	R G X
38	Y N X	M F	R G X
39	Y N X	M F	R G X
40	Y N X	M F	R G X
41	Y N X	M F	R G X
42	Y N X	M F	R G X
43	Y N X	M F	R G X
44	Y N X	M F	R G X
45	Y N X	M F	R G X
46	Y N X	M F	R G X
47	Y N X	M F	R G X
48	Y N X	M F	R G X
49	Y N X	M F	R G X
50	Y N X	M F	R G X

**Notes:**



APPENDIX M

Bicyclist Follow-Up Survey

## Email Script

Hello, my name is Doug Wiegand. My dissertation project involved bicycle helmet use – you may remember someone speaking to you about this project on campus last semester.

You provided your email address during this interaction, stating you would be interested in completing a brief online survey for a chance to win a \$20 cash raffle prize.

This survey is completely voluntary. If you are still interested, completing the survey will take about 5 minutes. It asks questions about your impressions of the project and your bicycling behavior. Your responses will be kept confidential, and your email address will be separated from your responses.

Please go to XXXXX.survey.vt.edu to complete the survey.

Thank you for your interest!

-Doug

## Survey Content

Please answer each question below as thoroughly as possible. Your responses will be kept confidential. There are no right or wrong responses – I would just like your honest impressions of this research study so I can address its strengths and limitations in my dissertation paper.

1. *I thought this project . . .* (5-point Likert scale from “Was a good idea” to “Was not a good idea”)
2. *The person who approached me . . .* (5-point Likert scale from “Handled it well” to “Handled it poorly”)
3. *Please give your overall impression (in as much detail as possible) of the study and the way it was handled by the individual who approached you. For example, what did you like and/or not like about the study? Would you have done something different to improve the study? Do you think the study could have worked to increase helmet use on campus? Why or why not?* (open-ended)
4. *Did you sign the pledge to wear a helmet?* (yes/no response option)  
*Why or why not?* (open-ended)
5. *If you signed the pledge, did you go to the bike shop to claim a helmet?* (yes/no)  
*Why or why not?* (open-ended)

6. *If you signed the pledge, how often did you wear a helmet in the 2 months following (estimate a percentage, e.g., “50% of the time I rode a bicycle”)?*
7. *Did this study have any impact on your decision of whether to wear a helmet when you ride a bicycle? (yes/no)*

*Why or why not? (open-ended)*

8. *If you would like to be entered in the raffle for \$20, please provide your email address. I will contact you by email if you are the winner and we can arrange to get you the prize. Your email will be separated from your responses, and will be deleted once the raffle winner is selected. (open-ended section to enter email address)*

*Thank you! If you have any questions, please email me at [dwiegand@vt.edu](mailto:dwiegand@vt.edu) or call 540-230-8517*

APPENDIX N

Curriculum Vita for Douglas M. Wiegand

CURRICULUM VITA

**DOUGLAS MICHAEL WIEGAND, MA**  
 VIRGINIA TECH TRANSPORTATION INSTITUTE  
 3500 TRANSPORTATION RESEARCH PLAZA Ψ BLACKSBURG, VA 24061  
 540-231-1055 Ψ 540-231-1555 (FAX)  
 DWIEGAND@VTTL.VT.EDU

OCTOBER 2006

## **FORMAL EDUCATION**

*August 2002 - Present*

Virginia Tech – Blacksburg, VA

***Doctor of Philosophy in Psychology***

Concentration: Clinical Psychology; Community Psychology; Psychology of Safety

*September 1998 - May 2000*

Claremont Graduate University – Claremont, CA

***Master of Arts in Psychology (Cum Laude)***

Concentration: Applied Social Psychology

*August 1994 - May 1998*

Virginia Tech – Blacksburg, VA

***Bachelor of Science in Psychology (Cum Laude)***

Concentration: Applied Behavior Analysis

## **GRANT AND CONTRACT EXPERIENCE**

2006-2007

*Commercial Motor Vehicle Driver Risk Factor Study*

Federal Motor Carrier Safety Administration, U.S. Department of Transportation

Principal Investigator for Site: Richard Hanowski, Ph.D.

\$226,513 for one year

2006-2007

*Driver and Mangement Research Study*

Federal Motor Carrier Safety Administration, U.S. Department of Transportation

Principal Investigator for Site: Richard Hanowski, Ph.D.

\$197,530 for one year

2005-2006

*The Epidemiology of Alcohol Use at Tailgate Parties*

Department of Health and Human Services

Principal Investigator: E. Scott Geller, Ph.D.

\$151,000 for one year



2003-2005

*Environmental Factors Affecting College Party Drinking*

National Institute for Alcohol Abuse and Alcoholism, Bethesda, MD

Principal Investigator: E. Scott Geller, Ph.D.

\$580,087 for two years

2002-2004

*An Incentive Approach to Reduce Alcohol Abuse at Parties*

National Institute for Alcohol Abuse and Alcoholism, Bethesda, MD

Principal Investigator: E. Scott Geller, Ph.D.

\$538,653 for two years

2002-2003

*Mental Health Needs and Service Use Assessment Project for Juvenile Justice*

County of Los Angeles Department of Mental Health, Los Angeles, CA

Principal Investigator: Bonnie T. Zima, M.D., M.P.H.

\$250,000 for one year

2000-2002

Mental Health Care for California's Children and Youth: How Can It Be Improved? The Caring for California Initiative.

State of California Department of Mental Health, Sacramento, CA

Principal Investigator: Bonnie T. Zima, M.D., M.P.H.

\$1.5 million for two years

1996-1998

*Critical Success Factors for Behavior-Based Safety.*

National Institute for Occupational Safety and Health, Atlanta, GA

Principal Investigator: E. Scott Geller, Ph.D.

\$281,376 for two years

1996-1998

*Industry-Based Interventions to Increase Safe Driving.*

National Institute for Occupational Safety and Health, Atlanta, GA

Principal Investigator: E. Scott Geller, Ph.D.

\$359,234 for two years.

1996-1997

*Providing Blood Alcohol Concentration Feedback and Education in Blacksburg.*

The Virginia Tech Service-Learning Center, Blacksburg, VA

Principal Investigator: E. Scott Geller, Ph.D.

\$3,000 for one year

## **TEACHING EXPERIENCE**

August 2005 – December 2005

*Personality Psychology* (PSYC 2054), Department of Psychology, Virginia Tech, Blacksburg, VA

- Overall teaching evaluation score: 3.7/4.0

August 2003 – May 2005

*Social Psychology* (PSYC 2084), Department of Psychology, Virginia Tech, Blacksburg, VA

- Overall teaching evaluation score: 3.9/4.0 (consistent over 4 consecutive semesters)
- Top teaching evaluation scores for this class in several decades within the department

## **PUBLICATIONS**

Glindemann, K. E., **Wiegand, D. M.**, & Geller, E. S. (in press). Celebratory drinking and intoxication: A contextual influence on alcohol consumption. *Environment and Behavior*.

Geller, E. S., & **Wiegand, D. M.** (2005). People-based safety: Exploring the role of personality in injury prevention. *Professional Safety*, 50, 28-36.

**Wiegand, D. M.** (2005). A people-based approach to OBM: Synergy, not “sin”-ergy. *Journal of Organizational Behavior Management*, 24, 185-193.

**Wiegand, D. M.**, & Geller, E. S. (2005). Connecting positive psychology and organizational behavior management: Achievement motivation and the power of positive reinforcement. *Journal of Organizational Behavior Management*, 24, 3-25.

Quist, R. M., & **Wiegand, D. M.** (2002). Attributions of hate: The media’s causal attributions of a homophobic murder. *American Behavioral Scientist*, 46, 93-107.

## **MANUSCRIPTS UNDER PREPARATION OR SUBMITTED FOR PUBLICATION**

**Wiegand, D. M.** (2006). Exploring the role of emotional intelligence in successful safety coaching. Manuscript submitted for publication June 22, 2006, *Journal of Safety Research*.

## **TECHNICAL REPORTS**

Hickman, J. S., Knipling, R. R., Inderbitzen, R. E., **Wiegand, D. M.**, Bergoffen, G., & Hanowski, R. J. (in press). *Synthesis report on the impact of behavior-based safety techniques on commercial motor vehicle drivers*. Transportation Research Board Commercial Truck & Bus Synthesis Program Project MC-15. Washington D.C.: Transportation Research Board.

California Health Services Research Consortium – Contributing Author. (2002). *Caring for California Initiative phase 2 technical report: Profiling quality of care*. State of California Department of Mental Health, Sacramento, CA.

Zima, B.T., Lecklitner, G., Schaepper, M., McDermott, D., Liao, D., & **Wiegand, D. M.** (2002). *Los Angeles County juvenile justice screening project: Preliminary indicators of mental health service need and use*. Los Angeles County Department of Mental Health, Los Angeles, CA.

California Health Services Research Consortium – Contributing Author. (2001). *Caring for California Initiative phase 1 technical report: Profiling quality of care*. State of California Department of Mental Health, Sacramento, CA.

Zima, B.T., Lecklitner, G., Schaepper, M., McDermott, D., Liao, D., & **Wiegand, D. M.** (2001). *Los Angeles County juvenile justice screening project: Preliminary findings from stage 1*. Los Angeles County Department of Mental Health, Los Angeles, CA.

### **CONFERENCE PRESENTATIONS**

Harris, D. M., Rhodes, P. A., Cunningham, T. R., & **Wiegand, D. M.** (May, 2006). *The Impact of Computerized Medication Ordering on Efficiency and Error Rate*. Paper presented at the 32nd annual meeting of the Association for Behavior Analysis, Atlanta, GA.

Woleslagle, A. R., **Wiegand, D. M.**, Kidd, D. G., Feigal, D. W., & Hylton, K. R. (November, 2005). Observations of Bicycling Behavior and Practices in a University Community. Poster presented at the 8<sup>th</sup> annual meeting of the Maryland Association for Behavior Analysis: Baltimore, MD.

Farrell, L. V., Drake, E. A., **Wiegand, D. M.**, Andrews, R., Zimmerman, M., & Geller, E. S. (May, 2005). *Evaluating a Community-Based Safety Belt Campaign: BuckleUp*, In *Memory of Ashley Krueger*. Paper presented at the 31<sup>st</sup> annual conference of the Association for Behavior Analysis: Chicago: IL.

Valentino, S. E., Mackey, E. M., Ball, D., & **Wiegand, D. M.** (May, 2005). *Assessing the Effects of Themed Fraternity Parties on Students' Levels of Intoxication*. Paper presented at the 31<sup>st</sup> Annual Conference of the Association for Behavior Analysis: Chicago: IL.

Geller, E. S. & **Wiegand, D. M.** (June, 2004). What's Your Safety IQ? Personality Traits and Person States Related to Injury Prevention. Paper published in the *Proceedings of ASSE's 2004 Professional Development Conference & Exposition*. Las Vegas, NV: American Society of Safety Engineers.

Valentino, S. E., Glindemann, K. E., **Wiegand, D. M.**, Doyle, J. J., & Keene, W. R. (May, 2004). *Assessing Environmental Factors Affecting College Students' Alcohol*

*Consumption at Fraternity Parties*. Paper presented at the 30<sup>th</sup> Annual Conference of the Association for Behavior Analysis: Boston, MA.

**Wiegand, D. M.**, & Geller, E. S. (May, 2004). *The Positive Psychology of Success Seeking: Promoting Positive Reinforcement in Organizations and Education*. Paper presented at the 30<sup>th</sup> Annual Conference of the Association for Behavior Analysis: Boston, MA.

Glindemann, K. E., Clarke, S. W., **Wiegand, D. M.**, & Hargrove, M. J. (October, 2003). *Intoxication Levels of Students With and Without a Designated Driver*. Poster presented at the 18<sup>th</sup> Annual Conference of the Virginia Department of Alcoholic Beverage Control: Chesapeake, VA.

Ehrhart, I. J., Rayne, S. R., Brooks, K. C., Williamson, L. E., & **Wiegand, D. M.** (October, 2003). *Preaching to the Choir: Interventions Efforts with a Small Co-ed Fraternity*. Paper presented at the semi-annual meeting of the Virginia Psychological Association: Charlottesville, VA.

**Wiegand, D. M.**, Burtner, M. L., Linden, S. K., Rush, W. R., & Budowle, R. E. (October, 2003). *“Getting Lit” at fraternity Parties: Differences in Alcohol Consumption Between Cigarette Smokers and Non-Smokers*. Paper presented at the semi-annual meeting of the Virginia Psychological Association: Charlottesville, VA.

**Wiegand, D. M.**, & Geller, E. S. (October, 2003). *Positive Psychology, Achievement Motivation, and the Power of Positive Reinforcement: A Case for Promoting Success Seeking in Organizations and Education*. Paper presented at the semi-annual meeting of the Virginia Psychological Association: Charlottesville, VA.

Glindemann, K. E., **Wiegand, D. M.**, Budowle, R. E., & Taliaferro, M. C. (June, 2003). *Further evidence of the celebratory drinking style of U.S. college students: When’s the next “alcohol holiday”?* Poster presented at the 11<sup>th</sup> Annual Convention of the Society for Prevention Research, Washington, D.C.

**Wiegand, D. M.**, Keene, W. R., Stuart, M. L., & Glindemann, K. E. (June, 2003). *Use of designated drivers in a university sample: A “green light” to increased intoxication?* Poster presented at the 11<sup>th</sup> Annual Convention of the Society for Prevention Research, Washington, D.C.

Glindemann, K. E., Marshall, D. T., Petersen, M. D., & **Wiegand, D. M.** (May, 2003). *An assessment of environmental variables influencing students’ alcohol consumption at college parties*. Paper presented at the 29<sup>th</sup> Annual Conference of the Association for Behavior Analysis: San Francisco, CA.

**Wiegand, D. M.**, Keene, W. R., Grandin, D. A., & Geller, E. S. (May, 2003). *From sober to wasted: Quantifying perceptions of alcohol intoxication*. Poster presented at the 29<sup>th</sup> Annual Conference of the Association for Behavior Analysis: San Francisco, CA.

- Keene, W. R., Stuart, M. L., **Wiegand, D. M.**, Speer, E. M., & Ehrhart, I. J. (April, 2003). *Who drinks more? Factors affecting front-loading and BAC levels*. Paper presented at the semi-annual meeting of the Virginia Psychological Association: Tyson's Corner, VA.
- Wiegand, D. M.**, Clarke, S. W., Burtner, M. L., Turner, P. J., & Clifford, J. S. (April, 2003). *Factors related to intoxication levels of pre-game tailgaters at an NCAA Division I football game*. Paper presented at the semi-annual meeting of the Virginia Psychological Association: Tyson's Corner, VA.
- Forness, S., Zima, B. T., Lechlitner, G., McDermott, D., Schaepper, M., Liao, D., & **Wiegand, D. M.** (November, 2002). *Mental health and juvenile justice: Psychiatric diagnoses and special education status of youth who were recently arrested*. Paper presented at the 26<sup>th</sup> Annual Conference on Severe Behavioral Disorders of Children and Youth: Tempe, AZ.
- Zima, B. T., Lechlitner, G., McDermott, D., Schaepper, M., Liao, D., & **Wiegand, D. M.** (May, 2001). *Detained youth: Who needs mental health services?* Poster presented at the annual meeting of the American Psychiatric Association, New Orleans, LA.
- Zima, B. T., Lecklitner, G., McDermott, D., Schaepper, M., Liao, D., & **Wiegand, D. M.** (October, 2000). *Mental health problems among detained youth: Relationship to criminal history*. Poster presented at the annual meeting of the American Academy of Child and Adolescent Psychiatry, Honolulu, HI.
- Quist, R. M., & **Wiegand, D. M.** (February, 2000). *Attributions of hate: Media representations of anti-gay hate crimes*. Poster presented at the 1<sup>st</sup> Annual Conference of the Society for Personality and Social Psychology, Nashville, TN.
- Wiegand, D. M.**, & Quist, R. M. (January, 2000). *Homophobic hate crimes and causal attributions*. Paper presented at the Minority Mentor Conference, Claremont, CA.
- Quist, R. M., & **Wiegand, D. M.** (October, 1999). *Attributions of hate: The media's causal attributions of a homophobic murder*. Poster presented at the Annual Conference of the Society for Psychological Study of Social Issues, Los Angeles, CA.
- Wiegand, D. M.**, Williams, J. H., Lee, D. F., & Breland, B. T. (May, 1998). *Increasing safe behaviors in an industrial setting: Global versus specific feedback*. Paper presented at the 24<sup>th</sup> Annual Convention of the Association for Behavior Analysis, Orlando, FL.
- Wiegand, D. M.**, Williams, J. H., & Olson, T. M. (April, 1998). *Assessing the effectiveness of different feedback strategies in industrial settings*. Poster presented at the Annual Meeting of the Virginia Psychological Association, Charlottesville, VA.

- Williams, J. H., **Wiegand, D. M.**, Depasquale, J. P., & Geller, E. S. (April, 1998). *The impact of global versus specific feedback in influencing organizational safety performance*. Paper presented at the 13<sup>th</sup> Annual Convention for the Society of Industrial Organizational Psychology, Dallas, TX.
- Rhudy, J., Chevaillier, C. R., Markell, B., **Wiegand, D. M.**, & Glindemann, K. E. (1997). *Drinking during alcohol awareness week: Are students getting the message?* Poster presented at the 43<sup>rd</sup> Annual Convention for the Southeastern Psychological Association, Atlanta, GA.
- Wiegand, D. M.**, Michael, P. G., Cecil, C., Breland, B. T., & Boyce, T. E. (October, 1997). *Intervening to improve the driving behaviors of pizza delivery drivers*. Poster presented at the 14<sup>th</sup> Annual Meeting of the Southeastern Association for Behavior Analysis, Chapel Hill, NC.
- Wiegand, D. M.**, Avis, M., Lindert, J., & Harrell, H. (1997). *To drink or not to drink: A study of college students' motivations to consume alcohol*. Poster presented at the 43<sup>rd</sup> Annual Convention for the Southeastern Psychological Association, Atlanta, GA.
- Wiegand, D. M.**, Biggs, J., Terrizzi, T., & Ludwig, T. D. (1997). *The effects of normative feedback and competition on pizza delivery drivers*. Paper presented at the 17<sup>th</sup> Annual Convention of the Florida Association for Behavior Analysis, Sarasota, FL.
- Wiegand, D. M.**, Boyce, T., Thompson, B., Olson, T., & Fortney, J. (May, 1997). *Effects of prompts, feedback, and rewards to improve driving: A systematic evaluation of intervention impact*. Paper presented at the 23<sup>rd</sup> annual convention of the Association for Behavior Analysis, Chicago, IL.
- McGorry, J., Brinkman, J., & **Wiegand, D. M.** (April, 1997). *An assessment of college students' normative beliefs about alcohol consumption*. Poster presented at the first annual meeting of The Virginia Collegiate Psychology Conference, Blacksburg, VA.
- Mehta, P., **Wiegand, D. M.**, Fransisco, D., & Howell, R. (April, 1997). *Commitment versus reward strategies to increase the use of actively caring thank-you cards*. Paper presented at the first annual meeting of The Virginia Collegiate Psychology Conference, Blacksburg, VA.

## **PROFESSIONAL EXPERIENCE**

January 2006 – Present

**Faculty Research Associate/Pre-Doctoral Intern**, Center for Truck and Bus Safety  
Virginia Tech Transportation Institute, Blacksburg, VA ([www.vtti.vt.edu](http://www.vtti.vt.edu))

Responsibilities:

- Writing grant and contract submissions on various aspects of transportation safety

- Running statistical queries of national crash databases
- Writing technical reports of research results
- Presenting research at professional conferences
- Database management and video data reduction
- Front Seat Experimenter for driving studies
- Developing a measure of driver risk
- Evaluating the safety training needs of commercial carriers transporting 9-15 passengers

July 2005 – December 2005 (temporary/emergency hire)

**Faculty Research Associate**, Center for Truck and Bus Safety

Virginia Tech Transportation Institute, Blacksburg, VA

Achievements:

- Database development/data management
- Reduced data for a field operation test of an on-board technology that monitors truck drivers' drowsiness levels and alerts them when at-risk
- Recruited participants and led them through pre- and post-drive procedures

August 2002 – May 2006

**Graduate Researcher**, Center for Applied Behavior Systems

Virginia Tech Department of Psychology, Blacksburg, VA

Responsibilities:

- Designed research interventions to increase safe, healthy, and/or environmentally beneficial behaviors in community and industrial settings
- Developed questionnaires, surveys, and checklists for psychological research
- Developed research protocols
- Organized data collection, entry, and verification
- Managed databases and performed data analyses
- Supervised undergraduate research assistants
- Presented research findings at professional conferences
- Led class sessions for undergraduate field study in community and health psychology

August 2002 – May 2005

**Graduate Clinician**, Psychological Services Center

Virginia Tech Department of Psychology, Blacksburg, VA

Achievements:

- Maintained a caseload of 10-35 client contact hours per semester for individual, couple, and anger management therapy
- Psychological assessment, including administration, scoring, report writing, and debriefing of child and adult clients
- Received and delivered individual and group supervision, including participation on practicum teams
- Documented therapy progress with case notes, intake reports and discharge reports

July 2000 – July 2002

**Staff Research Associate IV**, Health Services Research Center, Neuropsychiatric Institute  
University of California at Los Angeles, Los Angeles, CA

Achievements:

- Coordinated all activities involved in a collaborative, statewide evaluation of children's mental health services, as well as an evaluation of the level of mental health problems, service use patterns, and short-term outcomes among detained youth within Los Angeles County juvenile halls
- Monitored a \$1.5 million dollar budget
- Interacted frequently with various internal departments and external vendors
  - Activities included grant preparation, establishing/maintaining contractual agreements, purchasing, and personnel administrative duties (hiring, training, etc.)
- Administered procedures for obtaining/maintaining human subjects' protection committee approval at the state, county, university, and clinic levels
- Composed and edited quarterly progress reports, annual technical reports, and research proposals
- Developed project literature, website, and marketing materials

May 1999 – May 2000

**Graduate Intern**, Research & Evaluation Division  
Riverside County Department of Mental Health, Riverside, CA

Achievements:

- Managed and analyzed quantitative and qualitative data from a mental health population
- Developed reports and professional presentations on county performance outcomes data
- Designed and implemented surveys to mental health clients and their families
- Performed literature/information searches on various topics in mental health

September 1999 – December 1999

**Teaching Assistant for Graduate Level Social Psychology**, Claremont Graduate University,  
Claremont, CA

Achievements:

- Prepared lecture presentations
- Assisted with the grading of weekly assignments, term papers, and examinations
- Interacted frequently with students at individual and group levels

September 1998 – May 2000

**Research Assistant in Psychology**, Claremont Graduate University, Claremont, CA

Achievements:

- Proofread and edited book chapters to be published



- Created an author index for a book on interpersonal violence
- Collected and managed data on interpersonal relationships

June 1997 – May 1998

**Project Leader & Conference Coordinator**, Center for Applied Behavior Systems  
Virginia Tech Department of Psychology, Blacksburg, VA

Achievements:

- Conducted site visits in various industries to detect potential safety hazards
- Worked closely with safety steering committees within several companies
- Designed and implemented interventions to increase safety in occupational and community settings
- Organized and presented professional conference presentations on behavior-based safety

January 1998 – May 1998

**Research Assistant**, Team Finney (currently the Pediatric Psychology Research Group)  
Virginia Tech Department of Psychology, Blacksburg, VA

Achievements:

- Interviewed children regarding risk-taking behaviors
- Assisted with the development and execution of an experiment looking at the effects of experimenter demands on people's self-reports of prescribed behavior
- Performed a literature review on risk-taking behaviors

January 1997 – May 1997

**Research Assistant**, Stress & Coping Team  
Virginia Tech Department of Psychology, Blacksburg, VA

Achievements:

- Participated in the development of a program to teach children fire safety
- Located and recruited fire victims for interviews
- Transcribed client sessions
- Became certified in CPR, First-Aid, disaster assessment, and emergency assistance by the American Red Cross
- Performed a literature review on fire safety

March 1996 – June 1997

**Research Assistant**, Center for Applied Behavior Systems  
Virginia Tech Department of Psychology, Blacksburg, VA

Achievements:

- Observed and recorded behaviors in naturalistic settings
- Planned and implemented community interventions to increase the rate of safe and/or environmentally beneficial behaviors in these settings

- Data entry, verification, and analysis

### **CONSULTING EXPERIENCE**

May 11-12, 2006

British Petroleum (BP) Shipping Americas – Chicago, IL

Main Speaker at the Safety Contractor Workshop

### **AWARDS AND HONORS**

- Outstanding Graduate Student of the Year Award, Virginia Tech College of Science (2006)
- Virginia Tech Graduate Student of the Month (January 2006)
- Honorable mention: C. William Applegate Applied Graduate Paper Award, Virginia Psychological Association semi-annual meeting (April, 2003)
- The Ida Lloyd Crotty Scholarship, Claremont Graduate University (1998-2000)
- Undergraduate Research Award, Virginia Tech Department of Psychology (1998)
- Virginia Tech Undergraduate Dean's List (1995-98)
- Certified Research Associate, The Center for Applied Behavior Systems (1996)

### **COMMUNITY SERVICE**

- Removing litter every 3-4 months along a one-mile stretch of Virginia's New River (2002-2006)
- Eight hours a week caring for a gentleman suffering from Dementia (October 2000 – December 2001)
- Rode a bicycle 575 miles to raise \$3,845 for AIDS service organizations and research, California AIDSride 8 (Summer 2001)
- Provided Blood Alcohol Concentration feedback and education during Alcohol Awareness Week in Blacksburg, VA (1995-1997)
- Volunteered for the American Red Cross (1997-1998)

### **RELEVANT COURSE WORK (GRADUATE)**

Clinical Practicum (2002 –2005)	Assessment of Human Intelligence
Statistics for Social Sciences	Research Methods
Analysis of Variance (ANOVA)	Multiple Regression
Overview of Social Psychology	Emotional Development
Computer Applications	Foundations of Evaluation
Innovation & Entrepreneurship	Human Service Organizations
Personality Assessment	Adult Psychopathology
Behavior Mgt. in Large Scale Systems	Statistics for Social Sciences II
Child Psychopathology	Developmental Psychology
Ethics in Clinical Psychology	Personality Processes
Biological Bases of Behavior	Advanced Statistics for Educators
Industrial Psychology	

### **RELEVANT COURSE WORK (UNDERGRADUATE)**

Introductory Psychology	Developmental Psychology
Psychology of Learning	Psychology of Personality
Principles of Psychological Research	Abnormal Psychology
Social Psychology	History and Systems in Psychology
Quantitative Methods	Introductory Sociology
Introductory Communications	Psychology and Creative Art
Field Study in Applied Behavior Analysis	Field Study in Health Psychology
Independent Study (Systems Theory)	Language and Logic (Philosophy)
Advanced Social Psychology (with lab)	Morality and Justice (Philosophy)
Knowledge and Reality (Philosophy)	Marriage, Dating, and Divorce
Psychology of Self	Statistics for the Social Sciences
Sociology of Deviant Behavior	

### **COMPUTER SKILLS/EXPERIENCE**

PC- and Macintosh-based computer systems, including Microsoft Office Pro (Excel, Word, Access, and PowerPoint), Windows 3.11-XP, SPSS, SAS, EndNote 2 Plus, Harvard Graphics, currently-published Internet software (Netscape Navigator, MS Internet Explorer, Eudora, Outlook Express, MS Exchange), *TELEform*, and electronic literature databases (e.g., MedLine, PsychInfo)

### **PROFESSIONAL AFFILIATIONS AND ORGANIZATIONS**

American Psychological Association	Student Affiliate
Make-A-Difference Foundation	Member, Board of Directors
Organizational Behavior Mgt. Network	Student Affiliate