EXAMINING OF THE EFFECTS OF BLAME VS. ATTACK ANTI-TOBACCO MESSAGES USING THE LIMITED CAPACITY MODEL OF MOTIVATED MEDIATED MESSAGE PROCESSING

A Dissertation

Presented to

the Faculty of the Graduate School

University of Missouri-Columbia

In Partial Fulfillment

of the Requirements for the Degree

Doctor of Philosophy

by

JENSEN J. MOORE

Dr. Glenn Leshner, Dissertation Supervisor

December 2007

The undersigned, appointed by the Dean of the Graduate School, have examined the dissertation entitled

EXAMINING OF THE EFFECTS OF

BLAME VS. ATTACK ANTI-TOBACCO MESSAGES USING

THE LIMITED CAPACITY MODEL OF MOTIVATED MEDIATED MESSAGE

PROCESSING

Presented by Jensen Moore

A candidate for the degree of Doctor of Philosophy

And hereby certify that in their opinion it is worthy of acceptance.

_____

Professor Glenn Leshner
Dissertation Advisor

_____

Professor Esther Thorson

_____

Professor Glen Cameron

_____

Professor Margaret Duffy

_____

Professor Tiffany Whittaker

All my love and gratitude go to:

My husband Matthew,
who drove me to distraction,
got irritated by my constant rambling and complaining and left me there,
later realized he should probably go back and get me,
then discovered he lost his keys, his wallet, his cell phone, and his PDA-
but knows it wouldn't matter because I wouldn't answer my cell phone
or check my e-mail right away anyhow-
and finally decided that I'm a smart girl and I'd find my way back on my own,
so he's going to go to bed and catch up on some sleep.
I love you too – really, really.

My daughter Jocelyn,
for subjecting herself to daycare so Mommy could work on her research.
My son Tristan,
for kicking Mommy in the ribs when she needed to be kept awake.
You both were the most welcome & wonderful "breaks" in my doctoral education.
XOXO my beautiful babies.

My best friends of almost 20 years, Joy and Katrina,
you two are the best sounding boards, warning systems, and comedy breaks
a girl could ever ask for. Thank you for being my saving graces!

The entire Copple family, for helping me to achieve this dream.
I now know what families do.

It wasn't always easy (in fact, it rarely was),
and without you all supporting me, I would have never made it.

Those who assume that miracles cannot happen are merely wasting
their time by looking… we know in advance what results they will find
for they have begun by begging the question.

C.S. Lewis,
Miracles

ACKNOWLEDGEMENTS

It seems like I have been surrounded by tobacco my entire life. As far back as I can remember, I can picture the cigarette smoked-filled living room in my grandparent's home. I remember going on car rides with my grandparents and getting so sick from the cigarette fumes that I had to hang out the car door or window and vomit. I remember watching my Aunts and Uncles smoke too – as well as cough uncontrollably. So, I'm not really sure why at age 6 I decided that smoking was somehow glamorous enough for me to bike 5 miles into town and spend my measly allowance of $1 a week on candy cigarettes (the gum ones that blew actual wisps of smoke out of the wrapper), or to waltz through my parent's home, pencil protruding from my mouth as a mock cigarette, stating to everyone that "I was going to smoke when I grew up."

There are a lot of things that I don't agree with my Mother on, but the best thing she ever did for me was take me aside that day and make me smoke, not one, but several cigarettes from my grandmother's pack. I got so sick from that experience that I never tried another cigarette until college. However, it did not prevent me from being dumb enough in high school to try chewing tobacco (another vomiting experience I'd just as soon forget). Nor, as I mentioned, did it stop me from trying to act "cool" in college by purchasing a very expensive brand of colored-paper, slender, ladylike cigarettes and try smoking them at a party (yet another vomiting experience I wish I could forget).

These are not the only painful memories I have of tobacco products. I also remember the day my Mother picked me up from daycare, bawling her eyes out, barely

able to squeak out the words that my beloved grandfather had died the night before from a heart-condition which was affected by his smoking. There was also the day that my Father called to tell me that my grandmother had developed a cancerous tumor behind her eye and it had to be removed (she now has a glass eye). There was no proof that it was linked to her smoking, but from where I sit you can't smoke a pack of cigarettes a day and not expect to have something bad happen. I remember too, the day my Sister told me my Uncle had a very advanced stage of colon cancer and that he wasn't expected to live very long (this same uncle had been coughing uncontrollably for years from cigarette smoking), so he wasn't going to stop smoking because he was going to die anyway. Then there was the day that I saw a pack of cigarettes in my best friend's car. Her mother had died of brain cancer only a few years earlier and she had recently been diagnosed with cervical cancer. I remember begging and pleading with her to stop and crying myself to sleep that night thinking of what it would be like to lose her too. Luckily, she got pregnant soon after and stopped smoking not only during her pregnancy, but for good - a fact which I'm sure her four children will one day thank her for.

Despite all this, I still have family members who continue to smoke, including my favorite Aunt – who despite the fact that her three daughters throw her packs of cigarettes away to try and get her to quit – merely laughs and says she may quit someday. This has been going on for almost 10 years now, so I guess someday might be in the next decade. In addition, I married a man who comes from a smoking family. He and his brother have had severe asthma all their lives (with numerous trips to the emergency room), and still his family refuses to stop smoking. I can't say for certain that their asthma was caused by his parent's (and extended family's) smoking, but I also can't say for certain that it

wasn't. I also can't say my own asthma wasn't caused by my grandparents - or several of my babysitters - smoking around me. Luckily, my husband doesn't smoke or chew. His brother however, still battles with a nasty chewing habit.

When we found out we were pregnant, my husband's parents said a grandchild was a great reason for them to quit. Their granddaughter was born in December 2006 and they came to see her – with cartons of cigarettes in tow. To this day, even with a second grandchild here, they still have not quit. My Mother-in-law said once that she saw on T.V. that Peter Jennings quit smoking and he still died of lung cancer years later – so what good would it do for her to quit now? My answer to her is this: "It may not do you any good, but it will do wonders for your grandchildren." When we visit them we can't stay at their house because of the cigarette smoke in the walls/carpets/clothes; every item that we get from them has to be either aired out or washed numerous times to get the smoke out; we don't ride in their car; and we have to limit when our children can be around them since we don't want them to "mimic" the smoking behaviors. In addition, my husband and I are constantly on guard keeping cigarette packs, ash trays, and used butts out of their reach. It is these experiences that I don't want my kids to remember about their grandparents.

I should note that there is one thing that I don't remember – I don't ever recall my own parents smoking or chewing around me and for that I am eternally grateful. Despite all the tobacco use in their own families, they refused to partake. I'm not sure if they thought cigarettes were dangerous to themselves or us kids, or if it was because we were so poor they couldn't afford them. Either way, I appreciate the fact that I did not grow up in a house filled with smoke (or spit), and I will make damn sure my children don't

either. Even if it means hurting their grandparents' feelings, telling complete strangers not to smoke around my kids, taking them to a hospital oncology floor so they can see people smoking out of the tracheotomy tubes in their necks (though Dr. Leshner assures me fear does not work in assuaging smoking behaviors), or making them smoke a few cigarettes until they get sick. I may also make them watch some of the anti-tobacco PSAs that I came across during the course of my research.

One of the most poignant I have ever seen was the genesis of this dissertation. In 1999, while watching television – which I am the first to admit I do more than I should – I saw one of the most remarkable public service announcements ever. It was called *Bodybags* and showed a group of people placing what appeared to be full bodybags outside the building of a major tobacco company. When they had piled 1,200 of them on the sidewalks surrounding the building, a man shouted through a megaphone: "This is what 1,200 dead people look like." A caption then stated that tobacco products kill 1,200 people per day. The ad was for the newly founded national *Truth* campaign. Even though I am a non-smoker, the campaign really grabbed my attention. I watched for that ad on T.V., and the 100-odd *Truth* ads that followed, almost religiously. After watching a *Truth* ad which featured thousands of babies crawling on a sidewalk with a sign on their little bellies which read: "How do infants avoid second-hand smoke? They learn to crawl," I was so moved that I logged on to the *Truth* website, became an organization member, and began posting anti-tobacco facts to their blog. I was even one of the first people to "win" one of the very babies featured in the ad (a toy my daughter now loves). So, I was quite happy to find out when I began this dissertation that I would finally be able to more fully explore this intense anti-tobacco campaign that has held my attention for so many years.

What to study, how to study it, etc. has always been hard for me. I have always been so interested in every little thing that it has made my research what Betty Winfield calls "a little all over the place." I can't say I blame her. My beginnings in this field were a little all over the place. When I began my Master's program at the University of Minnesota I knew I loved T.V., loved journalism, loved advertising, and hated numbers. I felt in my heart I was going to be qualitative – after all, I had always been good at essays, book reports, critical analyses and the like (no offense Dr. Duffy), and never very good at numbers - one look at the math section of either my ACT or GRE will prove that point. Furthermore, I had once taken a statistics course in undergrad and remembered almost nothing about it (although it was at 8 a.m., so who could really blame me?). So I began my Master's program thinking that I would do rhetorical analyses, critical cultural analyses, discourse analyses, etc. However, when it came to research questions, I kept asking about how effective a particular communication was. It was then, much to my chagrin, that I discovered that media effects studies used statistics. So my research began with a positive and a negative – I could study all the effects of anti-tobacco campaigns I wanted, but I would have to use numbers to do it.

I thought I would get eased into the world of statistics – that was until I met Dr. Esther Thorson, whom I have come to the conclusion never eases into - but goes full boar into - research projects. When I came to the University of Missouri I was assigned to work as her research assistant. During my first meeting with Esther, she handed me a stack of data and asked me to look at it and come up with some theories about what was going on with it. At that point I was pretty sure she hated me. I had always designed research, carried it out, and analyzed my own data (though admittedly, not well). She was

asking me to completely reverse-engineer the entire process (by the ICA deadline 6 weeks away), and I thought it must be some kind of hazing. It was at that point that I broke down and signed up for my first statistics course since 1998. That course and the four which followed it have been possibly the best thing that ever happened to me. I now know just enough about statistics to be completely dangerous - so, my thanks to Esther for making me statistics public enemy #1.

Esther was also kind enough to hand-pick my wonderful dissertation committee. I think she knew that I wanted to be challenged as well as supported and she told me exactly who would do just that. When I told her what my idea was she immediately told me I would need a strategic communication member, a health communication member, a quantitative methods member, and an outside statistics member.

I learned about academic family trees while I was at the University of Minnesota. My Master's thesis advisor was Shelly Rodgers – making her my Master's "Mommy". Her doctoral advisor was Esther Thorson – making her my "Grandma." However, while doing my doctorate at MU Esther was my faculty advisor – making her my Ph.D. "Mommy". I know it sounds like some kind of twisted family tree – but my "Grandma-Mommy" Esther picked out a wonderful family for my dissertation. She chose Glenn Leshner, Margaret Duffy, and Glen Cameron as my School of Journalism members and assured me that although a mix of backgrounds and methodologies they would all play nice with one another (wink, wink).

I have to admit that I was a little afraid of Dr. Glenn Leshner before I met him. He has long had the reputation of being a very tough instructor and demanding committee member. No one I knew at that time had him on their committee. When I asked them why

they said they wanted to make their dissertation as easy as possible (most of them picked what they said were "cake" committee members). In addition, I was pretty sure he would say "no" since when I asked him to be on my committee: 1) I had never had a class with him, and 2) he had just watched me stumble through my fourth presentation of the 2004 AEJMC conference. I was fairly certain he wasn't too impressed with me, but I think Esther and Wayne Wanta convinced him it would be o.k.

After working with him for the last two years I can honestly say that having him chair my dissertation committee (a chore he graciously took over from Esther) was possibly the best decision I have ever made. He helped me to not only set up and interpret a very difficult experiment, but spent countless hours editing (and editing, and editing, and editing…) various dissertation drafts. I have learned a great deal from how meticulous and demanding he is. I have also learned that underneath his formidable stern exterior lies a very shrewd and wickedly funny individual. His wit and wisdom have been invaluable. In terms of my academic family tree, I could not have asked for a better "Father".

I have always had a warm connection to Dr. Glen Cameron. Not only did he attend the same undergraduate college and have the same track coach, but he has been wonderfully supportive of all my decisions. He was the first person to congratulate me when I found out I was pregnant and shared some of his own childrearing tales with me. He has always been there for me to talk to and has even gone to bat for me in a few battles. Everything he does is accomplished through intuitiveness, charisma, and tact – three things I hope I have learned a little bit about from him. He also introduced me to a hands free software program called Dragon which has helped me prepare for classes,

conferences, presentations and the like the last few years (all while being able to hold a child in my arms).

I hope she doesn't take this the wrong way, but Dr. Margaret Duffy has always reminded me of Cybil Sheppard both physically and in character. Some people think Cybil Sheppard is crude and aggressive. I have always felt that she is clever, incisive, and hilarious – three things that I see in Margaret. Margaret has always trusted me to do my own thing. Even when I was her R.A., she just "let me loose" knowing that I would be productive. Under her direction I created three pieces of qualitative research which contributed to this dissertation – a discourse analysis, a rhetorical analysis, and a fantasy theme analysis of different anti-tobacco campaigns.

Dr. Tiffany Whittaker is the second person in my life who has made statistics bearable. The first person was Alex Waigandt who taught the intro statistics course I used to refresh my undergraduate statistics. I thought that there couldn't be anyone better until I took one of Tiffany's classes. She makes things like Bonferroni corrections, factorial designs, and epsilons not only bearable, but understandable. I have never had a statistics professor put so much time and effort into helping me understand, and be able to run my own statistics. Her notes are amazing and her classes are fun, which may be why I took all my stats classes from her and have her on my committee. She also is gracious and considerate - putting up with random (and sometimes stupid) questions and e-mails even though I am no longer one of her students.

There is one person who was not on my committee who should be considered an honorary member. Dr. Wayne Wanta was the first person who made writing a research paper understandable to me. I had done a few papers during my Master's at Minnesota,

but didn't fully comprehend all the "parts" until I came to MU. In the first class I had with Wayne he gave us all a "formula" of sorts as to what goes into the various pieces of a research paper. I have always needed a roadmap or example of what goes where – so when he laid it out for us, it finally made sense. I have had 20+ conference papers, won a few research awards, and had several journal articles accepted since that time, so I owe him a world of thanks.

I would also like to thank the directors of the Missouri School of Journalism PRIME Lab, Dr. Glenn Leshner, Dr. Paul Bolls, and Dr. Kevin Wise, whose valuable suggestions regarding MediaLab, DirectRT, and running participants made this dissertation possible. I also cannot thank enough the following PRIME Lab members: Stephanie (i.e., "Sammy") Miles, Brian Pellot, Stephanie Schafer, Rebecca Norris, and Ryan Meyer. Each of these students served as lab assistants and aided in the data collection portion of this study. They also helped me to iron out MediaLab and DirectRT problems along the way. I could not have finished this dissertation without their help.

A special thank you goes out to Michelle Maldanado and Natalie Granda at Crispin, Porter, & Bogusky advertising in Miami for helping me get my hands on the entire archive of the *Truth* anti-tobacco campaign advertisements. Without there help I would not have had any stimuli to use for my dissertation as I constantly got the runaround from everyone at the ALF.

I can't speak highly enough of the wonderful classroom instruction I have had while at MU from: Esther Thorson, Stephanie Craft, Wayne Wanta, Betty Winfield, Glenn Leshner, Lee Wilkins, Keith Sanders, Tiffany Whittaker, and Alex Waigandt. I have also had the opportunity to R.A. for and work on papers with some of the top people

in the research world: Esther Thorson, Glenn Leshner, Glen Cameron, Margaret Duffy, Wayne Wanta, Keith Sanders, and Shelly Rodgers. In addition, I was able to do several research papers with classmates: Scott Reinardy, Keith Greenwood, Fred Vultee, and Mugar Geana. It was an honor to get the experience of working with them all.

I also can't speak highly enough of the graduate school support staff. Amy Lenk, Ginny Cowell, and Martha Pickens have put up with my dumb questions since before I even got here. They not only helped me get through the application process, but have given me invaluable advice throughout the last four years. If any of them was ever to retire, the program might fall apart. Amy, this means you can't go anywhere – ever.

Even though I am a mere female, I was invited to take part in the monthly Advanced Probability Seminar (i.e., Journalism School Poker night) led by Dr. Keith Sanders and attended by Dr. Earnest Perry, Kelly Marsh, Dr. Scott Reinardy, and Dr. Keith Greenwood. I think I may be the first female they had ever invited. I am not sure if it was because they wanted to take my money or if they thought of me as just one of the guys. Either way, I had a wonderful time and was honored to attend. I learned a lot more from those evenings than just how to play poker. Thank you all for including me.

I would also like to thank my best friend, Joy Morrey, who although she has a full-time job and four children of her own to raise, managed to find the time to edit portions of my dissertation for me. I know she will forgive my overuse of the word "as" and my liberal use of commas the same way she has forgiven me all my shortcomings over the last 19 years. I always said that if she was a guy I would have married her.

That said, a special thank you goes out to my husband Matthew, who despite having a hectic medical school schedule, helped by watching our children, entering data,

editing presentations, reviewing notes, and working on a bibliographies so I could finish both my Master's and Doctoral degrees. You are now formally nominated for Saint-hood (right after Joy).

I would also like to thank my husband's family (Clayton, Mary, Josh, and Cassie Copple) and my Aunt Marie Kasten-Hohl who helped in various ways to support our family during both my Master's and doctoral degrees. They have helped with transportation, technology, living arrangements, and other issues Matt and I have had over the years. I can't say thank you enough for all the times Clayton and Mary have handed out money for "medicinal purposes" to help make our lives easier as well as more enjoyable.

Finally, I would like to acknowledge that I had two beautiful children who took part in this endeavor with me. I am sure that the surge of hormones experienced during both pregnancies helped me to finish my doctoral degree. They also have made me more committed to continuing this type of research if for no other reason than to give me information to use in my future discussions with them regarding smoking, drinking, and doing drugs. The sex stuff I will leave to my husband and his various medical school photos of STDs.

My oldest child has on numerous occasions referred to my husband as "Doctor Daddy". After I defended my dissertation she called me "Doctor Mommy" for the first time and my eyes welled up with tears. I know that I am only what Dr. Cameron calls a "paper doctor," and I will never be saving lives or using carpentry tools in the operating room like my husband, but I am glad that I am finally a doctor – at least in her eyes.

Before I began my dissertation, I thought it was something I would do on my own. I never knew it would take so much help from so many people. I hope I have not forgotten anyone, but if I have - and you are making the mistake of reading this pile of dead trees and fail to see your name here - I apologize and I thank you too.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

A’	(pronounced A-prime) sensitivity measure
Aad	Attitude toward the advertisement
AHMSV	Attack with high Message Sensation Value
ALF	American Legacy Foundation
ALMSV	Attack with low Message Sensation Value
ANOVA	Analysis of Variance
B”	(pronounced bee-double prime) response bias measure
BAS	Behavioral Activation System
BHMSV	Blame with high Message Sensation Value
BI	Behavioral Intent
BIS	Behavioral Inhibition System
BLMSV	Blame with low Message Sensation Value
BSS-2	Brief Sensation Seeking - 2
BSSS-4	Brief Sensation Seeking Scale – 4
BSSS	Brief Sensation Seeking Scale
IAPS	International Affective Pictures System
ImpSS	Impulsive Sensation Seeking
LC4MP	Limited Capacity Model of Motivated Mediated Message Processing
MAM	Motivation Activation Measure (also Mini-MAM I and Mini-MAM II)
MANOVA	Multivariate Analysis of Variance
MSA	Master Settlement Agreement
MSV	Message Sensation Value
NB	Negativity Bias
PMSV	Perceived Message Sensation Value
PO	Positivity Offset
PSA	Public Service Announcement
SAM	Self-Assessment Manikin
SDT	Signal Detection Theory
SS	Sensation Seeking
STRT	Secondary Task Reaction Time
SU	Substance Use
TU	Tobacco Use

ABSTRACT

Previous research using cognitive and persuasive measures posits that traditional Blame anti-tobacco advertisements which conceptualize smoking problems and consequences as caused by the individual are superior to the new Attack ads which challenge the institutions behind tobacco products. The current study utilizes Lang's Limited Capacity Model of Motivated Mediated Message Processing (LC4MP) to examine Attack vs. Blame and high vs. low Message Sensation Value (MSV) anti-tobacco ads as well as individual Motivation Activation which influences what parts of incoming information are encoded and stored.

A total of 226 participants took part in a 2 (Message Type: Blame/Attack) X 2 (Message Sensation Value: low/high) X 2 (Positivity Offset: low/high) X 2 (Negativity Bias: low/high) repeated measures experiment. Findings suggest that high MSV Attack ads - like those used by the national *Truth* campaign - are more effective than Blame ads in terms of encoding (STRTs, Response Latency, Recognition Memory), Persuasiveness (Aad, Evaluation of the Argument, Behavioral Intent), and Emotional Response (Arousal, Positive & Negative Valence). In addition, aversive activation (i.e., NB) was more influential than appetitive activation (i.e., PO) in terms of anti-tobacco message effectiveness.

Chapter 1
Introduction

For more than 100 years American citizens and organizations have waged a war against smoking. Though many consider social marketing and public health campaigns relatively new, anti-tobacco campaigns have been around since the early days of the cigarette. In "Cigarette Wars," a historical account of the anti-cigarette movements, Tate (1999) outlined the moral, social, and health appeals used in the anti-cigarette campaigns of the 19th century. Arguments ranged from cigarettes being addictive and unhealthy; "launch[ing] pads to moral decay," "sapping intellect," "stunting bodies and shortening lives" and being the "pest of modern society," to being a major contributor to social problems such as drinking, drug use, delinquency and abuse (pgs. 45-48, 148)

A century later, many of these health arguments were justified with the cancer scares of 1951 and 1952 which led to more than 7,000 articles correlating smoking and disease. The Surgeon General's reports in the 1960s confirmed our worst fears – smoking cigarettes did indeed cause cancer and a myriad of other health issues that often resulted in death (United States Department of Health and Human Service, 1964; 1967). However, it wasn't until 10 years after these reports that the Surgeon General declared that "cigarette smoking is the single most important preventable cause of death" and warning labels extolling the dangers of smoking were placed on cigarette packages (United States Department of Health and Human Service, 1979, p. 7).

Once it was widely recognized that smoking was hazardous to the smoker's health, it was only a matter of time before researchers started gathering information on the dangers of second-hand smoke. After all, it was reasoned that smokers had the benefit of the cigarette's filter to protect them. What protection did those around smokers have? Studies indicated that second-hand smoke was just as dangerous as smoking, killing 38,000 to 67,500 people each year (Lindblom & McMahon, 2005). Calling it "involuntary smoking", second-hand smoking reports have outlined the causal linkages of second-hand smoke to 16 illnesses and infections ranging from ear infections and asthma to coronary heart disease and lung cancer (United States Department of Health and Human Services, 1986; 2006). A total of 28 Surgeon Generals reports over the last 42 years have all pointed to the same conclusion: tobacco is "the plague of our time" (Roper, 1991, p. 3188).

Tobacco products have been linked to bladder cancer, cervical cancer, esophageal cancer, kidney cancer, laryngeal cancer, leukemia, lung cancer, oral cancer, pancreatic cancer, stomach cancer, abdominal aortic aneurysm, atherosclerosis, cerebrovascular disease, coronary heart disease, chronic obstructive pulmonary disease, pneumonia, respiratory illnesses and infections, fetal death and stillbirths, fertility, low birth weight, pregnancy complications, cataracts, hip fractures, low bone density, and peptic ulcer disease (United States Department of Health and Human Services, 2004). These result in over 400,000 deaths in the United States alone each year, more than the total number killed by AIDS, alcohol, motor vehicles, homicide, illegal drugs, and suicide combined (Kaplan, 2000).

Anti-tobacco campaigns have used these findings to battle what has become a growing smoking population. Mass media campaigns are often the chosen means of information dissemination because they reach a large audience. Social marketing tactics that employ advertising, marketing, and public relations strategies to "unsell" cigarettes are often used. The goal is to use the media to influence attitudes or change behaviors regarding smoking. The decrease in smoking rates from 1965 (when 40% of the population smoked) to 1998 (23%) have been attributed to public policies, increased tobacco taxes, warning labels, and *mass media campaigns* (Minkler, 2000).

However, over the years it has become increasingly difficult for smokers to quit as flavorings and chemicals have been added to increase the pleasure and addictiveness of smoking cigarettes. In addition, more children have begun to try cigarettes – and have continued to smoke into adulthood – due to increased tobacco advertising strategies aimed at attracting youth and teens. Finally, 30 years after the Surgeon General's reports regarding the dangers of smoking, 46 states and 5 U.S. territories took "Big Tobacco" to task for their actions. In 1998, the tobacco industry – faced with testimony and documentation regarding their actions from their own companies – collectively agreed to the Master Settlement Agreement (MSA). The agreement placed advertising restrictions on the companies and also established a fund for a campaign with the overall goals of educating the American public regarding the health effects of smoking and the nature of tobacco products in general, as well as counteracting the use of tobacco products by youth in America (Master Settlement Agreement, 1998).

Under this agreement, millions of tobacco industry dollars were earmarked for a national public education fund called the American Legacy Foundation (ALF). Believing

that current social marketing methods of combating youth smoking had proven unsuccessful, the ALF turned their attention to a State of Florida pilot program called 'truth.' Instead of providing information about smoking behaviors and cessation, the 'truth' campaign focused on the deceptive and manipulative practices of the tobacco companies. Individuals "don't respond to 'Don't smoke,'" said ALF President Cheryl Healton, "They do respond to 'These people want my money and they don't care about my health, they've spent 50 years denying the health effects of tobacco'" (Carlson, 2001, p. 2).

Thus, at the end of the 20th century, a new type of anti-tobacco campaign emerged. The appeal used was often classified as "attack," "counter-advertising" or "structurally-focused" as these public service advertisements (PSAs) challenged the credibility of the tobacco industry often by using wording from their own documents to vilify the tobacco companies for manipulative and deceptive practices in attracting and maintaining consumers/smokers. The acceptability of cigarettes themselves are called into question (i.e., not smoking behaviors), and individuals are seen as victims of tobacco industry deception.

Recently, some have argued that these "Attack" campaigns are more attractive to audiences as well as effective in reducing or preventing smoking behaviors than what are considered "traditional" anti-tobacco campaigns (Farrelly et al., 2002; Goldman & Glantz, 1998; Hersey et al., 2003; Siegel, 1998; Sly et al., 2005; Sly, Hopkins, Trapido, & Ray, 2001; Sly, Trapido, & Ray, 2002). Meanwhile, traditional campaigns have focused on the individual as responsible for consequences of their actions. These are based on the assumption that whether or not to smoke is a decision completely under the control of the

individual; thus any negative effects of smoking are completely preventable if an individual either stops smoking or chooses not to start smoking (Dorfman & Wallack, 1993; Wallack, 1986).

Purpose

The current study takes both a cognitive and affective approach in examining the effectiveness of Attack vs. Blame anti-tobacco campaigns. DeFleur and colleagues (1992) suggested that three things influence what we learn from the media: 1) individual differences, 2) the medium used, and 3) message factors. The Limited Capacity Model of Motivated Mediated Message Processing (LC4MP, A. Lang, 2006b) takes into account each of these influences. It is based on the assumption that as information processors we can only attend to a limited amount of information in any presented message. According to the model, how many of our available resources are dedicated to processing a message depends upon our personal motivation (i.e., Motivation Activation), the medium presenting the message, and individual goals and features of the message (i.e., message sensation value) that garner our automatic and controlled attention (A. Lang, 2006b).

Research by Lang and colleagues (A. Lang, 2006a, , 2006b; A. Lang, Shin, & Lee, 2005; A. Lang, Wang, & Bradley, 2004) in the area of Motivation Activation suggests that individuals possess distinctly different motivational traits (i.e., Positivity Offset and Negativity Bias) which make them attend to and process messages in different ways. This study is based on the assumption that an individual's Motivation Activation is not only correlated with their Sensation Seeking (SS) tendencies, but that Positivity Offset (PO) and Negativity Bias (NB) can be used as targeting and design variables for

anti-tobacco messages. In the area of health communication, Message Sensation Value (MSV) and SS studies have consistently shown that high SS individuals are more "attracted" to and more likely to process information from high MSV messages. Messages directly targeted at high SS individuals (those more likely to perform substance use behaviors such as smoking) have been shown to effectively influence anti-drug intentions. In the same vein the current study attempts to segment the audience into high PO, high NB (Coactives), high PO, low NB (Risk Takers), low PO, low NB (Inactives), and low PO, high NB (Risk Avoiders), and provide and understanding of how these segments are likely to process and be persuaded by anti-tobacco messages.

Niederdeppe (2005) posited that experimental studies of message sensation value (MSV) using Lang's limited capacity model have mainly used physiological measures of attention instead of measures of processing and persuasion. He suggested that "future experiments might incorporate these measures to provide a broader understanding of the relationship between stylistic elements and outcomes" (p. 342). Likewise, in the current version of the model (i.e., LC4MP) Lang too notes the deficiency stating that few limited capacity studies have focused on persuasion and attitude change (A. Lang, 2006b). The current study seeks to resolve this issue by using measures of persuasion and attitude change as well as message processing.

The LC4MP model has recently been applied to designing cancer messages which raise awareness, impart knowledge, persuade, and/or change behaviors. Lang (2006b) stated that in order to increase awareness, a message must be attended and encoded. For persuasion to take place, the message must elicit positive attitudes and evaluations. Thus, the current study is concerned with examining the persuasive aspects of the message

including positive attitudes and evaluation of message arguments as these have been shown to predict future behaviors (Mitchell & Olson, 1981).

In addition, this study examines aspects of the message such as novelty, emotional arousal, and dramatic impact that contribute to the MSV and the overall persuasiveness of the message. The experiment used in this study explores responses to Blame vs. Attack messages at both high and low message sensation levels in terms of: 1) persuasiveness of the PSA, 2) affective responses to the PSA, and 3) cognitive processing of the PSA. This research is important in understanding what messages are most effective in influencing those audience members who are most at risk for smoking behaviors. The general research question addressed in this study is whether high or low MSV Blame or Attack messages are more persuasive, influential, attended better, and encoded more by high PO individuals (Coactives and Risk Takers) – the groups shown to be more likely to partake in substance use behaviors. In addition, this study provides insights into two groups that LC4MP findings have been lacking for – those with low NB (Inactives and Risk Avoiders).

Accordingly, the present study is designed to aid in efforts to a) create messages to reduce smoking behaviors, and b) create messages to reduce smoking initiation. It is assumed that cessation and prevention advertisements may require different means of persuasion. For example, those more likely to smoke may be better influenced by a "Blame" strategy that informs them about how dangerous their behavior is while those less likely to smoke may be better influenced by an "Attack" strategy that informs them about how tobacco companies manipulate people into smoking. Therefore, results from this research direct message design in rather general terms as this study does not address

what specific appeals (i.e., humor, fear, disgust) or combinations of appeals are persuasive. However, it does inform as to what overall message type (i.e., Blame vs. Attack) and sensation levels are likely to influence cognitive processing in individuals with differing Motivation Activation (i.e., Risk Takers, Risk Avoiders, Coactives, and Inactives).

Chapter 2
Literature Review

The literature review is broken into five chapters. The first chapter consists of a summary of the limited capacity explanation for information processing limits as well as an examination of the information processing steps of attention, encoding, storage, and retrieval. It concludes with a discussion of the measures of resources allocated and recognition memory used in this study, secondary task reaction times (STRT) and signal detection theory (SDT), respectively. The second chapter provides the main theoretical perspective used in this research: the Limited Capacity Model of Motivated Mediated Message Processing (LC4MP) with specific focus regarding conceptualizations and findings relating to Motivation Activation and its link to Sensation Seeking (SS) and Tobacco Use (TU), and message features including Message Sensation Value (MSV). The main goal of public service campaigns is attitude formation and behavior change. The third chapter addresses cognitive and affective means of persuasion and attitude change. The fourth chapter examines how effective anti-tobacco campaigns have been in promoting/preventing pro-social behaviors as well as a background of the conceptualization of Blame vs. Attack messages. Specific attention is given to studies that have explicated the differences between the two campaigns as well as studies that have empirically examined the two types of campaigns.

Information Processing

The basic premise underlying information processing models is that humans are by nature information processors and that media messages are information to be processed by the audience. That is, when an individual encounters new information, he/she immediately tries to recognize, understand, and manage the information into a framework that allows the individual to alter attitudes and behaviors in order to deal with the new information. As a result, individuals become what McGuire (1978) refers to as a "problem solver" or information processor. Information processing has been said to result in awareness, learning, associations, and memory for a given stimuli.

Though the current study is concerned with information processing of media messages in the form of public service advertisements, some theoretical assumptions and conclusions from social and cognitive psychology will be overviewed as well.

Limited Capacity of the Human Mind. To more fully understand information processing, cognitive psychologists used the computer as a representation of the human mind (Marr, 1982). It was posited that the computer functioned similarly to human mental functions by taking in new information, retrieving old information, storing information, producing outputs, and connecting visualizations and representations (Feigenbaum & Feldman, 1995). Despite these parallels, computers do not exhibit some of the limitations the human mind possesses such as short-term memory span, processing speed, and accuracy. Nevertheless, the human mind is still considered superior based on its ability to select from or adapt to stimuli (Sharples, Hogg, Hutchinson, Torrance, &

Young, 1989). However, though the human mind has unlimited storage capacity (it can form an infinite number of memories); it can only process a limited amount of information at one time. Early researchers examined the limited capacity of information processing in relation to selective attention.

Auditory information processing theories suggested a single filter called a "limited capacity channel" that restricted the amount of information that made it from short-term memory stores into long-term memory (Broadbent, 1958). The problem with this theory was that it suggested that humans allowed *all* information to enter the short-term memory store. In addition, no voluntary attention was involved as the limited capacity channel did not restrict information until after an individual had "taken in" all incoming information, thereby only limiting what entered long-term memory.

Deutsch and Deutsch (1963) rejected the idea of a filter following short-term memory, as well as the idea that attention was involuntary. In addition, they suggested that there was a "meaning-dependent" selection process which helped to determine what parts of the message meant something to the individual and should be processed and which parts did not mean something and thus, should be discarded. Treisman (1960) hypothesized that both Broadbent (1958) and Deutsch and Deutsch (1963) were somewhat correct and combined their theories into a information processing model which hypothesized an "attenuator" that took in incoming messages as well as a "central filter" that sorted messages for meaning and then sorted them for processing. However, Gibson (1941) was adamant that a third attentional filter existed, one which enabled individuals to act based on prior experience with the stimuli. This was described as a "response

choice" by Kahneman and Treisman (1984) and involved acting in a certain pre-determined way to specific messages.

In the 1970s, information processing shifted from filter to capacity theories (Kihlstrom, 1999). These theories posited that there were both automatic and controlled cognitive processes which helped to allocate resources to processing the message. Limited capacity combined the process of selection and attention as a "filter" that protected the information processing system from an overload (Van Der Heijden, 1992, p. 238). As stated by Garner (1974) "the amount of information available for processing is always greater than the limited capacity. Therefore the organism must process information selectively" (as cited by Van Der Heijden, 1992, p. 23).

This line of thought is reflected in the limited capacity model for processing media messages as the initial processing stage is described by Lang (2000) as both "controlled" and "automatic" selection of information. Like earlier theories, selection is performed by the individual because he/she simply cannot take in all the stimuli provided during exposure (p. 48). The suggestion that attending exposure is voluntary and involuntary has been consistent throughout cognitive information processing research as individuals, posited Neisser (1967) "are by no means neutral or passive toward the incoming information. Instead they select some parts for attention at the expense of others, recording and reformulating them in complex ways" (p. 7).

Stages of Information Processing

Information processing consists of exposure to content, short-term memory stores of information that has been attended to, encoding of information that the individual can

associate with previous memories, and storage of encoded information into long-term memory. Therefore, when a person experiences something (exposure), he/she takes in what he/she can/wants of that new information and holds it in short-term memory, and if chosen (attention) to be changed into something (encoding), that can be associated or connected to previous information (storage), passes that information to long-term memory. This information can later be accessed and used in decision making (retrieval). Though each of the processes is discussed separately below, Lang (2000) stated that, "it is assumed that the human brain can, and usually does, engage in all of these subprocesses simultaneously" (p. 47).

Attention. Any information to which an individual is exposed first enters the *sensory memory* stores. These stores retain both auditory and visual information long enough for the individual to choose what parts of the available stimuli he/she wishes to *attend* to (Driscoll, 2000). Attention however, is not solely voluntary. Lang (2000) suggested that there are two types of stimuli that we involuntarily attend to and choose for further processing: *novel* and *signal* stimuli. Novel stimuli are those that are unexpected or unusual in some way. These stimuli often indicate that there is something in the environment that needs to be processed for an individual's self-preservation. For example, the sound of a gunshot will likely cause an individual to focus their attention to find out where the sound came from. Less threatening than the sound of a gunshot is the change in volume between a television program and a commercial, though this change too causes audience members to automatically attend the stimuli. Signal stimuli are those that have specific meaning for different individuals. The classic example of a signal

stimulus is our own name. Studies of the cocktail party phenomenon show that an individual can be oblivious to other parts of social conversations, but will automatically focus their attention when he/she hears their own name (Broadbent, 1954; 1958). Thus, both novel and signal stimuli result in an automatic *orienting response*, or focusing of an individual's attention and processing resources to the stimulus.

Lang and Basil (1998) proposed that in regard to media messages, attention is the "process of allocating resources" from the fixed pool of an individual's total limited resources (p. 44). Attention serves as the conduit from exposure to possible memory formation and occurs continuously throughout exposure as "new information from the message is continuously attended to" (A. Lang, Borse, Wise, & Prabu, 2002, p. 216). In terms of the limited capacity model, Lang (2000) proposes that the allocation of attentional resources is determined by 1) the individual, and 2) the message. That is, attention or resource allocation is both automatic and controlled.

However, attention has not been found to be constant or consistent. A number of studies have shown that attention fluctuates during message presentations (A. Lang, 1995; Reeves & Thorson, 1986; Reeves, Thorson, & Schleuder, 1986). How much attention is allocated to processing a message is important as noted by Klitzner, Gruenewald, and Bamberger (1991),

> The effects of exposure to advertising are mediated by attentional mechanisms which determine what the subject perceives and memorial mechanisms which determine the amount of information retained from each ad. Differing amounts and types of information will be retained from advertisements depending upon the amount and manner of attention paid by subjects to ad stimuli and their efficiency in transferring this information from short- to long-term memory stores (p. 288).

The manner of attention refers to automatic and controlled processes affected by individual goals and message features (A. Lang, Zhou, Schwartz, Bolls, & Potter, 2000). The amount of attention refers to actual resources allocated to processing a message.

As noted earlier, orienting responses elicited by structural or content features of a message will automatically increase resources allocated to the message. Furthermore, resources that were allocated but not used in attending to a message are available for use in other processing tasks; specifically, for the process of encoding (A. Lang & Basil, 1998). Information that has been attended enters *short-term* or *working memory.* However, failure of information to become encoded often results from limited capacity (i.e., individual does not have enough resources or has not allocated enough resources to process a stimuli), as incoming information must be attended to in order to become encoded (Klatzky, 1980).

Encoding. Encoding involves forming a representation of information in short-term memory that can be transferred into *long-term memory*. Lang (2000) suggested that this is a two-step process which involves selection of the information and transformation of the information. Transformation involves *rehearsal* or *chunking* of information into an understandable mental representation. Rehearsal involves repetition of information. Chunking involves combining smaller pieces of information into larger ones. For example, chunking information about a penguin may mean combining information about living in the cold, not flying, and being the preferred food of whales into one large piece of information about penguins whereas rehearsal may mean that the individual repeats a piece of information about the penguin over and over in an attempt to remember it.

Encoded information that is rehearsed or chunked in short-term memory is transferred to the long-term memory through *storage*, while any information that entered the short-term memory and is not encoded is lost through decay or displacement (Driscoll, 2000).

Lang (2006a) suggested that the amount of resources allocated to a stimulus (minus those required by the stimulus) affected how many are available for other processes such as encoding. Lang and Basil (1998) proposed that resources available for encoding were based on: 1) message features that increased automatic allocation of resources, 2) the complexity of the encoding task, and 3) competing demands of processing and storage (p. 458). However, the researchers went on to note that, "even when resources are scarce, the subprocess of encoding a message may get more than its share of resources" (p. 464).

Like the limited capacity of attention, researchers suggest that there are limits to encoding. Due to limited capacity restrictions, not all information that enters the sensory store can be transformed or encoded (Engle & Oransky, 1999). Recall that during encoding information must be rehearsed or chunked in order to become part of long-term memory. Information that is not transformed in this way is lost (Engle & Oransky, 1999). Lang, Dhillon, and Dong (1995) regarded the encoding process as limited because only portions of message information are transformed for storage.

In addition, individual traits (i.e., goals, motivation) and message features can influence encoding by encouraging the allocation of processing resources. As noted above, Lang (2000) suggested that orienting responses signal that the individual should allocate resources to encoding. Conversely, messages that combine several structural features can be detrimental to encoding. In a recent review, Lang (2006b) stated that

overly difficult or unfamiliar messages which contain structural features that elicit orienting responses may adversely influence encoding. In simple or familiar messages however, orienting responses to structural features have been shown to increase encoding.

Lang (2000) also suggested that resources allocated to processing novel or signal stimuli were dependent on cognitive load. Eveland and Dunwoody (2001) suggested that, "in terms of learning from media, *cognitive load* may be defined as the amount of mental effort required to locate specific information and understand how this information is oriented within a larger information source" (p. 56, italics theirs). Lang (2006b) stated that "when the message requirements and the user's goals result in more calls for resources than there are resources, *cognitive overload* is said to occur" (p. 8). This means that cognitive overload occurs when more mental resources than are available are required for any or all of the information processing stages. Therefore, cognitive overload results in reductions in processing abilities. For example, when low levels of cognitive load exist, novel stimuli will produce higher levels of encoding. However, if cognitive load is high, novel stimuli may cause cognitive overload, and encoding and storage could suffer. Retrieval of stored information can also be affected by cognitive load. Lang (2000) posited that in situations of cognitive overload, individuals would not be able to allocate as many resources to retrieving information saved in memory.

Craik and Lockhart (1972) stated that the better an item is encoded, the greater the memory for the item will be. However, their research also suggested that if an item has been encoded then a trace memory of the item remains in short-term memory regardless of whether storage in long-term memory occurs. This is consistent with Lang's (2000)

assertion that memory has varying degrees. Waugh and Norman (1965) posited that these traces can be maintained indefinitely in short-term memory stores but if not fully encoded and stored will be lost. Trace representations indicate encoding, while full representations indicate storage. Consequently, Lang (2000; 2006b) posited that recognition accurately measures encoding, cued-recall measures storage, and free recall measures retrieval.

Storage. Storage consists of linking information an individual already holds in long-term memory to encoded information. That is, he/she links new mental representations with already stores ones. For example, if an individual has a mental representation of a bird as an animal with feathers and wings that it uses to fly, and he/she encodes new information about penguins (that although they are birds and have feathers, they do not fly) then he/she must *link* the old information with the new information. His/her new memory about birds will include the fact that while all birds have feathers and wings, not all of them can fly.

Lang (2000) suggested that storage was affected by individual goals or needs met by attending a particular stimulus (entertainment vs. learning). For example, those individuals watching TV solely for entertainment would not store as much of the information presented by the stimuli as those watching for learning purposes being that memory formation is a goal of active learners. This means that storage is an important process in knowledge acquisition.

Retrieval. Once new information is linked to previously encoded information it is saved in long-term memory (Driscoll, 2000). The process of accessing stored information

from long-term memory is called retrieval. Research on associative networks indicates that the number of links established during storage between old and new information is important in terms of information processing as those memories with many links are easier to retrieve than those with few links (for a review see Lang, 2000). Hindrances during retrieval can include competition for attention or confusion with similar information, thus resulting in interference (Klatzky, 1980). Therefore, only a small amount of available stimuli make it through each of these processes as demands on attention, selective processes, decay, displacement, and interference often result in loss of information.

Secondary Task Reaction Times. In mass media studies the Secondary Task Reaction Time (STRT) measure has been used as a covert assessment of resources available following allocation of resources to media messages. It relies on the same conception of mental resources as the limited capacity model in that individuals are regarded as information processors with limited processing resources. Inherent in the limited capacity model is the assumption that individuals, when presented with a media message, use their limited resources to attend, encode, store, and retrieve parts of the message concurrently. Thus, each process competes for a portion of the limited resources (A. Lang, Bradley, Park, Shin, & Chung, 2005).

As noted above, attention involves the allocation of mental resources to a message processing situation. In studies which use STRTs as a dependent measure, attention to the message is the primary task. Participants are instructed that attending to the message is the most important part of the research – in some cases they are even told there will be a

memory test at the end of the task in order to assure that the primary task is in fact, primary. A secondary task is also given wherein participants respond to an auditory or visual object inserted in the message. For example, participants could be instructed to strike a key on the computer keyboard indicating when they saw a flash of light. Participants are told to perform this secondary task as quickly as possible. The time that elapses between the onset of the flash of light and the participant's response is the response time (A. Lang, Bradley, Park, Shin, & Chung, 2005).

The response time or STRT indexes the resources available or the difference between what the individual allocated to processing the message and what the message required. Lang and colleagues (2006) suggested that this difference could be a positive number, a negative number, or zero. In addition, the number could be very large or very small depending on how many resources were allocated compared to how many were required. This conceptualization (resources allocated – resources required = available resources) posits that STRTs will become slower if available resources decrease. However, what resources are left over depends upon resources allocated and required. That is, if resources required by the message remain constant, and resources allocated to the message increase, then STRTs should speed up because there are more resources available to perform the secondary task. On the other hand, if resources required by the message increase and resources allocated to the message remain constant, then STRTs should slow down as the resources available to perform the secondary task decrease. In addition, other processes (i.e., encoding, storage, and retrieval) will be influenced by available resources. Each could increase if available resources are high and decrease if available resources are low; however, which sub-processes increase depends upon

individual resource allocation (A. Lang, Bradley, Park, Shin, & Chung, 2005). Though Lang and Basil (1998), suggest that the first sub-process (i.e., encoding) automatically "hogs" leftover resources, and that any resources still left will go to storage and retrieval.

Recall that individuals automatically allocate resources to some items (i.e., novel, arousing stimuli). Likewise, content features that elicit personal relevance or emotional responses are likely to signal that resources should be allocated to processing the message. Lang and Basil (1998) also posited that message complexity "determines how many resources are allocated" to processing a message (p. 458). That is, structurally complex messages will result in more processing resources being allocated to a message. For example, increased use of structural features such as cuts, edits, audio complexity, and visual complexity may cause increases in resources allocated to processing a message, independent of an individual's goals. Thus, STRTs will get faster or slower depending on how many resources the message requires. In cases where more resources than necessary are allocated the result will be more resources available for other sub-processes. This takes into consideration over-allocation of resources, suggesting that in some cases (e.g., personally relevant messages, complex messages) individuals may consciously or unconsciously allocate more resources than the primary task requires. On the other hand, Lang and colleagues (2006) suggested that when resources required for processing are greater than resources allocated, then cognitive overload occurs. Their study showed that when cognitive overload occurred, STRTs became faster while recognition memory decreased.

Several studies have provided evidence for STRTs as a measure of the difference between resources allocated and resources required. These studies showed that increased

use of both structural and content features resulted in faster STRTs indicating, as argued by Lang and colleagues (2006), that individuals allocated more resources to processing the message than they did to "simpler" messages. Results of television message studies done by Reeves, Schleuder, and Thorson (Reeves, Thorson, & Schleduer, 1986; Thorson, Reeves, & Schlueder, 1985; Thorson, Reeves, & Schleuder, 1987) showed faster STRT times to visually complex versus visually simple messages. Likewise, audio complexity resulted in faster STRT times than simple audio messages (Reeves, 1986). Highly arousing complex messages have also been shown to result in faster STRT times than highly arousing simple messages (Lang, Bolls, & Kawahara, 1996).

Signal Detection Theory of recognition memory. Recognition memory tasks measure encoding by assuming that information was either encoded or lost and that if an item was well encoded, then the individual should be more accurate in correctly recognizing it (Klatzky, 1980; Wixted & Stretch, 2004). A recognition task consists of showing previously viewed (i.e., probe) and distracter material (i.e., foil) to an individual and asking him/her to make a judgment (i.e., yes/no) about whether or not the material is familiar (Jacoby & Kelley, 1992). Signal Detection Theory (SDT) suggests that when an individual is faced with a recognition task he/she can respond with a correct response or with an incorrect response (Hancock, Masalonis, & Parasuraman, 2000). Correct recognition of a previously viewed item indicates that there is a memory trace (i.e., the item was somewhat encoded) (Klatzky, 1980).

Signal detection analyses thus help to assess recognition tasks by measuring the sensitivity of an individual's ability to discriminate between probes and foils (Macmillan

& Creelman, 2005). There are four possible responses to material presented in this type of recognition task: 1) a correct "yes" response to a probe (hit), 2) a correct "no" response to a foil (correct rejection), 3) an incorrect "yes" response to a foil (false alarm), and 4) an incorrect "no" response to a probe (miss).

Thus, decisions about item familiarity reflect how well an item was encoded into memory (Klatzky, 1980; Wixted & Stretch, 2004). If the item was fully encoded, then the individual should be able to accurately recognize it from distracters, that is, he/she should have more correct judgments and fewer incorrect judgments. However, the number of correct judgments will be less when material is not encoded well (Pastore, Crawley, & M.S. & Skelly, 2003; Wixted & Stretch, 2004).

Furthermore, individuals may exhibit what is called "response bias" or a tendency to reply in one way or another to recognition questions (Macmillan & Creelman, 2005). Due to situational (e.g., participants were instructed to respond very quickly or very accurately), motivational (e.g., participants attempt to maximize rewards and minimize punishments), or individual (e.g., participants are willing to guess) differences some individuals are more willing to say "yes" and others more willing to say "no" (Kornbrot, 2006). A propensity to say "yes" regardless of whether or not the item is a probe or foil indicates an individual was more likely to guess (i.e., answer liberally). A propensity to say "no" regardless of whether or not the item is a foil indicates the individual was less likely to guess (i.e., answer conservatively).

When combined, conceptualizations of STRTs and SDT suggest that it is possible to ascertain what is happening, in terms of resources available and encoding that takes place, for each type of PSA. Recall that resources allocated – resources required =

resources available, and that faster STRTs indicate more resources available. Resources allocated reflect message features/content as well as user goals as both lead to controlled or automatic allocation of resources to processing. Also recall that if better encoding takes place, then recognition memory is more accurate. Thus, if STRTs speed up and recognition memory increases, then it is assumed that more resources were allocated to processing – through either controlled or automatic processes - than were required by the message, nevertheless, indicating that there were more resources available and greater encoding took place. On the other hand, if STRTs slow down and recognition memory decreases, then the message required more resources than the individual - through either controlled or automatic mechanisms - allocated, fewer resources were available, and less encoding took place.

Chapter 3
Literature Review

The Limited Capacity Model of Motivated Mediated Message Processing

Lang's (2000) original Limited Capacity Model of Mediated Message Processing (LC3MP) not only posited that an individual's ability to process incoming stimuli was limited, she suggested that resource allocation affected an individual's resources available to partake in the sub-processes of encoding, storage, and retrieval. In this model, Lang reasoned that when mass media messages are not fully processed it is due to: 1) an individual's allocation of fewer resources to processing than the message required, or 2) the message required more resources than the individual had allocated.

She further stated that resources allocated to processing a message in terms of encoding, storage, and retrieval were affected by message characteristics and media characteristics as well as personal goals/motivation. In addition, encoding and storage competed for the same cognitive resources and increasing resources allocated to perform one process, decreased resources available to perform the other processes. For example, by increasing the resources allocated to encoding, an individual can transform more stimuli, but storage may suffer as not enough resources will be available to fully link transformed stimuli to existing memories (A. Lang, 2000).

In the recent revision of the model, Lang (2006b) more strongly focused on individual personality traits that play a large part in processing media messages. The Limited Capacity Model of Motivated Mediated Message Processing (LC4MP) takes into

consideration personality traits, media aspects, and message features that influence processing of a message making it a more complete model than its predecessors specifically in that it includes motivational differences of the audience which influence processing (Cappella, 2006).

The LC4MP is based on the same assumptions posited in the LC3MP: 1) humans are by nature information processors, 2) our ability to process information is limited by our cognitive resources available, 3) there is a fixed limit to an individual's cognitive processing resources, 4) the sub-processes of encoding, storage, and retrieval operate concurrently often competing for these limited resources, 5) processing deteriorates when insufficient resources are available for any of these sub-processes, 6) allocation of resources to messages occurs consciously through an individual's goals (e.g., learning vs. entertainment) as well as unconsciously through message features (e.g., novel/signal stimuli), and 7) cognitive overload occurs when a message requires more resources than allocated causing processing to suffer (A. Lang, 2006b). However, the LC4MP suggested that individual motivations play a part in automatic and controlled processing of stimuli as personality differences (i.e., Motivation Activation) are posited to influence message processing (A. Lang, 2006a; 2006b).

Motivation Activation. Lang (2006b) suggested that certain groups of individuals may possess cognitive and/or motivational tendencies that impact information processing. Her research on Motivation Activation is grounded in the bivariate attitude research begun by Cacioppo and Bernston (1994). This line of study offered a unique alternative to bipolar theories and measurement of attitudes which examined attitudes on bipolar

scales reflecting two dimensions – positive and negative. This meant that attitudes were reciprocal as a stimulus evoked either positive or negative attitudes, but not both. Therefore, the more positive an attitude, the less negative it could be. Moreover, bipolar scales did not account for conflict, ambivalence, and inconsistency in attitudes (for a review see Cacioppo & Bernston, 1994). Cacioppo and Bernston (1994) speculated that the popular view of attitudes as bipolar (positive-negative) evaluations of stimuli did not "discriminate between a condition in which neither process was activated and a condition in which both processes were activated equivalently" (p. 403). Instead, they argued that attitudes should be thought of as bivariate with evaluations of how positive *and* how negative a stimulus is contributing to the overall attitude. This also meant that attitudes could work reciprocally (i.e., same as the bipolar model), uncoupled, or nonreciprocally. In sum, they suggest that individuals can be motivated to behave in particular ways by positive and negative attitudes with the stronger attitude dominating. Their research also likened positive and negative attitudes to approach and avoidance behaviors respectively, and suggested that positive attitudes toward a stimulus corresponded to appetitive behaviors and negative attitudes corresponded with aversive behaviors. However, it should be noted that aversive behaviors do not necessarily mean that individuals evade (i.e., flight) a particular stimulus, for in certain instances their aversive response is to attack (i.e., fight) the stimulus. Both serve as a means of protecting the individual from the stimulus.

Dual system motivation studies have shown that humans possess both appetitive and aversive systems that function to protect and preserve the individual. In addition, the human appetitive and aversive systems automatically influence processing of

motivationally relevant messages with greater appetitive activation resulting in attending to message information (e.g., greater encoding and storage), and greater aversive activation resulting in further processing of a message (e.g., greater storage and retrieval) (Cacioppo & Gardner, 1999). Like the attitude measures described by Cacioppo and Bernston (1994), these systems can work reciprocally (e.g., increases in appetitive and decreases in aversive), uncoupled (e.g., increases in appetitive and nothing happening with aversive), or nonreciprocally (e.g., increases in appetitive as well as increases in aversive).

The appetitive system motivates individuals to approach new stimuli. This system was likened to human "natural curiosity" as individuals are continuously examining new information (Cacioppo & Bernston, 1994, p. 413). The appetitive tendency is called *Positivity Offset* (PO), and operates slowly as humans are cautious in approaching unknown stimuli. The aversive system protects individuals from new stimuli by instigating fight or flight responses. When an individual is at rest, this system is relatively inactive; however, when danger appears, the aversive system quickly takes over. Cacioppo and Bernston, (1994) called this *Negativity Bias* (NB) and noted that though both negative and positive stimuli signal that there is information to be processed, negative stimuli more strongly affect individuals' behaviors than positive stimuli. In subsequent studies, this supposition has been supported as individuals have shown more intense responses to negative versus positive stimuli. Furthermore, the studies indicated that NB occurs more quickly than PO (Cacioppo, Gardner, & Bernston, 1997; Ito, Larsen, Smith, & Cacioppo, 1998).

Recent work by Lang and colleagues (2006a) took this approach further by suggesting that motivation was an individual trait – that some people possess more appetitive traits and others more aversive traits. This line of research posits that *Motivation Activation* is an automatic individual response to stimuli which "fine tune(s)" the information processing system by signaling to the individual that certain parts of the information should be encoded and stored (p. 3). This serves the function of protecting and preserving the individual as the information can be used at a later time to identify dangerous objects and avoid them accordingly. For example, prior to encountering new stimuli an individual's PO and NB are not at rest, but are working at relatively low levels. Positivity Offset is working a little more than NB though, for as Lang stated, it is essential for individuals to "leave the nest" – thereby approaching new stimuli cautiously (p. 2). When the encounter occurs, the NB system quickly activates until the new stimuli is comprehended. During this time, increased NB also activates information processing in that the new stimuli must be encoded and stored. This is done so that in future encounters with the same or similar stimuli, the individual will know how to react (i.e., direct the individual toward either fight or flight). Following the encounter, NB is still working as the individual further stores the new stimuli – comparing and contrasting it to previously stored information – and encoding decreases (A. Lang, 2006a; 2006b; A. Lang, Wang, & Bradley, 2004).

Recent studies conducted by Lang and colleagues (A. Lang, 2006a; 2006b; A. Lang, Shin, & Lee, 2005; A. Lang, Wang, & Bradley, 2004) have found a number of individual differences regarding PO and NB. Physiological measures have shown that those with high NB exhibit elevated aversive reactions (i.e., startle reflex) and negative

responses (i.e., frowning) than those with low NB. High POs showed higher levels of encoding (i.e., recognition memory) for negative information than low POs (p. 55). In addition, those with high PO exhibited decreased aversive reactions (i.e., startle reflex), more resources available for encoding (i.e., faster STRTs), increased resources allocated to processing the message (i.e., decreased heart rate), and increased positive responses (i.e., smiling) than those with low PO (pgs. 27-28).

Currently, Lang's research has focused on segmenting individuals with differing levels of PO and NB and examining information processing differences among the groups (A. Lang, 2006a; 2006b). This line of study has found that there are four different types of Motivation Activation wherein individuals respond more or less strongly to emotional stimuli: Coactives, Risk Takers, Risk Avoiders, and Inactives. The following section details findings by Lang and colleagues regarding each of these motivation types.

Coactives. Those individuals with high PO and high NB are *Coactives*. This group has overactive appetitive and aversive systems. This group is less likely to use substances such as drugs, alcohol, and tobacco than Risk Takers. Coactives respond both negatively and positively to emotional stimuli. For example, when viewing an anti-tobacco advertisement which shows a pile of dog poop with a sign in it that states that cigarettes contain urea - the same as dog poop, a Coactive may find it funny that someone stuck signs in dog poop and looks to see what the sign says (i.e., positive emotion with appetitive activation). In addition, Coactives may be angered by the fact that there are chemicals in cigarettes and want to either fight the tobacco companies, or when their

curiosity regarding the sign was assuaged, flee from the dog poop (i.e., negative emotion with aversive activation) (A. Lang, 2006a; 2006b; A. Lang, Wang, & Bradley, 2004).

Risk Takers. Those individuals with high PO and low NB are *Risk Takers*. This group has an overactive appetitive system and an underactive aversive system. This group is more likely to use substances such as drugs, alcohol, and tobacco than Coactives, Inactives, and Risk Avoiders. Risk Takers respond more positively to emotional stimuli, thus the advertisement described above will likely evoke humor and a desire to see what the sign says (A. Lang, 2006a; 2006b; A. Lang, Wang, & Bradley, 2004). Lang, Shin, and Lee (2005) conceived Risk Takers as being analogous to individuals with high Sensation Seeking tendencies.

Risk Avoiders. Those individuals with low PO and high NB are *Risk Avoiders*. This group has an underactive appetitive system and an overactive aversive system. This group is less likely to use substances such as drugs, alcohol, and tobacco than Risk Takers, Coactives, and Inactives. Risk Avoiders respond more negatively to emotional stimuli, thus the same anti-tobacco advertisement will likely evoke more anger and either a fight or flight response (A. Lang, 2006a; 2006b; A. Lang, Wang, & Bradley, 2004). Lang, Shin, and Lee (2005) conceived Risk Avoiders as being analogous to individuals with low Sensation Seeking tendencies.

Inactives. Those individuals with low PO and low NB are *Inactives*. This group has both underactive appetitive and aversive systems. This group is more likely to use

substances such as drugs, alcohol, and tobacco than Risk Avoiders. Inactives do not respond strongly either positively or negatively, that is, Inactives will likely not have a large humor or anger response to the anti-tobacco ad regardless of emotional valence of the message, nor will they desire to read the sign or flee/fight (A. Lang, 2006a; 2006b; A. Lang, Wang, & Bradley, 2004).

Segmenting Audiences. Lang (2006b) went on to suggest that individuals could be segmented based on their individual motivation to process media messages. However, segmenting individuals is not a new strategy. Persuasion research has long held that individuals possess characteristics, beliefs, intentions, or expectations that influence message exposure, attention, and subsequent processing. An understanding of audience attributes can inform message design in ways that influence the likelihood that individuals will retain information from a persuasive message and use it in later decision making. Providing persuasive messages to the entire viewing audience however, is not only impossible, but is unnecessary. Linking messages to audiences may increase the effects of the message as different groups of people may react differently to different types of persuasive messages (Everett & Palmgreen, 1995; Petty, Wegener, & Fabrigar, 1997).

Studies have shown that particular segments of the population are more at risk for substance abuse behaviors. In regard to tobacco use, those with lower incomes and less education (Campaign for Tobacco Free Kids, 2005b; Viswanath & Emmons, 2006); have peers or parents who smoke (Conrad, Flay, & Hill, 1992; Gorsuch & Butler, 1976; Krosnick, Chang, Sherman, Chassin, & Presson, 2006; Oskamp & Schultz, 1998); and

individuals who use drugs or drink alcohol (Campaign for Tobacco Free Kids, 2005a) have all been shown to be more susceptible to smoking behaviors.

Slater (1995) stated that for persuasive health communication messages to be more effective, designers should "identify people who are similar in important respects and tailor one's communication content and delivery to them" (p. 187). He went on to suggest that it is essential to identify similar characteristics that determine the health behavior, including motivations of at-risk individuals. Furthermore, he posited that the segmenting criteria need not be exhaustive, but should explain a large portion of the health behavior in question.

Along these same lines, Everett and Palmgreen (1995) speculated that "the audience should be segmented into internally homogeneous subgroups that may be more at risk than other segments and that can be reached through certain types of either messages or media vehicles or both" (p. 226). They suggested personality variables as one way to segment the audience and to design messages specifically targeting personality traits associated with substance use. One way to segment audiences discussed by Greene and colleagues (2002) was to examine individual difference variables such as Sensation Seeking (SS) tendencies. Stephenson (Stephenson, 2003b) described sensation seekers as a "well-defined audience segment" that may be more involved with or see more personal relevance in messages regarding substance use (p. 343).

The current study seeks to ground Lang's (2006b) assertion that individuals can be segmented by Motivation Activation within a SS framework. A recent study by Lang, Shin, and Lee (2005) conceptualized SS as the resting state for the appetitive and aversive systems. That is, prior to exposure to a stimulus, SS is the individual's

biologically-based inactive state that desires or wishes to avoid arousing experiences. Individuals with high SS desire arousing experiences, and thus display greater appetitive activation as they seek new pleasures. Individuals with low SS don't necessarily dislike pleasurable experiences, but they do not posses as great of appetitive activation toward seeking new pleasures. Additionally, individuals with high SS do not seem to avoid negative experiences – perhaps also seeing them as arousing - indicating a less responsive aversive activation system. Individuals with low SS however, seem to posses a greater aversive activation system as they avoid negative experiences to a greater extent.

Furthermore, findings by Lang, Shin, and Lee (2005) conceived Risk Takers as being analogous to individuals with high SS tendencies (high SS = high PO, low NB) and Risk Avoiders as being analogous to individuals with low SS tendencies (low SS = low PO, high NB). Risk Takers were shown to possess an overactive appetitive system and a less active aversive system and vice versa for Risk Avoiders. This suggests that both PO and NB are associated with SS tendencies. Their study found that Risk Takers were the most likely to perform SS behaviors than Inactives, Coactives, and Risk Avoiders respectively.

Sensation Seeking. While Motivation Activation is concerned with the personality characteristics underlying these behaviors, SS studies have focused on biological influences underlying substance use. Sensation Seeking studies have consistently shown that individuals possess different biologically based risk-taking or SS tendencies (Stephenson & Southwell, 2006). Sensation Seeking was defined by Zuckerman (1994) as "the seeking of varied, novel, complex, and intense sensations and experiences, the

willingness to take physical, social, legal, and financial risks for the sake of such experiences" (p. 27). These activities included: gambling, driving fast, rock climbing, bungee jumping, parachuting, hang gliding, and watching horror films (Roberti, 2004; Zuckerman, 1994; Zuckerman & Kuhlman, 2000), and were posited to provide stimulation - helping SS individuals achieve the high levels of arousal that they yearn for.

Sensation Seeking behaviors are said to be biologically based as individuals with high SS tendencies have shown to possess a lower baseline of dopamine in their brains (for a review see Donohew et al., 2000; Stephenson & Southwell, 2006). The higher levels of arousal sought by sensation seekers helps to increase the low amounts of dopamine (shown to be linked to feelings of pleasure and arousal) in the brain, thus, sensation seekers desire stimulation. This is accomplished by performing some of the behaviors listed above as well as performing risky substance abuse behaviors (Stephenson & Southwell, 2006). Four dimensions tied to arousal and stimulation have been used to examine SS behaviors: 1) disinhibition, 2) thrill and adventure seeking, 3) experience seeking, and 4) boredom susceptibility (Zuckerman, 1994).

The belief that pleasure and pain motivate human behaviors has been consistent throughout psychological research. The hedonic principle underlies the foundation of many theories involving motivation and goal-directed behavior and suggests that individuals approach pleasure and avoid pain (Higgins, 1997). Influenced by the hedonic principle, neuroscience recognizes that pleasure and pain are key factors in human behavioral motivation in terms of drives (Kandel, Schwartz, & Jessell, 2000). Human drive states are characterized by feelings of discomfort prior to fulfillment of needs and feelings of satisfaction when the needs have been satisfied. Changes in an individual's

physiological state can only occur after the cerebral cortex sends a signal about changes to particular areas of the brain. The area of the brain in which humans feel fear - the amygdala - reacts to threats as well as pain (Armony & LeDoux, 2000). Signals in the amygdala cause the fight or flight response in the limbic system. In this way we are engineered to avoid pain. Additionally, fibers traveling directly from the amygdala reach the accumbens nucleus - the source of feelings of pleasure (Kiernan, 1998). In contrast to pain, experiencing pleasure leads to an output of dopamine in limbic areas of the brain, thus increasing pleasure levels (Kandel, Schwartz, & Jessell, 2000). This type of positive reinforcement for feelings of pleasure often leads to self-stimulation (addiction). Thus, it appears as though the need to seek pleasure and avoid pain is "hardwired" into our brains as the human brain automatically seeks experiences that will maintain, as well as increase, dopamine levels (Kandel, Schwartz, & Jessell, 2000).

Researchers in the areas of cognitive and social psychology have had an understandable interest in pleasure and pain as well, as noted in the literature on emotion (Craig, 1999; Kazarian & Evans, 2001; Schwarz & Clore, 2006), motivation (Melzack & Wall, 1982); terror-management (Arndt, Goldenberg, Greenberg, Pyszczynski, & Solomon, 2000; Greenberg, Solomon, & Pyszczynski, 1997), well-being (Kahneman, 1999), and self-regulatory processes (Carver & Scheier, 1990; Higgins, 1997). However, when it comes to health behaviors it seems as though the line between pleasure and pain blurs. What is typically considered a negative behavior can be pleasurable for some and painful for others (e.g., drinking alcohol). In addition, pleasure and pain do not necessarily operate in opposition to one another as a behavior can be both pleasurable and painful (e.g., getting a tattoo).

Contemporary research suggested that SS tendencies influence and can be used to predict human behavior (Stephenson & Southwell, 2006). Similar to the appetitive and aversive systems discussed above, SS studies have indicated that individuals possess a behavioral activation system (BAS) and a behavioral inhibition system (BIS). The BAS operates analogous to the appetitive system as it approaches pleasures and novel information. The BIS operates analogous to the aversive system as it avoids painful or negative information (for a review see Palmgreen, Stephenson, Everett, Baseheart, & Francies, 2002). Thus, individuals with a more active BIS avoid risky or negative stimuli (i.e., low SS) while those with a more active BAS approach novel or positive stimuli (i.e., high SS).

Studies of SS have linked the construct to substance abuse behaviors such as alcohol, drugs, and tobacco as well as risky health behaviors such as delinquency, aggression, social risk taking, and risky sex (Ball, 2001; Donohew, 1990; Donohew et al., 2000; Jessor & Jessor, 1997; Martin et al., 2004; Newcomb & Felix-Ortiz, 1992; Stein, Newcomb, & Bentler, 1994; Xiaoming et al., 2000; Zuckerman & Kuhlman, 2000). In addition, these behaviors build upon one another as individuals are likely to engage in more than one risky behavior (Donovan & Jessor, 1985; Ingersoll & Orr, 1989; Lipsitt & Mitnik, 1991). In one study, researchers showed that individuals with high risk-taking tendencies reported more danger-related risk (e.g., ride roller coaster, speed in auto, ride motorcycle, hitchhike, betting, purchase lottery tickets) and substance use behaviors (e.g., use of alcohol, marijuana, cocaine, tobacco) (Gonzalez et al., 1994).

Sensation Seeking has recently been a variable of interest in health communication studies as researchers suggest that the need for sensation influences

information processing (Lee & Ferguson, 2002). Sensation Seeking translates into "differences in the desired level of stimulation from exposure to information" (Stephenson & Palmgreen, 2001, p. 50). Specifically, SS influences whether or not an individual attends a message based on how novel, entertaining, or emotional the message is (Everett & Palmgreen, 1995). One SS targeting study by Palmgreen and colleagues (2001) indicated that arousing stimuli which are more likely to attract attention should be designed and targeted to high sensation seekers. Furthermore, Everette and Palmgreen (1995) reported higher levels of processing resulting in greater memory for high sensation seekers exposed to highly arousing messages. In addition, the researchers found that high SS individuals who viewed highly arousing messages reported more positive attitudes and reduced intentions to use drugs. This implied that the content of mediated messages could be used to attract and influence those most likely to pursue risky behaviors. Recent studies using highly arousing messages on SS individuals suggest that these messages increase attention (Donohew, Lorch, & Palmgreen, 1998; Lorch et al., 1994) as well as encoding and storage (Everett & Palmgreen, 1995). Specifically, high SS individuals have shown better attention, recall, and more positive attitudes and behavior change for messages with high message sensation values while low SS individuals have shown preference for low sensation value messages (for a review see Palmgreen, Stephenson, Everett, Baseheart, & Francies, 2002).

Taken together, work by Lang and colleagues on Motivation Activation and work on SS by Zuckerman, Palmgreen, Stephenson and others suggest that the two personality characteristics appear to work similarly and should be considered complementary; hence, underlying how individuals cognitively process persuasive messages. High sensation

seekers correlate strongly with high PO, low NB individuals (i.e., Risk Takers) and low sensation seekers correlate strongly with low PO, high NB individuals (i.e., Risk Avoiders). Accordingly, those who seek out risky endeavors (i.e., high SS/Risk Takers) are more likely to perform substance use behaviors and be influenced by the same types of arousing messages. That is, messages that evoke high levels of emotion or arousal in these groups should be more likely to positively influence cognitive processing, persuasiveness, and behavior change. The following section discusses message attributes that are likely to influence information processing of these groups.

Message Sensation Value. Recall that high SS individuals sought out more arousing or novel messages in order to create the appropriate dopamine levels in their brain. The Activation Model used in most SS studies hypothesized that individuals "enter information exposure situations with the expectation of achieving or maintaining an optimal state of arousal" (Donohew, Palmgreen, & Duncan, 1980, p. 297). This model has been used to show the link between individuals possessing high SS tendencies and messages with high message sensation value (MSV). This line of research has found that need for sensation is an important determinant of the stimulation sought in a message. Individuals with high SS are more likely to attend, recall, and comprehend information presented in a high MSV message (Donohew, Lorch, & Palmgreen, 1998).

Message sensation value refers to the intrinsic features of a message, while perceived message sensation value (PMSV) "reflects the degree to which an advertisement's structural and content features evoke sensory, affective, and arousal responses in audiences" (Stephenson, 2003a, p. 345). Three primary features contribute

to MSV: 1) video, 2) audio, and 3) content. Video features include graphics, images, cuts and edits. Audio features include sound effects, music, speakers, and background noise. Content features include novel, emotional, or dramatic messages. Each of these contributes to the emotional arousal, dramatic impact, and novelty — the sensation value of the message (Morgan et al, 2003). The overall MSV is measured using three factors: 1) emotional arousal, 2) dramatic impact, and 3) novelty. Audience responses to each of these, or PMSV, measures the same three factors (Palmgreen, Stephenson, Everett, Baseheart, & Francies, 2002).

Emotional arousal is measured by eight items which address how: 1) emotional, 2) powerful, 3) involving, 4) exciting, 5) arousing, and 6) stimulating a message is as well as 7) how strong its visuals and 8) how strong its sound effects are. Dramatic impact is measured by six items which address how: 1) dramatic, 2) graphic, 3) creative, and 4) intense a message is as well as 5) if it has a strong soundtrack and 6) it gives the individual "goose bumps". Novelty is measured by three items which address how: 1) novel, 2) unique, and 3) unusual a message is (Palmgreen, Stephenson, Everett, Baseheart, & Francies, 2002).

As noted in the discussion of individual characteristics, individuals with low levels of NB (i.e., Risk Takers) have been correlated with high SS and greater SU behaviors. Findings regarding this group by Lang (2006b) proposed that Risk Takers are more likely to process novel stimuli and less likely to process arousing stimuli. Highly arousing stimuli direct the individual to store information for future encounters. In addition, highly arousing stimuli can result in cognitive overload as encoding ceases, but storage continues. However, it is not possible to examine the effects of these separately as

the MSV combines novelty, emotional arousal, and dramatic impact into one measure often referred to as "arousal".

Morgan and colleagues (2003) suggested that in general, moderate levels of these message features automatically activate message processing, and higher levels of these features elicit stronger emotional responses. In addition, Stephenson and colleagues (2003a; 2003b; Stephenson et al., 2001; Stephenson & Palmgreen, 2001) have shown that MSV is linked to increases in perceived persuasiveness and emotional response. Specifically, their studies of MSV in anti-marijuana and anti-cocaine messages have shown that for high SS individuals high MSV messages influenced participants' feelings of sympathetic distress, anti-marijuana attitudes, and argument-based processing, However, it should be noted that there are certain types of stimuli, such as novel or signal stimuli discussed earlier, that are likely to influence processing as well. The next section overviews stimuli which signal automatic allocation of processing resources.

Motivationally Relevant Stimuli

Message features have been shown to influence attention, emotional arousal, memory, cognitive capacity levels, attitudes toward the message, and persuasiveness of the message (for a review see Morgan, Palmgreen, Stephenson, Hoyle, & Lorch, 2003). In addition to the orienting features (i.e., novel/signal stimuli) discussed earlier, Lang (2006b) suggested that there are motivationally relevant aspects of messages that "influence the motivational and cognitive systems and aspects of those systems influence how the message is perceived, encoded, stored, and eventually retrieved" (p. 5).

Motivationally relevant stimuli are those that automatically signal that an individual should allocate processing resources. These stimuli lead to automatic storage as the individual needs to remember motivationally relevant stimuli to survive, that is, to recognize negative stimuli in the future and act accordingly. Lang (2006b) suggested that there are two types of motivationally relevant stimuli: 1) those that influence primary motivational systems (i.e., sex, food, danger), and 2) those that influence learned consequences motivational systems. Learned consequences differ for everyone as they are based on what the individual has experienced as a positive or negative consequence to specific stimuli.

Recent findings by Lang and colleagues (2005) indicated that simple portrayals of risky products (i.e., photographs of cigarettes, drugs, or alcohol) are motivationally relevant to individuals. Images of these products automatically increase levels of aversive activation as well as increase resources allocated to encoding and storage resulting in higher levels of arousal and memory. However, findings have been shown to differ based on individual Motivation Activation. Lang (2006a) suggested that risky products elicited more appetitive activation and increased memory for high PO individuals (i.e., Coactives and Risk Takers). Similarly, risky products elicited more aversive activation and increased attention levels for high NB individuals (i.e., Coactives and Risk Avoiders). This indicates that risky product advertisements, such as those promoting alcohol and tobacco use, are more likely to be attended and encoded by Risk Takers – the very group more likely to try these products.

In contrast, the content of anti-risky product messages is fairly standard; abstain from, or give up, negative behaviors. In terms of anti-tobacco PSAs it is reasonable to

assume that smoking individuals would pay attention to anti-tobacco messages as this type of message is personally relevant. Research on message involvement posited that the relevance of a message to an individual affects their motivation to process the message (for a review see Wood, 2000). Likewise, Lang (2006b) found that "people's personal level of involvement with messages…also effects motivational activation" as greater levels of both automatic and controlled allocation of processing resources take place (p. 15).

Conversely, in a study of health message relevance, Southwell (2001) found that those individuals who are the targets of pro-health messages are often less likely to attend to the message. This may be due to the fact that smoking individuals have associated smoking behaviors with positive experiences. Based on Lang's (2006b) definition of motivationally relevant stimuli, if smoking is associated with the learned consequence system instead of the primary motivational system (i.e., danger) the smoker may not have linked smoking to danger. That is, if a smoker has never experienced negative consequences of smoking and therefore sees smoking as positive, he/she may not attend to messages that portray smoking as negative because these messages are not motivationally relevant. Furthermore, SS research shows that high SS individuals perform risky behaviors such as smoking, drinking, and using drugs in order to feel aroused – thereby increasing their dopamine levels. It is therefore likely that they may not see these behaviors as negative, but instead may see them as pleasure-inducing.

Taken together, findings regarding message attributes suggest that to achieve optimal states of arousal, individuals with high SS tendencies or high PO/low NB (i.e., Risk Takers) are attracted to high MSV messages. These messages contain intrinsic

features that are emotionally arousing, dramatic, and novel. When high SS or risk taking individuals encounter high MSV messages, study results have shown that they are more likely to not only be aroused by but also to attend, recall, comprehend, and be persuaded by these messages. In addition, motivationally relevant stimuli will signal automatic allocation of processing resources including arousal, encoding, and storage of information for future encounters.

Chapter 4
Literature Review

Persuasion and Attitude Change

Persuasion is defined as "any instance in which an active attempt is made to change a person's mind" (Petty & Cacioppo, 1981, p. 4). This requires either formulating or changing attitudes and is often accomplished through cognitive and affective means. Studies regarding the connection between persuasion and establishment of and changes in attitudes have yielded useful insights. It is generally accepted that persuasive communications are effective in influencing attitudes (for a review see Beisecker & Parson, 1972). Zillmann and Bryant (1985) suggested that persuasive messages make attitudes relevant and available so that individuals use them in decision making.

Perloff (1993) defined attitudes as "learned, enduring, and affective evaluation[s] of an object (a person, entity, or idea) that exerts a direct impact on social behavior" (p.27). He went on to note, however, that attitudes do not always predict behaviors as factors such as beliefs, opinions, situations, and experiences also influence decisions. Though some researchers suggest that if an attitude is "strong" enough it will persist over time, resist counter-persuasion, and impact behaviors (Krosnick & Petty, 1995). Researchers have long debated the causal relationship between attitudes and behaviors. Some suggest a correlational effect, stating that in most cases attitudes will predict behaviors (Bohner & Wanke, 2002). Nonetheless, attitudes serve both informational and psychological needs, not the least of which is that they produce affective, behavioral, and

cognitive responses (Bohner & Wanke, 2002). That is, attitudes often determine our emotions, our behaviors, and our learning.

It has been suggested that an individual's desire to process information is strongly associated with attitude. Researchers suggest that attitudes "affect the intensity of our information processing" in regard to each stage of processing (i.e., exposure, attention, encoding, elaboration, memory) (Bohner & Wanke, 2002, p. 189). Positive attitudes allow for greater information processing while negative attitudes impede information processing (Zaichkowsky, 1994). Consequently, if an individual forms a positive attitude about a particular item, he/she is more likely to pay attention to, elaborate upon, and store information about that item in memory. Perloff (1993) suggested that attitudes will only influence behaviors if they are accessible to the individual, that is, can be activated from memory. Thus, memory is an important aspect of persuasion (Hovland, Janis, & Kelley, 1953).

Regarding attempts to influence anti-tobacco attitudes and behaviors, Oskamp and Schultz (1998) posited that the mass media serve three main functions: enculturation, attitude change, and issue salience. Enculturation is "the process of instilling and reinforcing the values, beliefs, traditions, behavioral standards, and views of reality that are held by most members of a given culture" (Oskamp & Schultz, 1998, p. 265). The media's effects on attitude change however, are both direct and indirect. Messages can influence an individual or they can influence those in our social circle. Studies have shown that peer attitudes and behaviors regarding smoking often influence individual attitudes and behaviors (Gunther, Bolt, Borzekowski, Liebhart, & Dillard, 2006). Finally,

in terms of issue salience, studies of agenda setting suggest that the media are quite adept at telling the public what to think about.

Measuring Persuasion and Attitude Change

Perloff (1993) noted that persuasion research on information campaigns typically involves examination of individual-level variables such as attitudes, emotions, and behaviors and whether attitudes and behaviors have been influenced in the desired direction (p. 302). McGuire (1978) asserted that for persuasion to occur an individual must attend the message, like the message, comprehend the arguments, and act according to the prescribed behavior. That is, for a message to affect a particular behavior individuals should form a positive attitude toward the message, positively evaluate the arguments presented in the message, have a positive emotional response to the message, and yield to the behavior prescribed by the message. Consequently, the dependent variables used in this study to measure the concept of persuasiveness are attitude toward the ad, evaluation of the argument, behavioral intent, and emotional response to the advertisement.

Attitude Toward the Ad. As posited by Burton and Lictenstein (1988) attitude toward the ad (Aad) reflects an individual's assessment – either positive or negative – in response to an advertisement. Attitude toward the ad consists of cognitive and affective reactions to an advertising stimulus that have a direct impact on overall attitudes and behaviors (Burton & Lichtenstein, 1988). Attitude toward the ad models assume that an individual's cognitive or affective responses to the advertisement will influence his/her

attitudes toward the brand, product, or idea featured in the advertisement as well as his/her intentions to perform the behavior prescribed by the advertisement (Perloff, 1993). It should be noted that the end behavior of advertisements that promote a brand/product is purchasing the item, whereas the end behavior of advertisements that promote an idea is accepting the idea. For example, an advertisement which suggests the idea of "saying no to drugs" is intended to affect positive anti-drug attitudes, thereby causing fewer people to use drugs.

Evaluation of the Argument. Likewise, an individual's evaluation of the argument will influence the impact the advertisement makes on attitudes and behaviors. Research suggests that advertisements are persuasive if the audience "accept[s] the truth of a claim" (Deighton, Romer, & McQueen, 1989, p. 336). This means that if an individual does not like or believe the argument presented he/she is more likely to ignore the prescribed behavior. Evaluation of the claim has been noted to require some level of cognitive processing as the individual must weigh the arguments and check them against their existing beliefs before forming an attitude (Burton & Lichtenstein, 1988). Attitude toward the ad and evaluation of the argument have been shown to be linked as an individual's overall attitude (unpleasant/pleasant) about the advertisement making him/her more likely to accept arguments made in the advertisement (MacKenzie, Lutz, & Belch, 1986).

These findings are based on the dual-mediation model which suggests that the direct effect of an ad (i.e., attitude toward the ad) as well as the indirect effect of an ad (i.e., attitude about the claims made in the ad) may work together when individuals form

overall attitudes (Lutz, 1985; Oskamp & Schultz, 1998). In this way, both attitude toward the ad and evaluation of the argument serve as predictors of behavioral intent. That is, if an individual has a positive attitude about the ad and evaluates the arguments positively then he/she should have greater intentions toward performing the prescribed behavior.

Behavioral Intent. Behavioral intent measures examine the likelihood that a particular behavior will be performed in the future. Thus, it is not a measure of what really does happen, but what an individual plans to do. Studies have shown that behavioral intent measures are reliable in predicting future behaviors (Chassin, Presson, Sherman, Corty, & Olshavsky, 1984; Choi, Gilpin, Farkas, & Pierce, 2001; McNeill et al., 1988). Moreover, these studies have shown that individual cognitions about performing future behaviors influence performance as well. Based on the self-efficacy model proposed by Bandura, this line of research posits that simply thinking about a behavior such as not smoking increases the likelihood that the individual will not smoke (Bandura, 1977; 1986; 1998). Furthermore, Bandura (1994) posited that mass media messages could influence attitudes thereby influencing behaviors. Accordingly, positive thoughts about and intentions to perform specific behaviors affect whether or not those behaviors are performed in the future.

Emotional Response. Dillard and Peck (2000) reasoned that the role of emotion in persuasive messages (especially in PSAs) is to influence a particular attitude toward the message. The effects of emotion-evoking appeals have led to many studies regarding influence and attitude formation (for a review see Wood, 2000). Most notably, studies by

Rogers & Prentice–Dunn (1997) and Dillard and colleagues (1996) have examined motivation and information processing differences resulting from exposure to emotional appeals. These studies assert that emotional appeals often provide the psychological basis for attitude and behavior changes. Emotional responses have also been shown to increase attitude accessibility (Fazio, 1995; Verplanken, Hofstee, & Janssen, 1998). In addition, Friestad and Thorson (1993) posited that emotionally expressive advertisements evoke stronger attitudes and are more memorable than non-emotional ads.

Studies have shown that emotional responses are made up of two dimensions: hedonic valence and arousal (P. J. Lang, 1995; P. J. Lang, Bradley, & Cuthbert, 1990; 1997; P. J. Lang, Greenwald, Bradley, & Hamm, 1993). Hedonic valence indicates how pleasant or unpleasant the individual found the stimuli and arousal indicates how intense (i.e., bored/excited) a particular stimuli made an individual feel. Bradley (2000) suggested that hedonic valence indicated which motivational system (i.e., appetitive or aversive) is active while arousal indicated how active the system is. In terms of Motivation Activation, positive emotions are associated with appetitive and negative emotions are associated with aversive (Petty, Wegener, & Fabrigar, 1997).

Pinker (1997) stated that emotions serve an evolutionary function as they alert individuals to possible environmental threats. Emotions are sources of information; they provide a physiological signal (e.g., decrease in heart rate, which also measures resource allocation) to the individual that "something" is happening and the individual should allocate processing resources to understand what that something is. In addition, some emotions (e.g., fear) suggest to the individual that particular actions (i.e., fight or flight) need to take place.

Zajonc (1984) posited that there are three conceptions of emotion: 1) occurrence of emotion, 2) experience of emotion, and 3) expression of emotion. Occurrence refers to the arousal of autonomic and neuromuscular emotional processes. Experience is conceptualized as the subjective state that accompanies these processes. Expression refers to the overt bodily displays of emotional reactions. Cognitive theories of emotion examine experience, that is, emotional responses elicited by stimuli. Studies of emotions in advertising suggest that emotional stimuli produce both distal (i.e., attitude or behavior change) and proximal (i.e., affective response) effects as individuals apply their emotions to evaluating a message, suggesting that cognition and emotion occur together to influence attitudes and behaviors (Lazarus, Coyne, & Folkman, 1984; Pechmann & Stewart, 1993). In addition, Isen (1993) suggested that cognition and emotion work together to influence information processing.

Message processing studies have suggested that emotional messages compel attention, are stored better, and are remembered better. Findings suggest that messages that elicit emotions increase overall attention to the message (Park & Thorson, 1990; Petty & Cacioppo, 1986; Ray, 1977). In addition, secondary task reaction times - which measure resources available – are slower for emotional messages indicating that during attention/encoding more resources are required by the message (A. Lang, 2000). Nonetheless, emotional responses influence message processing as resources are automatically allocated to the sub-processes of storage and retrieval (A. Lang, Borse, Wise, & Prabu, 2002). This is not surprising as research shows that messages that elicit emotions are recalled better (Clark & Isen, 1982; Crockett, 1988; Hazlett & Hazlett, 1999; Hitchon & Thorson, 1995).

Though studies have shown that overall emotional messages influence information processing by activating the processes of encoding and storage, research on specific emotions has shown that individuals respond differently to positive and negative messages. Studies have shown that advertising messages are often either positively or negatively valenced, which triggers audience feelings relating to this valence (Yi, 1990). That is, a positively valenced message may create positive emotions in an individual. In general, positive messages lead to more positive reactions and negative messages lead to more negative reactions (Brown, Homer, & Inman, 1998).

Messages are positive when they evoke pleasant feelings. Studies have consistently shown that "using positive emotions results in greater intent to comply with the message" (Becker, McMahan, Etnier, & Nelson, 2002; Monahan, 1995, p. 81). Positive emotional appeals typically lead to increased memory, more positive judgments, and more positive attitudes (Isen, 1993). Monahan (1995) suggested that the positive feelings created by emotional appeals "can substantially influence social behavior" by engaging individuals with the message (pp. 82-84). Messages are negative when they evoke unpleasant feelings, though they may affect positive or negative attitudes. However, findings regarding negative emotions have been inconsistent with attitudes differing after exposure to negative messages (Edell & Burke, 1987). Messages are coactive when they evoke both pleasant and unpleasant feelings. Few studies have examined the effects of coactive messages. One notable exception was a study conducted by Thorson and Friestad (1993) on poignant (i.e., positive and negative) messages. Their study found that messages that evoked both positive and negative emotions were recalled

more, liked better than, and judged to be more effective, important, and interesting than positive or negative advertisements.

Cacioppo and Gardner (1999) posited that "negative emotion…serves as a call for mental or behavioral adjustment. Positive emotion, in contrast, serves as a cue to stay the course or explore the environment" (p. 206). Along these same lines, Lang (2006b) found that encoding takes place in response to positive stimuli as the individual simply takes in information from the environment. Encoding, storage, and retrieval take place in response to negative stimuli as the individual must form a well-linked and accessible memory about what he/she should do in future "dangerous" situations.

Lang (2006a) stated that positive messages elicit appetitive activation and signal that resources should be allocated to encoding while negative messages elicit aversive activation and signal that resources should be allocated to storage. However, it should be noted that the level of emotional valence necessary to activate each system differs. Positive stimuli need to be very strong to elicit responses in the appetitive system as individuals are by nature already appetitively activated. Meanwhile, a weak negative stimulus will elicit responses in the aversive system as individuals are protective by nature (A. Lang, 2006b).

McGuire (1978) posited that positive and negative appeals could also be conceived of as reward or punishment appeals in that positive reactions could reduce an individual's anxiety that something negative could occur and negative reactions could increase an individual's anxiety that something negative could occur. This line of research posited that anxiety is a drive state that can either aid in or interfere with message processing. High levels of anxiety experienced through negative messages

decrease processing as do low levels of anxiety experienced through positive messages. Instead, a moderate level of anxiety is necessary to motivate individuals to attend a message and actively process the information in it.

Arousal. The intensity of emotional response has also been shown to influence message processing. Research by Peter Lang and colleagues (P. J. Lang, 1995; P. J. Lang, Bradley, & Cuthbert, 1990; 1997; 1999; P. J. Lang, Greenwald, Bradley, & Hamm, 1993) has consistently shown that arousing stimuli are processed differently than calm stimuli. This line of research has shown that arousal motivates startle responses. These startle responses tell the human body to react in some way to the stimuli. Thus, the more arousing the stimuli the greater the reflexive reaction.

Lang and colleagues (2004) suggested that arousal automatically increases the resources allocated to processing a message. Their study found that arousing messages increased participants' emotional and physiological reactions and increased attention allocated to the message. Highly arousing messages have also been shown to reduce resources available for encoding as Lang, Bolls, and Kawahara (1996) reported slower STRTs for highly arousing messages and faster STRTs for calm messages. However, this finding was restricted by message complexity as highly arousing complex messages had faster STRTs than highly arousing simple messages.

In a study of effects of risky products on arousal, Lang and colleagues (2005) found that participant responses to photographs of risky products such as alcohol, tobacco, and condoms on both self-report and physiological measures of arousal indicated that risky products elicited more arousal responses. This arousal led participants

to allocate more resources to processing resulting in greater free recall (i.e., measure of retrieval) for the risky products.

Taken together, this line of research suggests that positive attitudes toward the advertisement and positive evaluations of the claims made in the advertisement should predict decreases in an individual's intent to smoke in the future. Positive emotions experienced may also evoke positive attitudes toward the ad and consequently, positive evaluations of the claims made in the ad. It has also been suggested that positive attitudes are more likely to lead to further processing of the message. Hence, the overall affect evoked by the message can be transferred to the individual's attitude toward the ad and evaluation of the argument, both of which influence individual processing (i.e., attention, encoding) of the ad. Thorson and Friestad (1993) posited that Aad measures require cognitive processing of an advertisement. That is, information processing occurs through an individual's evaluations of "liking" an advertisement. In addition, positive attitudes toward an advertisement suggest that an individual will be more likely to attend to, encode, store, and later access the information from the advertisement to make behavioral decisions.

Emotional responses to PSAs also affect attitude toward the advertisement and evaluation of the argument. These emotional responses often help to predict future behaviors as Morris and colleagues (2002) argued that "emotional reactions are strongly predictive of behavioral intention" (p. 14). Furthermore, emotional responses to messages can signal the need for information processing increases in encoding and storage for later decision making. Positive emotional stimuli often signal a need for increased resources allocated to encoding and negative emotional stimuli often signal a need for increased

resources allocated to storage. Coactive or poignant stimuli are better attended to, liked, and remembered. In sum, studies have shown that emotional messages are processed to a greater extent than non-emotional messages. The intensity of these emotions also plays a role as more arousing messages signal automatic allocation of processing resources.

Chapter 5
Literature Review

Anti-Tobacco Campaigns

The goal of anti-tobacco campaigns is to influence individuals to either abstain from, or give up, cigarette smoking. Anti-tobacco campaigns have successfully influenced public attitudes regarding social norms for smoking, beliefs about the dangers of secondhand smoke, and anti-smoking behaviors. Knowledge gained from campaign efforts – media and otherwise – has helped to establish smoking as an unattractive, dangerous, and deadly behavior that affects smokers and non-smokers alike. This has resulted not only in decreases in smoking, but in policies to reduce smoking in public places such as elevators, restaurants, airplanes, and lounges (United States Department of Health and Human Services, 2000; 2001; 2006).

Recent studies have shown that mass media anti-tobacco messages have had both a direct and indirect influence on smoking behaviors as these messages influence the impressions of both the individual as well as those in his/her social circle (Gunther, Bolt, Borzekowski, Liebhart, & Dillard, 2006). The perceptions and activities of individuals in one's social circle and their reaction to pertinent media messages is important as parents' and peers' smoking behaviors are influential in individual decisions whether or not to smoke. A survey of 417 former adult smokers by Popham and colleagues (1993) found that more than 1/3 of the respondents indicated that anti-tobacco ads they had been exposed to through the media influenced their decision to quit smoking. Furthermore, a

study by the Surgeon General (2002) stated that "media-based activities can postpone or prevent smoking onset in 20-40 percent of adolescents" (p. 1). A study by Flay and colleagues (1995) compared a media-only intervention with social resistance curriculum, social resistance and media, information only curriculum, and no treatment. This study found that a media only curriculum increased student knowledge regarding the effects of smoking, awareness of smoking influences, self-efficacy beliefs about refusing to smoke, decrease in perceptions of smoking acceptability, decrease in intent to smoke, and decrease in smoking behaviors.

A number of message strategies have been used to promote anti-tobacco attitudes and behaviors. For example, fear appeals have been used extensively in disease prevention and health promotion messages to communicate threats of disease, damage, or death associated with performing socially unacceptable behaviors such as smoking, drinking, and drug use (Millar & Millar, 1996; Ohbuchi, Ohno, & Mukai, 2001; Ruiter, Verplanken, & van Eersel, 2003; Shehryar & Hunt, 2005). In addition, framing health messages in terms of gains (i.e., benefits of adopting a prescribed behavior) and losses (i.e., costs of not adopting a prescribed behavior) has been shown to influence individual health behaviors (Rothman, Bartels, Wlaschin, & Salvoney, 2006; Salvoney, Schneider, & Apanovitch, 2002; Viswanath & Emmons, 2006).

However, no matter what the strategy, the goal of any anti-tobacco campaign is to influence attitudes and beliefs. Arheart and colleagues (2004) stated:

> The success of anti-tobacco campaigns is predicated first on their ability to change pro-tobacco attitudes/beliefs and to maintain anti-tobacco attitudes/beliefs for two basic reasons. First, it is believed that attitudes/beliefs are the foundations for behavior; and second, it is believed that changes/maintenance in targeted attitudes/beliefs

> will precede (and are an intermediated outcome) actual change/maintenance in outcome behaviors (p. 910).

Blame vs. Attack.

Wallack and colleagues (Dorfman & Wallack, 1993; Wallack, 1986; Wallack & Corbett, 1987) suggested that PSAs can be broken into two types of advertising strategies: 1) those that conceptualize smoking problems and consequences as caused by the individual and 2) those that conceptualize smoking problems and consequences as socially or politically influenced, with the former category referred to as "traditional advertisements" and the latter referred to as "counter-advertisements." Kotler, Roberto, and Lee (2002) conceived traditional anti-tobacco PSAs as those that focus on the individual as the cause of the problem. The purpose of traditional PSAs is to "sell a behavior" by persuading individuals to voluntarily reject or abandon smoking. On the other hand, counter-advertisements call into question the motives of marketers and industry officials who are more concerned with profits than with health (Dorfman & Wallack, 1993). Antecol (1998) stated that counter-ads "challenge the institutions behind the product" and are more accurately called "structurally-focused" ads with those that blame the individual called "individually-focused" ads (pp. 20-21).

Traditional "Blame" PSAs are part of a larger strategy called a social marketing campaign which incorporates marketing, public relations, and advertising strategies to sell people on pro-social behaviors (Flay & Cook, 1981; Straubhaar & LaRose, 2002). Social marketing campaigns – often referred to as public service, information, advocacy, or public communication campaigns – attempt to change an aspect of society that is seen as detrimental in some way (Kotler, Roberto, & Lee, 2002; Straubhaar & LaRose, 2002).

The campaigns often utilize marketing components such as: publicity and promotion, audience segmentation, and mass media resources (Solomon, 1981).

In essence, social marketing campaigns identify normative prescriptions for social behaviors. Research in this area suggests that the persuasiveness of messages, appeals, or arguments presented in support of specific social behaviors affects both individual expression of norms as well as desired behaviors (Sly, Hopkins, Trapido, & Ray, 2001). Thus, to the extent that norms for social behaviors can exist, it follows that they may be linked to the type of persuasive arguments supporting those behaviors.

Studies have shown that traditional approaches are based on theories of "outcome expectancy" where individuals assess the risks and benefits associated with smoking behaviors as well as theories of "self-efficacy" where individuals are motivated to perform health behaviors that they believe they can perform (Ajzen & Fishbein, 1980; Bandura, 1986; Hersey et al., 2003). Inherent in the idea of social marketing efficacy is Bandura's (1994) idea that although individual behaviors are both environmentally and internally controlled, some environmental events such as peers and media messages often influence whether an individual performs a behavior.

Flay (1987) suggested that social marketing programs use the mass media to influence smoking attitudes and behaviors in three ways: 1) inform about negative consequences in an attempt to motivate smokers to quit, 2) promote smoking cessation for smokers who want to quit, and 3) provide smoking cessation aid to those who try to quit. Most social marketing campaigns use an integrated approach where media, interpersonal programs, and promotions are used together to influence attitudes and

behaviors. However, the current study deals only with the media aspect of these campaigns in the form of anti-tobacco PSAs (Pechmann & Reibling, 2000).

Thus, traditional social marketing or Blame PSAs focus on negative threats (e.g., social or health) to the individual. This individual view of behaviors suggests that disease and death are the consequences of foolish behaviors, bad habits, and unhealthy lifestyles that are preventable and are completely under an individual's control (Guttman & Ressler, 2001). Blame campaigns often inform audiences as to what actions are necessary to be a socially moral and responsible person.

Studies have shown that Blame messages are often perceived as personally relevant and often lead to greater levels of involvement and interest (Antecol, 1998). In addition, by using fear appeals, Blame PSAs cause individuals to think about negative consequences associated with performing smoking behaviors thereby increasing individual feelings of responsibility and guilt (Elvin, 2001; Kymalaninen & Weisman, 2004; Lindsey, 2005; O'Keefe, 2000; 2002). The danger of these PSAs is that they place the blame solely on the individual as the cause of the problem (often overlooking social and environmental factors) and they suggest that individuals are obligated to perform according to social norms (Guttman & Ressler, 2001).

On the other hand, Attack PSAs focus on the tobacco companies as causing smoking problems and stress that individuals are the victims of their manipulations. Counter-marketing or Attack campaigns have been supported by the Surgeon General as a way to encourage audience empowerment and involvement in changing social norms about tobacco (United States Department of Health and Human Services, 2000). However, these campaigns are relatively new and little research has been done on the

theories behind attack campaigns, though some suggest that they are based on theories of media literacy and the Persuasion Knowledge Model where, by providing the audience with knowledge about how they are being marketed to/persuaded, individuals can make better decisions (Flanagin & Metzger, 2000; Friestad & Wright, 1994; Hersey et al., 2003; Pechmann, Zhao, Goldberg, & Reibling, 2003). Thus, knowledge of what tobacco companies are attempting to do through their messages may serve to shape individual responses to future persuasion attempts. Attitudes or information retained from past persuasion experiences often are the basis of understanding persuasive messages and provide a means for thinking about future messages (Friestad & Wright, 1994).

Dorfman and Wallack (1993) posited that the intent of attack ads is to "challenge authority and dominant views" (p. 723). These messages draw attention to the negative behaviors of the industry and provide the audience with facts and figures they can use to make the decision whether or not to smoke. In addition, feelings of independence are fostered by appeals used in attack PSAs that center on resentment and deception thus increasing feelings of anger and aggression (Farrelly et al., 2002). Within what Arheart and colleagues (2004) called an industry manipulation context, attack ads challenge: 1) traditional attitudes and beliefs about tobacco use and consequences; 2) the image of tobacco executives and the industry; 3) individuals to make informed decisions about tobacco use and consequences (p. 912). Likewise, Hersey and colleagues (2003) stated that:

> counterindustry campaigns are based on the assumption that messages aimed at changing attitudes and beliefs about tobacco industry practices can inoculate [individuals] against persuasive cigarette marketing techniques and motivate them to assert their independence against tobacco companies by choosing not to smoke (p. 545).

Examinations of Blame and Attack PSAs. Current research has attempted to examine differences between these two categories of PSAs. In a content analysis of 100 anti-tobacco print advertisements of what was referred to as social marketing ads (i.e., Blame) vs. industry manipulation ads (i.e., Attack), Moore and Greenwood (2005) found that the persuasive elements used by both types of PSAs were significantly different in both verbal and visual aspects. The study showed that the Attack campaign used more death and disgust images, and an overall anger appeal stressing tobacco industry blame, annoyance, resentment, and rage. In addition, the researchers noted that backgrounds with bright red and orange were used in the Attack campaign (whereas black and white were predominant in the Blame campaign) and suggested that this was done to create feelings of anger in the Attack advertisements. Moreover, the Blame campaign used a mix of fear and disgust appeals as well as encouragement, and text was used more in the Blame ads as "problem solving" opportunities or ways to find help were given.

Moore and Reinardy (2005) conducted a rhetorical analysis of a series of Attack PSAs from Minnesota's *Target Market* campaign. Findings from this study suggested that the overall theme of this Attack campaign was that "cigarette companies have lied, targeted children, minority groups, and the disadvantaged as well as added addictive poisons to their product to continue to "feed" new consumers to an industry which makes billions of dollars a year" (p. 10). The ads examined frequently used teen/young adult characters who questioned the tobacco industry, promoted rebellion against tobacco industry messages, and suggested overall social targeting of the tobacco industry advocating holding tobacco companies and tobacco executives responsible for their

actions. These Attack messages were designed to evoke strong feelings of rebellion against the tobacco industry, as well as feelings of disgust, anger, and betrayal.

Likewise, Benoit and Harthcock (1999) used rhetorical analysis to study *The Campaign for Tobacco Free Kids*. Again, advocating a departure from traditional anti-tobacco advertising, this Attack campaign portrayed those afflicted as helpless, weak victims against the tobacco companies. The researchers suggested that the campaign successfully attacked the tobacco industry by indicating that the companies had performed, authorized, ordered, encouraged, and permitted acts that were offensive to the public such as targeting children with their ads and adding chemicals to cigarettes to make them more addictive. As evidence of this, expert testimony, health statistics, and tobacco industry documents were utilized in the PSAs. Thus, the companies were vilified in the PSAs as the campaign was able to show that tobacco companies had planned, knew the consequences of, and had benefited from their actions.

Moore (2007) examined the emergence and evolution of the national *Truth* anti-tobacco campaign using Bormann's (1972) Symbolic Convergence Theory method, Fantasy Theme Analysis. The study explored rhetorical artifacts of: advertisements, websites, documents, and articles in order to construct an overall representation of the strategies used to create rhetorical visions of the national *Truth* anti-tobacco campaign. Findings suggested that messages such as those disseminated by the *Truth* campaign were actually dramas (i.e. fantasy themes) which spread from the mass media into the public sphere. Moore suggested that the overall theme of the *Truth* campaign was inherently righteous with Big Tobacco portrayed as the evil villain with unlimited resources; *Truth* portrayed as the little guy, fighting for what is right; and the public portrayed as being

manipulated and lied to. The emotions evoked are those associated with rebellion: anger, disgust, revulsion, and loathing (Healton, 2001; Hicks, 2001). Through the *Truth* campaign the public is asked to take part in a war against a morally corrupt opponent by becoming empowered, prepared, and diligent.

Recently, researchers have employed survey methodology to examine the effects of attack campaigns. A national survey of 6,875 youth ages 12-24 showed that of those respondents who lived in states with counter-industry (i.e., Attack) campaigns, instances of established smoking decreased and being adverse to smoking increased. Furthermore, negative beliefs about the tobacco industry increased as did beliefs about the dangers of secondhand smoke (Hersey et al., 2003). In a comparison of an attack campaign (i.e., *Truth*) to an industry counter-ad campaign (i.e., Phillip Morris), a study by Farrelly and colleagues (2002) found that participants who reported awareness of the *Truth* campaign were less likely to smoke, more likely to have negative attitudes about smoking and the tobacco industry, and more likely to acknowledge the health consequences of smoking. These attitudes also increased over the course of the *Truth* campaign while the Phillip Morris campaign had little effect. Follow-up to the study by Farrelly and colleagues (2005) suggested that the *Truth* campaign accounted for a 22% decline in youth smoking nationwide. The study controlled for intrapersonal, interpersonal, community, media, policy and economic factors so that the effects of the *Truth* campaign on smoking rates could be examined.

A longitudinal study of the Florida "truth" campaign showed that those individuals exposed to the campaign were less likely to begin smoking (Sly, Hopkins, Trapido, & Ray, 2001). A follow-up to this study showed that after 22 months, the

Florida “truth” campaign had influenced both attitudes and behaviors as respondents who indicated that they had seen four or more “truth” ads reported more positive attitudes toward anti-smoking and less likelihood to begin smoking (Sly, Trapido, & Ray, 2002). In addition, one recent study has shown that defunding a state attack campaign (i.e., Minnesota’s Target Market) resulted in increased susceptibility to tobacco influences, specifically in intentions to smoke (Sly et al., 2005).

However, when comparing Attack vs. Blame campaigns, the results have been inconsistent. In an experimental examination of the two types of anti-tobacco ads, Antecol (1998) found that Blame ads were more effective in garnering attention, interest, involvement, positive emotion, and arousal. This led to greater reports of participant memory for Blame ads and more positive attitudes toward them as well. Included in this study were measures of autonomic response (heart rate and skin conductance). Findings supported self-report data regarding attention and arousal superiority for individually focused (i.e., Blame) ads. In addition, recall measures of memory suggested that there were no existing memory stores for the structurally focused (i.e., Attack) ads. The ads were relatively new at the time of the study, and it was posited that without stored memory traces attention, interest, and involvement suffered.

In contrast, a focus group examination of structurally vs. individually focused anti-tobacco PSAs by Goldman and Glantz (1998) posited that messages that attack the tobacco industry are most effective. Their study found that both youth and adults preferred Attack PSAs to traditional Blame PSAs.

Though the specific categories or Blame/Attack, traditional/counter, or structurally-focused/individually-focused were not identified in their study, Pechmann

and colleagues (2003) examined 194 anti-smoking advertisements and posited that there are seven common message themes: 1) disease and death, 2) endangers others, 3) cosmetics, 4) smokers' negative life circumstances, 5) refusal skills role model, 6) marketing tactics, and 7) selling disease and death. These can be easily categorized into Blame vs. Attack as the first four themes addressed individual consequences of smoking such as health risk vulnerability, severity of health risks to self and others, appearance-related risks, and social disapproval. Following a social marketing framework the fifth theme, refusal skills role model, attempted to enhance individual feelings of self-efficacy by providing messages which stress that individuals are highly capable of refusing to smoke or quitting smoking. These messages often provide "just say no" advice to the audience. The final two themes addressed tobacco company machinations in producing, marketing, addicting, and killing its customers.

The researchers then experimentally tested the seven themes found in anti-smoking messages and found that Blame themes of "disease and death", "endangers others", "cosmetics", and "smokers' negative life consequences" did not work as well as Attack themes of marketing tactics and selling disease and death in terms of participants' perceived severity of health risks, vulnerability to social disapproval risks, costs of not smoking, and benefits of not smoking. However, in terms of intentions not to smoke, the Blame theme of "endangers others" worked better than either Attack theme. In addition, the "smokers' negative life circumstances" Blame theme worked better than both Attack themes in terms of severity of social disapproval risks and self-efficacy at refusing cigarette offers (Pechmann, Zhao, Goldberg, & Reibling, 2003).

In addition, Pechmann and Reibling (2000) used an experiment to compare health, counter-industry, and industry anti-tobacco advertisements to see how effective each was in communicating the severity of and vulnerability to health risks, severity of and vulnerability to social risks, and intent to smoke. Findings from this study indicated that health messages were the most likely to impact smoking intentions. Both industry and counter-industry ads did not significantly influence anti-industry motivation or reduce intent to smoke.

Taken together, these findings suggest that though qualitative and survey studies suggest that Attack PSAs are more effective in reducing smoking, experimental studies suggest otherwise. Findings from experimental research show that while both influence intentions not to smoke, traditional Blame PSAs are more likely to influence individuals' feelings of social disapproval and self-efficacy beliefs about performing anti-smoking behaviors. Furthermore, traditional Blame PSAs are better attended and encoded into memory, are perceived as more interesting, involving, arousing, and pleasant as well as influence more positive attitudes.

Chapter 6
Hypotheses and Research Questions

In an overview of using the LC4MP to design effective health communications, Lang (2006b) proposed that different levels of processing are necessary for different message goals. If the goal of the message was awareness, then attention and encoding are necessary. If the goal was knowledge gain, then it would be necessary for an individual to store information in memory. Persuasion required that individuals attend and encode information with positive evaluations. Finally, if the objective was behavior change, then not only were encoding and storage necessary, but so was motivation as individuals needed not only reasons to change, but information on how to change. The current study is specifically concerned with the persuasiveness of Blame vs. Attack anti-tobacco PSAs.

The overall research question guiding this study is: In terms of message processing, which type of appeal – Blame or Attack – is more effective, at what message sensation level, and for individuals with what type of Motivation Activation? A total of three hypotheses regarding Blame vs. Attack messages were derived from the extant literature. The overall theory used in this study, the LC4MP, as well as findings from studies of SS and MSV, provided evidence regarding how the Motivation Activation groups of Risk Takers, Coactives, Inactives, and Risk Avoiders would likely processes the different types of high vs. low MSV anti-tobacco messages. In addition, research regarding persuasion and attitude change provided the foundation for hypotheses regarding overall persuasiveness of each type of PSA.

In the current study it is assumed that both Attack and Blame PSAs are likely to be construed as negative stimuli as they use negative appeals such as fear and disgust to address a negative topic – smoking behaviors. Findings regarding emotional responses indicate that negative messages can be perceived as either negative or positive, depending on the individual. It is assumed that one type of message will be seen as "less" negative than the other by different individuals in this study. The hypotheses detailed in this section therefore address how individuals with differing levels of PO and NB are likely to be affected by each type of advertisement.

Recall that it takes very positive stimuli to be processed at the same level as moderately negative stimuli. Furthermore, positive attitudes toward and positive evaluations of the advertisement are more likely to lead to increased intentions not to smoke. It stands to reason then, that in this study PSAs perceived to be more negative will likely influence information processing more than those perceived to be more positive, while those perceived to be more positive will likely lead to greater persuasive evaluations more than negative PSAs.

The LC4MP is based on the assumption put forth by Neisser (1967) that individuals are not neutral or passive to new stimuli, but instead have different goals and motivations that influence their processing of the stimuli. Research has shown that individual message processing varies as a function of which system (appetitive or aversive) is more easily activated. That is, individuals differ in whether they are either appetitively activated (Positivity Offset) and/or aversively activated (Negativity Bias). In general, aversive activation results in decreased encoding, and appetitive activation results in increased encoding. High POs (Risk Takers and Coactives) are more likely to

encode negative stimuli than low POs. High NBs (Risk Avoiders and Coactives) are less likely to encode negative stimuli than low NBs (A. Lang, 2006a). In addition, findings by Lang and colleagues (2005) showed that individuals with low NB (Risk Takers and Inactives) are strongly correlated with high SS tendencies and those with high PO (Risk Takers and Coactives) are strongly correlated with greater SU behaviors. The current study perceives both PO and NB as influential in determining how individuals are likely to attend to and process new stimuli as well as in their interactions with messages hoping to achieve optimal states of arousal. That is, they will be more likely to process messages that activate their respective motivational systems as well as fulfill their arousal needs.

Lang, Shin, and Lee (2005) suggested that PO was associated with Sensation Seeking and substance use as individuals with high PO were more likely to approach risky objects. Additionally, work by Cacioppo and colleagues (Cacioppo & Bernston, 1994; Cacioppo, Gardner, & Bernston, 1997; Ito, Larsen, Smith, & Cacioppo, 1998) suggested that NB holds a stronger sway on attitudes and behaviors. Thus, individuals with high PO and low NB (Risk Takers) should be more influenced by negative messages such as the ones used in this study. In addition, SS studies show that high SS individuals (Risk Takers) seek out highly arousing experiences – as well as highly arousing messages – to help them maintain or achieve optimal arousal levels. Research on MSV holds that high MSV messages help high SS individuals achieve optimal states of arousal through emotional arousal, dramatic impact, and novelty. High MSV messages are perceived as more persuasive by high SS individuals. In addition, high MSV messages lead to increased attention, recall, and comprehension in high SS individuals.

Recall that high MSV messages appeal to high SS individuals as high levels of novelty, dramatic impact, and emotionality appeal to their need for stimulation resulting in more positive evaluations, greater resources allocated, and better recognition memory for high MSV messages. Highly arousing messages signal an increase in resources required to process a message. In addition, Lang (2006b) suggested that stimuli which are motivationally relevant are processed to a greater extent by individuals (regardless of PO or NB). Motivationally relevant stimuli are those that influence primary motivational systems and/or influence learned consequences motivational systems.

Messages that affect strong emotional responses in terms of hedonic valence and arousal are also more persuasive; affect greater attitude and behavior change; and influence automatic allocation of processing resources to encoding, storage, and retrieval resulting in better memory formation. The persuasion process (attitude/behavior formation or change) is impacted by the ability of the message to acquire the audiences' attention, elicit emotion, affect positive attitudes, and be encoded. Likewise, information processing is affected by each as resources allocated are affected by both the individual and the message.

Rationale and Hypotheses

Evidence presented earlier suggested that the new Attack PSAs are effective in influencing perceptions of health risks, social disapproval, and benefits of not smoking. This type of advertisement also significantly influenced individual actions such as intent not to smoke and desire to assert independence over tobacco company manipulations. On the other hand, traditional Blame PSAs were more likely to influence individuals'

perception of negative consequences of smoking, evoke feelings of guilt and responsibility, and significantly increase self-efficacy beliefs about performing anti-smoking behaviors. Furthermore, findings suggested that traditional Blame PSAs were better attended and encoded into memory, perceived as more interesting, involving, arousing, and pleasant as well as engendered more positive attitudes.

Recall that Blame messages identify smoking problems and consequences as caused by the individual. Lang (2006b) suggested that an individual's own sense of risk would influence their message processing. Blame messages are motivationally relevant in terms of both primary and learned consequence motivational systems. That is, Blame messages address primary motivations by portraying death and disease risks associated with smoking. They also address learned consequence motivations by providing further information about the negative side effects of smoking. Blame messages likely lead to feelings of guilt in smokers and feelings of anger in non-smokers. In addition, Blame messages have been shown to be perceived as more personally relevant (Antecol, 1998). Lang (2006b) asserted that personal relevance influences the amount of resources allocated to processing a message. In the current study, it is assumed that those who smoke will view anti-tobacco messages as more personally relevant. Studies correlating Motivation Activation and SU behaviors have shown that those with high PO (Risk Takers, Coactives) are more likely to take part in SU behaviors such as smoking. Thus, these individuals are more likely to allocate increased resources to processing Blame messages.

Recall that Attack messages identify smoking problems and consequences as caused by the tobacco industry, marketers, and other social/political forces. Attack

messages likely lead to feelings of anger toward those who promote and/or produce tobacco products. Those individuals with low PO (Inactives, Risk Avoiders) who are less likely to partake in SU behaviors may not perceive Blame messages as personally relevant and thus not allocate resources to processing these messages. Additionally, Attack advertisements may be seen as less negative (i.e., more positive) than Blame advertisements as they still promote pro-social behaviors without confronting individual behaviors . Recall that high PO individuals were more likely to encode negative stimuli than low PO individuals and high NB individuals were more likely to encode positive stimuli than low NB individuals. In this case, low PO low NB individuals (Inactives) and low PO high NB individuals (Risk Avoiders) are more likely to encode stimuli they perceive to be less negative. Thus, the more positive message addressed by Attack advertisements may decrease aversive activation and will likely influence resources allocated to processing for these groups. Taken together these findings lead to the first set of hypotheses:

> H1a: Blame messages will cause high PO individuals (Risk Takers and Coactives) to allocate more resources to processing the message (faster STRTs) than Attack messages.
>
> H1b: Attack messages will cause high NB individuals (Risk Avoiders and Inactives) to allocate more resources to processing the message (faster STRTs) than Blame messages.

Also recall that high SS individuals (Risk Takers, Inactives) are more likely to process high MSV messages than low SS individuals (Risk Avoiders, Coactives). High MSV PSAs will be more likely to help high SS individuals in achieving an optimal state of arousal thereby influencing processing to a greater extent than low MSV PSAs. On the

other hand, low SS individuals do not crave/require the higher levels of stimulation provided by high MSV messages. Their message processing may be negatively influenced by high MSV messages that they perceive as too intense. Recall that research by Cacioppo and colleagues (Cacioppo & Bernston, 1994; Cacioppo & Gardner, 1999) suggested that SS directly correlates to NB as low NB individuals (Risk Takers and Inactives) are more likely to perform SS behaviors and high NB individuals (Risk Avoiders and Coactives) are less likely to perform SS behaviors. Thus, the following hypotheses are proposed:

> H2a: High MSV messages will elicit better message encoding (better recognition memory) for low NB individuals (Risk Takers and Inactives).
>
> H2b: Low MSV messages will elicit better message encoding (better recognition memory) for high NB individuals (Risk Avoiders and Coactives).

Taken together, these hypotheses suggest that: 1) high PO, low NB individuals (Risk Takers) are more likely to process and recognize Blame messages with high MSV to a greater extent than other PSAs, 2) high PO, high NB individuals (Coactives) are more likely to process and recognize Blame messages with low MSV to a greater extent than other PSAs, 3) low PO, high NB individuals (Risk Avoiders) are more likely to process and recognize Attack messages with low MSV to a greater extent than other PSAs, and 4) low PO, low NB individuals (Inactives) are more likely to process and recognize Attack messages with high MSV to a greater extent than other PSAs. These are consistent with findings that suggest that for high POs negative information is more likely to be processed than positive information and for high NBs positive information is more likely to be processed than negative information. However, recall that processing is

a necessary but not sufficient step in persuasion and that more positive evaluations lead to greater persuasion (McGuire, 1978). Thus, the messages which are perceived more positively are more likely to influence persuasion.

As noted earlier, Blame PSAs – though personally relevant to those more likely to smoke – may be perceived as more negative to high POs as they address negative consequences which may likely occur in a smoker's future. Thus, Attack PSAs may be perceived as more positive by this group. Furthermore, individuals who do not smoke may feel that the subject matter of Blame PSAs is negative, but may not perceive the message itself as negative because the consequences portrayed do not pertain to them. In addition, MSV studies indicate that high MSV messages result in greater persuasion and greater emotional response. In this case, the response is more positive than "negatively" perceived Blame PSAs. Thus, all four groups (Coactives, Inactives, Risk Takers, and Risk Avoiders) will perceive high MSV Attack messages more positively than Blame messages and be more likely to report more positive attitudes toward the advertisement, more positive evaluations of the argument, and greater intent not to smoke for these messages. Thus, the following were hypothesized:

H3a: High MSV Attack PSAs will elicit more positive attitudes toward the ad than other PSAs.

H3b: High MSV Attack PSAs will elicit more positive evaluations of the argument than other PSAs.

H3c: High MSV Attack PSAs will elicit greater intent not to smoke than other PSAs.

H3d: High MSV Attack PSAs will elicit greater arousal responses than other PSAs.

H3e: High MSV Attack PSAs will elicit greater positive emotional responses than other PSAs.

The above hypotheses address the effects of and interactions of the variables under investigation in this study. However, recent work by Lang and colleagues (A. Lang, 2006a; 2006b; A. Lang, Shin, & Lee, 2005; A. Lang, Wang, & Bradley, 2004) suggested that Motivation Activation (Positivity Offset & Negativity Bias), SS, and SU are strongly correlated. In fact, while creating three separate Motivation Activation measures, Lang correlated each with measures of SS and SU. In order to provide further validation of this measure, this study will also examine correlations among the three variables, however, since anti-tobacco messages are the focus of the current research, this study uses TU (tobacco use) instead of SU. Thus, the final research question:

RQ1: What are the relationships among Positivity Offset, Negativity Bias, SS, and TU in the current study?

Chapter 7
Method

The empirical method used in this study was the controlled experiment. This was used to examine the information processing and persuasive differences that occurred between Blame vs. Attack PSAs. To do this, a repeated measures factorial design was used to measure the changes in cognitive and affective responses across PSAs. This allowed for the simultaneous analysis of the independent variables while at the same time making the experiment sensitive to stimuli differences (Stevens, 2002).

Design

A 2 (Message Type: Blame/Attack) x 2 (Message Sensation Value: low/high) x 2 (Positivity Offset: low/high) x 2 (Negativity Bias: low/high) x Message Replication (5) x Order repeated measures design was used.[1] Order was a between-subjects variable as were PO and NB. Both PO and NB were considered individual characteristics included as moderating variables. Message Type, Message Sensation Value, and Message Replication were within-subjects variables. This combination of between and within-subjects design is preferable to between-subjects designs as differences for repeated tests on the same individual vary less than those on different individuals, thereby allowing for a more sensitive examination of individual variability (Stevens, 2002).

[1] Order was randomly computer-generated through the MediaLab program for the following stimuli: 1) 35 IAPS pictures for the Mini-MAM II task, 2) 20 30-second PSAs for the STRT task, and 3) 80 2-second audio clips for the recognition memory task.

A number of threats to both internal and external validity are dealt with in the design of this experiment. In order to increase internal validity, confounding variables such as Message Sensation Value, and individual Motivation Activation (PO and NB) were controlled by including them in the design. Because of the possibility of carryover effects, primacy or recency effects, as well as the effects of practice and fatigue, message presentation order for each of the stimuli was built into the design and controlled by using multiple computer-generated random message presentation orders. In addition, because the same individual is measured repeatedly, this type of design is vulnerable to validity issues relating to: subject learning, fatigue, treatment effects, measurement order, and sensitization (Campbell & Stanley, 1963; Stevens, 2002).

To address these issues, carryover, measurement order, and sensitization effects of treatments were countered by: varying the presentation of questions; allowing participants to become comfortable with the experimental task; giving participants a series of questions between each stimuli presentation to serve as a "buffer" between the tasks; and giving participants a distracter task prior to the recognition memory task. Furthermore, to limit participant fatigue and subject mortality, the length of each portion of the experiment was limited to less than 40-minutes with the total length of the experiment, including obtaining consent and debriefing participants, kept to one hour (Calfee, 1985).

To increase external validity, multiple treatment interference was controlled through randomizing the presentation order of photos and messages. In addition, a post-test only design was used so that no interaction effect of testing occurred. In terms of message generalizability, by using multiple messages as stimuli in each level of the

experimental design, secondary message features that could confound the results are minimized. However, because the messages used in this study were restricted to Blame or Attack messages, and various appeals are used within each of these categories, it should be noted that these experimental findings may not be generalized to other types of anti-tobacco messages (e.g., efficacy messages), or specific message appeals (e.g., fear, humor, or disgust) (for a review see Shapiro, 2002).

Participants

Young adults (aged 18-24) were selected as the sample for this research as a 2003 study by the ALF suggested that individuals in this age range are exposed to pro-tobacco messages "in a variety of media, including magazines and newspapers, the Internet, retail outlets, bars and festivals, and television and film" (p. 3). Though the study stated that young adults expressed a high awareness of these messages, they – more than young teens (aged 12-14) and older teens (aged 15-17) – are more likely to be current smokers and prior smoking experimenters and are less closed to smoking than the other groups (Niederdeppe, Lindsey, Girlando, Ulasevich, & Farrelly, 2003).[2] Furthermore, studies have shown that approximately 33% of college students use tobacco regularly and that this group is also more likely to perform other risky behaviors such as using drugs and alcohol (Lee & Ferguson, 2002; Rigotti, 2000). This tendency for performing risky behaviors has been extensively documented by Zuckermann and colleagues (1971; 1979; 1984; 1988; Zuckerman, Kolin, Price, & Zoob, 1964) and shown to reach its peak in the late teens/early twenties.

[2] Sixty-three percent of young teens and 45% of older teens reported being closed to smoking, while only 31% of young adults reported being closed to smoking.

This made the 18-24 age group exceptionally attractive in terms of studying the persuasive, emotional, and arousing effects of anti-tobacco messages as these messages are extremely relevant to influencing their current smoking behaviors and intentions. In addition, messages that stress the death and disease aspects of cigarette smoking – which both the Blame and Attack messages used in this research do – are more likely to influence this demographic as they are more conscious of smoking behaviors having negative consequences than the younger groups (Niederdeppe, Lindsey, Girlando, Ulasevich, & Farrelly, 2003). That may be why anti-smoking campaigns have been shown to have a greater effect on reducing adult smoking behaviors than youth and teens (Pechmann & Reibling, 2000)

A total of 266 participants from a large Midwest university participated in this experiment. A total of 17 participants did not complete the study making the mortality rate 6 percent. Furthermore, data from 23 subjects were deleted due to technical difficulties with the computer program experienced on the first day of data collection (9%). This resulted in a final $N = 226$[3]. This type of sample is acceptable for an experimental study that tries to measure psychological processes though issues of generalizability arise when trying to draw inferences from this sample to the overall population. That is, since it is expected that the underlying psychological processes that occur in information processing are similar across students and adults, it is feasible that they can be examined using a student sample. Furthermore, using a homogeneous sample such as this allows for a more conservative test of the hypotheses (for a review see Basil, Brown, & Bocarnea, 2002).

[3] A priori power estimates indicated that 180 participants was the sample size necessary at a power of .80 to detect a medium effect size (.25) at the .05 significance level for a 4 group between-subject design.

Participants were recruited from seven undergraduate and graduate journalism courses (See Appendix 1), and were given extra credit for their participation. Data from a total of 78 males (34.5%) and 148 females (65.5%) were used in the final analyses. The average age of participants was 18-20 (85%) with an average freshman education level (54.9%). The ethnic make-up of the participants was mostly Caucasian (51.3%) with African American (34.1%), Arabic/Indian (7.1%), Asian (3.5%), and Eskimo/Inuit (3.1%) following. The majority of participants stated that English was their primary language (71.2%). Participants indicated that the majority of their parents' incomes were below $100,000 per year (41.2%), while 39.3% noted that their parents' incomes were above $100,000 per year, and 19.4% stated that they either did not know or they refused to answer this question. Table 1 shows the socio-demographic make-up of the participants in this study.

Table 1
Socio-Demographics

	TOTAL	*%*
AGE		
Under 18	3	1.3
18-20	192	85.0
21-23	24	10.6
24-26	4	1.8
27-29	2	.9
30+	1	.4
GENDER		
Male	78	34.5
Female	148	65.5
ETHNICITY		
African American	77	34.1
Arabic/Indian	16	7.1
Asian	8	3.5
Caucasian	116	51.3
Eskimo/Inuit	7	3.1
Hispanic	2	.9
EDUCATION		
Freshman	124	54.9
Sophomore	55	24.3
Junior	19	8.4
Senior	18	8.0
Graduate	9	4.0
ENGLISH PROFICIENCY		
English is 1st language	161	71.2
English is 2nd language	56	24.8
PARENT'S INCOME		
Less than $20,000	6	2.7
$20,001-$40,000	11	4.9
$40,001-$60,000	22	9.7
$60,001-$80,000	30	13.3
$80,001-$100,000	24	10.6
$100,001-$120,000	31	13.7
$120,001-$140,000	17	7.5
More than $140,00	41	18.1
Don't know	34	15.0
Chose not to answer	10	4.4

Participant Tobacco Use (TU) was compiled from 11 measures: 1) current cigarette smoking status, 2) past cigarette smoking status, 3) cigarettes smoked per day, 4) current cigar smoking status, 5) past cigar smoking status, 6) current chewing tobacco use, 7) past chewing tobacco use, 8) what type of smoker they were, 9) tobacco use per month, 10) tobacco use per week, and 11) tobacco use per year. Table 2 shows responses to each of the measures which were combined into the TU scale.

Table 2
Tobacco Use

	TOTAL	*%*
CURRENT CIGARETTE SMOKING STATUS		
Smoke	11	4.9
Do not smoke	215	95.1
PAST CIGARETTE SMOKING STATUS		
Smoked	24	10.6
Did not smoke	202	89.4
CIGARETTES SMOKED PER DAY		
0	183	81.0
1-3	38	16.8
4-6	4	1.8
Chose not to answer	1	.4
CURRENT CIGAR SMOKING STATUS		
Smoke	14	6.2
Do not smoke	212	93.8
PAST CIGAR SMOKING STATUS		
Smoked	35	15.5
Did not smoke	191	84.5
CURRENT CHEWING TOBACCO STATUS		
Use	0	0
Do not use	226	100.0
PAST CHEWING TOBACCO STATUS		
Used	6	2.7
Did not use	220	97.3
SMOKING CLASSIFICATION		
Tried it once	78	34.5
Smoked when younger	84	37.2
Former smoker	13	5.7
Social smoker	11	4.8
Stress smoker	10	4.4

Group smoker	9	3.9
Daily smoker	2	.8
Chose not to answer	19	8.4

TOBACCO USE PER WEEK		
Never	*203*	*89.9*
1 day	*10*	*4.4*
2 days	*6*	*2.7*
3 days	*1*	*.4*
4 days	*1*	*.4*
5 days	*0*	*0*
6 days	*0*	*0*
Daily	*4*	*1.8*
Chose not to answer	*1*	*.4*

TOBACCO USE PER MONTH		
Never	*188*	*83.2*
1 day a month	*14*	*6.2*
2-3 days a month	*11*	*4.9*
1-2 days a week	*4*	*1.8*
3-4 days a week	*3*	*1.3*
5-6 days a week	*1*	*.4*
Daily	*4*	*1.8*
Chose not to answer	*1*	*.4*
TOBACCO USE PER YEAR		
Never	177	78.3
1 month	17	7.5
2-3 months	12	5.3
4-5 months	5	2.2
6-7 months	7	3.1
8-9 months	3	1.3
10-11 months	1	.4
All year long	2	.9
Chose not to answer	2	.9

Participant tobacco use was used as a grouping variable for portions of this study. To do this, a median split was used to determine a middle category with those falling below the median being classified as low TU, those at the median being classified as moderate TU, and those above the median being classified as high TU. A total of 67 participants were classified as exhibiting low TU (29.6%); 89 participants were classified

as exhibiting moderate TU (39.4%); and 70 participants were classified as exhibiting high TU (31.0%).

Participants also completed questions regarding Positivity Offset (PO), Negativity Bias (NB), and Sensation Seeking (SS). Median splits were used to establish PO and NB for the overall Motivation Activation Measure (MAM). A total of 119 participants (52.7%) fell into the low PO and 107 participants (47.3%) fell into the high PO category. A total of 115 participants (50.9%) fell into the low NB and 111 participants (49.1%) fell into the high NB category. Positivity Offset and Negativity Bias groups were then crossed and the following MAM categories emerged: 1) *Coactives* consisted of high PO and high NB individuals (n = 54, 23.9%), 2) *Risk Takers* consisted of high PO and low NB individuals (n = 53, 23.5%), 3) *Risk Avoiders* consisted of low PO and high NB individuals (n = 57, 25.2%), and 4) *Inactives* consisted of low PO and low NB individuals (n = 62, 27.4%).

Sensation Seeking was also established using a median split. A total of 119 participants fell into the low SS category (52.7%) and 107 participants fell into the high SS category (47.3%). Table 3 shows how participants were grouped on the variables of Positivity Offset, Negativity Bias, Motivation Activation Measure, Sensation Seeking and Tobacco Use.

Table 3
PO, NB, MAM, SS, and TU

	TOTAL	*%*
POSITIVITY OFFSET		
Low	119	52.7
High	107	47.3
NEGATIVITY BIAS		
Low	115	50.9
High	111	49.1
MOTIVATION ACTIVATION MEASURE CATEGORY		
Coactive (high PO, high NB)	54	23.9
Risk Taker (high PO, low NB)	53	23.5
Risk Avoider (low PO, high NB)	57	25.2
Inactive (low PO, low NB)	62	27.4
SENSATION SEEKING		
Low	119	52.7
High	107	47.3
TOBACCO USE		
Low	67	29.6
Moderate	89	39.4
High	70	31.0

It should be noted that while using median splits has been accepted as a way to group people on a measured variable - and is actually preferred over using the mean to split data as the mean is susceptible to extreme cases or outliers – there are problems associated with changing continuous variables into categorical variables. First, those individuals whose responses lay near the median are broken into groups considered to be "different" in some way (e.g., high vs. low IQ), when in fact they may not differ greatly at all. Hayes (2005) noted that by reducing higher levels of measurement (i.e. continuous variables) into discreet variables measurement precision is lost as the total possible values of a measured variable are "lumped" into a limited number of values which do not "reflect the *amount* or quantity of something… it is simply categorization" (p. 22, italics theirs).

Apparatus

Data for the final experiment were collected using MediaLab V2006 on three laptop computers with color wide-screens. The MediaLab software allowed for a complex factorial design to be used in this experiment with different stimuli presentation orders, integrated questionnaires (i.e., for the pretest and demographic sections as well as between video clips), and responses to experimental tasks (i.e., for the STRTs and recognition memory tasks). The STRTs and recognition memory speed/accuracy data were gathered using DirectRT V2006 incorporated into the MediaLab presentation. DirectRT enabled the researcher to gather response data to the millisecond, synchronized with video presentations (Empirisoft.com, 2006a; 2006b; 2006c).

Stimuli

In this study the manipulated independent variables were public service announcements (PSAs) containing either Blame or Attack appeals and the level of perceived message sensation value (low/high) of the message. Anti-tobacco stimuli pre-tested and used in the final experiment were television PSAs available from the national *Truth* campaign and the Centers for Disease Control and Prevention Media Campaign Resource Center database from 1999 to the present. Real television PSAs were used (as opposed to those created in a media lab) so that findings could be generalized to such advertisements. The television PSAs chosen for the study were each 30-seconds in length. Scripts for the PSAs used in the final experiment can be found in Appendix 2.

Television PSAs were used in this study for a number of reasons. It has been argued that individual allocations of resources are not the same for each media type since

different media require different levels of effort during processing (e.g., newspaper requires more than television) (Chaffee & Schleuder, 1986; Krugman, 1971). This line of research posited that passive media like television require less attention on the part of the viewer to process incoming stimuli. Active media on the other hand, require the individual to engage or participate in cognitive processing as the individual has to take in and make sense of the stimuli on their own. However, a recent study of brain wave activity contradicts this suggestion. Geske and Bellur (2006) showed that participants indicated greater alpha, beta, and theta waves (i.e., indicating higher levels of attention and involvement) for television commercials than magazine advertisements, as well as higher self-report scores for liking for and interest in television commercials. Consistent with this view, Anderson and Burns (1991) posited that television is a medium that elicits and maintains attention. Another advantage of this medium is that viewing television advertisements removes the possible confound of individual differences in reading speeds associated with newspaper, magazine, and some Internet advertisements.

The previous sections provided evidence that different message features such as sensation value and novelty can influence an individual's information processing. Likewise, media that support presentation of these features can influence processing levels. For example, radio consists solely of auditory stimuli meaning that it cannot rely on visuals to evoke emotion and arousal. On the other hand, television can use both auditory and visual information to evoke these feelings. Findings by Lang and colleagues (A. Lang, 1995; A. Lang, Geiger, Strickwerda, & Sumner, 1993) provide evidence that suggests information-rich media such as television (with both audio and video

presentation of information), may increase arousal and attention while at the same time decreasing encoding, storage, and retrieval.

Moreover, the use of television messages is attractive in terms of applying MSV measures as television messages include both audio and visual information, are fast-paced, structurally complex, and easily convey both information and emotion (Palmgreen, Stephenson, Everett, Baseheart, & Francies, 2002). This makes television an attractive medium for presenting anti-tobacco messages to low NB or high SS individuals who require these types of messages for information processing to occur (for a review see A. Lang, 2006b; Stephenson, 2003b).

Another strength of this medium is that television viewing is not a novel experience that will interfere with experimental procedures as it ranks third only to sleeping and work in occupying an individual's day (Oskamp & Schultz, 1998). Finally, television has been the primary medium used to disseminate health messages to the public, and has been shown to raise issue salience as well as affect the most attitude and behavior changes (Atkin & Marshall, 1996).

Message variance was established by sampling five different messages within each level of the independent variables, ensuring that individual PSA effects were minimized. Thus, secondary message features that could possibly confound results such as use of fear or humor appeals were addressed through message variance. This helped to improve the accuracy of the observations about Blame vs. Attack PSAs as multiple messages exemplifying each condition reduced systematic between-message differences thereby stabilizing subject responses to the messages. This also allows for the ability to make generalizations across the message categories of Blame vs. Attack (Reeves &

Geiger, 1994). However, as noted below, two types of messages—refusal skills role model messages and Blame with Attack messages— were excluded. Thus, generalization about these message categories is not possible.

Message Type. The independent variable of message type (i.e., Blame and Attack) was operationalized according to intrinsic message features discussed by Pechmann and colleagues (2003), Benoit and Harthcock (1999), Dorfman and Wallack (1993), and Antecol (1998). For this research, Blame messages were those that portrayed the individual as the cause of or the person controlling smoking problems. These messages contained a number of themes identified by Pechmann and colleagues (2003) including: disease and death, endangering others, cosmetics, and smokers' negative life circumstances. For example, Blame PSAs often indicated that an individual was "at fault" by endangering others through secondhand smoke; causing themselves unattractive consequences such as bad breath and skin wrinkles; and experiencing social disapproval for choosing to smoke. Other messages suggested that the individual who smokes is likely to damage their body irreparably, resulting in disease or death.

Attack messages were those that portrayed the tobacco companies as the cause of smoking problems. Benoit and Harthcock (1999) stated that Attack ads portray the tobacco companies as villains. For example, Attack PSAs often suggested that tobacco companies or tobacco executives were manipulative, deceitful, and corrupt. In addition, Pechmann and colleagues (2003) posited that these ads expose tobacco industry manipulations in "selling disease and death" (p.5). They also identified a marketing tactics theme which showed the lengths that tobacco companies will go to in marketing

cigarettes to children, women, and minorities. This type of Attack message stressed such things as: companies placing cigarette ads at a child's eye level in stores; putting more ads in minority publications; and adding flavoring to cigarettes to make people feel they are more like candy.

Message Sensation Value. The independent variable of message sensation value (MSV) was operationalized according to research by Palmgreen and colleagues (1991; 2002) as a message attribute which affects "the degree to which formal and content audio-visual features of a message elicit sensory, affective, and arousal responses" (1991, p. 219). Studies have shown that the sensation value of a message positively correlates to message processing as well as Sensation Seeking behaviors (Donohew, 1990; Donohew, Lorch, & Palmgreen, 1998; Palmgreen et al., 1991).

In the current study, MSV was measured using the 17 item Message Sensation Value scale by Everett and Palmgreen (1995). This 7-point semantic differential scale asks participants to indicate the level to which emotional arousal, dramatic impact, and novelty was present in each of the messages. The adjectives used were: unique/common*, powerful impact/weak impact*, didn't give me goose bumps/gave me goose bumps, novel/ordinary, emotional/unemotional*, boring/exciting, strong visuals/weak visuals*, not creative/creative, not graphic/graphic, arousing/not arousing*, unusual/usual*, involving/uninvolving*, not intense/intense, weak sound track/strong sound track, undramatic/dramatic, stimulating/not stimulating*, strong sound effects/weak sound effects*. To calculate the overall sensation value of a message, responses were summed for each of the 17 items across the PSAs and averaged. Items with an * were reverse-

coded so that an average score of "7" indicated a very high MSV and an average score of "1" indicated a very low MSV (Palmgreen, Stephenson, Everett, Baseheart, & Francies, 2002).

Stimuli Selection. Prior to use in the study, only those PSAs targeted to older teens and young adults (approximately ages 18-24) and of high digital quality were selected for pre-testing. A total of 48 possible 30-second anti-tobacco PSAs were randomly chosen and pre-tested to verify the presence of: targeted the specified age range, message characteristics of Blame and Attack, and MSV. The exact wording for the pre-test questions can be found in Appendix 5.

A total of 39 participants took part in the stimuli pre-test. Participants were recruited from undergraduate journalism courses at the University of Missouri - Columbia and were given extra credit for their participation. The recruiting script can be found in Appendix 3. Following informed consent, participants were shown the PSAs one at a time and rated each PSA according to the scales mentioned above. The entire process took 1 hour to complete. The written consent form can be found in Appendix 4. At the end of the study, participants were asked a series of socio-demographic questions, were thanked for their participation, and were debriefed. The pre-test debriefing script can be found in Appendix 6.

Following each PSA, pre-test participants were asked to indicate what age group the ad they just viewed targeted. They were also asked whether the PSA suggested that the individual smoker or the tobacco companies (or both) were the source of the cigarette problem. Messages that had mixed appeals (i.e., both Blame and Attack) were excluded

from the study. For example, one message theme identified by Pechmann and colleagues (2003) that was not used in this research was the "refusal skills role model" theme. This type of message uses role models such as celebrities and peers to influence kids not to try smoking or to stop smoking. These appeals are effective in influencing adolescents' smoking behaviors by increasing self-efficacy. However, the "fault" of this type of message is confusing as some indicate that smoking is an individual choice that can be avoided by just "saying no" while other messages indicate that smoking is the result of "being stalked" by cigarettes. This suggests that both the individual and the tobacco companies are at fault for smoking behaviors. For this reason, the refusal skills role model messages were not used in this research.

In addition, pre-test participants completed the MSV scale following each ad. This aided stimuli selection by evaluating the level to which emotional arousal, dramatic impact, and novelty was present in each of the PSAs. After computing the average MSV of each PSA, those ads which fell in the top 1/3 were determined to be high MSV messages and those in the bottom 1/3 were determined to be low MSV messages. Those messages with an average MSV in the middle regions were not used in the final experiment.

Following data analysis, 20 messages were selected to be the stimuli in the final experiment with an equal number of messages in each cell of the design. This ensured that multiple appeals were sampled as the majority of anti-tobacco campaigns use multiple appeals in a single message as well as multiple appeals across messages in a campaign (Atkin & Marshall, 1996, p. 488). The MSV scale uses 17 questions (responses range from 1-7) to create an overall MSV rating out of 119 possible points. This number

is then divided by 17 to get the average MSV score. Means for both the overall MSV rating and average MSV score are given below.

The five PSAs that received the highest mean ratings (Overall *M* = 84.5, Average *M* = 5.0,) on the scale and were solely Blame messages were selected to be the Blame High Message Sensation Value (BHMSV) stimuli. The five PSAs that received the highest mean ratings (Overall *M* = 82.7, Average *M* = 4.9) on the scale and were solely Attack messages were selected to be the Attack High Message Sensation Value (AHMSV) stimuli. The five PSAs that received the lowest mean ratings (Overall *M* = 63.7, Average *M* = 3.7) on the scale and were solely Blame messages were selected to be the Blame Low Message Sensation Value (BLMSV) stimuli. The five PSAs that received the lowest mean ratings (Overall *M* = 64.2, Average *M* = 3.8) on the scale and were solely Attack messages were selected to be the Attack Low Message Sensation Value (ALMSV) stimuli.

Measures

The independent variable measured in this study was Motivation Activation (PO and NB). Motivation Activation was used in this study as two moderating variables that were hypothesized to affect the relationship between message type and message sensation value and the dependent variables of: resources available, recognition, and persuasiveness. In addition, since studies have shown that there are links between individual characteristics and processing of emotional messages, at the beginning of the study participants were asked to respond to questions regarding socio-demographic

characteristics (e.g., gender, age, education, and ethnicity), tobacco use, and Sensation Seeking behaviors (A. Lang, 2006b; Zuckerman, 1979).

Motivation Activation. To measure the PO and NB of participants, each participant's Motivation Activation was assessed. The Mini-MAM II (A. Lang, Wang, & Bradley, 2004) measure was used in this study to calculate Motivation Activation as it has been shown to have fewer gender differences for particular International Affective Pictures System (IAPS) slides; has shown better ability to distinguish between Risk Avoiders and Risk Takers; and is more strongly correlated with Sensation Seeking and substance use measures than both the full MAM and Mini-MAM I measures. A series of studies conducted by Lang and colleagues (A. Lang, 2006a; A. Lang, Wang, & Bradley, 2004) has examined the validity and reliability of the Mini-MAM II with similar results occurring in all tests. In addition, convergent validity of the Mini-MAM II measure was established by correlating findings with two different Sensation Seeking (i.e., BSSS-4 and BSS-2) and substance use measures (i.e., cigarettes and marijuana). Those with low NB (i.e., Risk Takers) were more likely to perform both Sensation Seeking (avg. correlation = +.32) and substance use behaviors (avg. correlation = +.20), and those with high NB (i.e., Risk Avoiders) were less likely to perform both Sensation Seeking (avg. correlation = -.18) and substance use behaviors (avg. correlation = - .20) (A. Lang, 2006a).

To assess Motivation Activation, participants viewed 35 IAPS pictures ranging from very positive to very negative at high and low levels of arousal. Two additional slides: flower (#5010) and shark (#1931), were used in practice trials so that participants

could gain experience with the computer controls. Participants were asked to rate on three separate 9-point scales how negative, how positive, and how arousing each picture was. The order of the positive and negative emotion questions was varied for each viewing and separated by the arousal question so that participants were not answering the questions in the same order each time, nor were they answering positive/negative questions back-to-back. This is consistent with findings presented by Cacioppo and Bernston (1994) that suggested that when positive/negative evaluations are close together reactions are rated more bipolar.

The IAPS pictures help to segment the audience according to underlying personality characteristics as studies have shown that images elicit positive and negative evaluations differently depending on an individual's propensity toward PO or NB. For example, Lang (2006b) found that "pictures of people smoking activate the aversive system in non-smokers and the appetitive system in smokers… for one group smoking related imagery is positive while for the other it is negative" (p. 23).

For the Mini-MAM II Positivity Offset was calculated by averaging the positivity ratings of all 7 slides at arousal level 6 and subtracting the average positivity ratings of all 14 slides at arousal level 1. A median split of the resulting data was then conducted to determine if an individual has a low or high PO. Negativity Bias was calculated by averaging the negativity ratings of all 14 slides at arousal levels 3 & 4 and subtracting the average negativity ratings of all 14 slides at arousal level 1. A median split of the resulting data was then conducted to determine if an individual has a low or high NB. Those individuals with high PO and high NB were classified as Coactives. Those individuals with high PO and low NB were classified as Risk Takers. Those individuals

with low PO and high NB were classified as Risk Avoiders. Those individuals with low PO and low NB were classified as Inactives (A. Lang, Wang, & Bradley, 2004).

Manipulation Check. No manipulation check was performed on message type or MSV as the stimuli were defined in terms of message properties and pre-tested for those properties. Thus, by defining the stimuli in terms of intrinsic features, no need for a manipulation check exists as the stimuli either are, or are not, Blame or Attack PSAs with either low or high MSV (O'Keefe, 2003). This was assessed prior to the experiment using the stimuli pre-test outlined above. There was also no manipulation check for the independent variable of motivation type as it was not a manipulated message variable, but an individual trait included as a moderator.

Persuasiveness of the Advertisement. Persuasiveness of the messages was examined as positive or negative attitudes associated with the advertisement and its claims have been shown to predict behaviors (Mitchell & Olson, 1981). Following exposure to each stimuli, participants were asked to respond to questions about the specific ad regarding attitude toward the ad, evaluation of the argument, and behavioral intent. Emotional response to the message was addressed as well, as it not only has been shown to predict intention, but to influence allocation of processing resources (A. Lang, 2006b; Morris, Woo, Geason, & Kim, 2002).

Attitude Toward the Ad. Defined as a positive or negative response to (i.e., liking) an advertisement, individuals are thought to have affective reactions to advertisements

which influence their levels of processing (A. Lang, 2006b; Lutz, 1985). Consistent with suggestions by Burke and Edell (1986) and Burton and Zinkhan (1989) the multidimensional Aad measure used in this study taps both cognitive and affective reactions to the advertisement. Attitude toward the ad was measured using three questions on 7-point bipolar scales developed by Kamp and MacInnis (1995).

To determine overall attitude toward each advertisement, participants were asked to rate the following statements: 1) Overall, what is your impression of the ad? (1=disliked it very much, 7=liked it very much); 2) To what degree did you feel positively toward the ad? (1=not at all positive, 7= very positive); and 3) Overall, how well did you like the ad? (1= did not like it at all, 7=liked it very much). Kamp and MacInnis (1995) reported an internal consistency reliability coefficient of .90 on the scale. For the current study, the scale exhibited an average Cronbach's alpha of .76[4].

Evaluation of the Argument. The quality and validity of the PSA claims were measured using the "attitude toward the ad" scale developed by Putrevu and Lord (1994) which examined positive and negative evaluations of advertisement claims. The PSA arguments were evaluated on a 7-point scale (1=strongly disagree, 7= strongly agree) using the following four statements: "The claims in this ad are true," "I believe the claims," "The ad is sincere," and "I think the ad is dishonest," In order for all measures to indicate higher levels of argument strength, the final statement was reverse-coded so that lower numbers indicated less agreement with the PSA claims. Putrevu and Lord reported

[4] Reliability coefficients were averaged across the 20 summed attitude responses given in this study.

a Cronbach alpha reliability coefficient of .81 for this scale (1994). For the current study, the scale exhibited an average Cronbach's alpha of .69[5].

Behavioral Intent. Intent to smoke (BI) was gauged using Pierce and colleagues' (1996) three-item measure wherein participants indicated on a five-point scale ranging from 1=definitely yes to 5=definitely no their future smoking behaviors. Presuming that both smoking and non-smoking participants would take part in the study, this set of questions addressed: 1) how likely they were to smoke one puff or more of a cigarette, 2) how likely they were to try out cigarette smoking for a while, and 3) how likely they were to smoke a cigarette if one of their best friends offered it. The scale has been validated and used in several protection motivation studies to examine participant responses to advocated behaviors (Maddux & Rogers, 1983; Pechmann, Zhao, Goldberg, & Reibling, 2003; Sturges & Rogers, 1996). Lower scores on this scale indicated that participants were more likely to smoke cigarettes in the future. For the current study, the scale exhibited an average Cronbach's alpha of .84[6].

Emotional Response. The MSV scale asks participants to indicate the level of emotionality present in a message. It does not address the specific emotion portrayed by a message or the emotion evoked by a message. As noted earlier, positive, negative, and coactive emotions elicited by messages cause different processing responses. Thus, the distinct emotional response to each message was examined.

---

[5] Reliability coefficients were averaged across the 20 summed evaluation responses given in this study.
[6] Reliability coefficients were averaged across the 20 summed behavioral intent responses given in this study.

Because of the appetitive/aversive biological basis of the current study, the dimensional model of emotion based on biological motivations was used in this study. In the dimensional model, emotions consist of valence, arousal, and dominance. For this study, an abbreviated version of the Self-Assessment Manikin (SAM), using only the hedonic valence and arousal portions measured on 9-point scales, were used to gauge emotional response to the ads (P. J. Lang, 1995). The original scale had a measure for dominance which was not used in this study.

Hedonic valence is the degree to which an individual thinks the message made them feel sad/happy. Arousal is the degree to which an individual thinks the message made them feel bored/excited. Current research suggests that individuals may feel one emotion or the other, or both jointly, in regard to certain message. Thus, the hedonic valence portion was broken into two separate 9-point scales, one for positive affect and one for negative affect (Cacioppo & Bernston, 1994; Cacioppo & Gardner, 1999; Ito, Larsen, Smith, & Cacioppo, 1998). That is, one scale examined pleasantness (i.e., how positive the message made them feel) and the other unpleasantness (i.e., how negative the message made them feel), while a separate scale measured arousal (i.e., how aroused the message made them feel). Each is on a 9-point scale with 1=not at all and 9=extremely (A. Lang, Wang, & Bradley, 2004). Higher scores on each scale indicate more positive emotion, more negative emotion, and more arousal respectively.

After viewing each PSA, participants completed a series of questions regarding hedonic valence and arousal using the SAM measure. The positive and negative questions were separated by the arousal question in each case, with the presentation of positive/negative altering between viewings so that participants were not always asked

the questions in the same order. The SAM was used instead of behavioral (e.g., coding facial expressions) or physiological (e.g., facial EMG or heart rate) as this type of self-report measure of emotional response has been shown to display results consistent with behavioral and physiological measures (for a review see Bolls, Lang, & Potter, 2001).

Resources Available. Resources available were measured using STRTs. The primary task was for participants to pay attention to the PSA they were viewing. Participants were instructed to pay careful attention to each PSA as there would be a memory task later in the experiment. The secondary task consisted of participants responding as quickly as possible to two auditory tones (i.e., probe) inserted into each PSA.

The probe used in this study was a 200 millisecond 1,000 Hz audio tone placed in two locations, one in the first half and the second in the second half of each PSA, with the stipulations that no tone occurred within the first or last 5 seconds of each PSA and that no two tones were within 5 seconds of one another. In addition, the MediaLab computer program ensured that probes occurred randomly (within the 20 seconds specified above) for each message presentation so that they were not tied to any structural or content features of the messages. Two probes were used as the message attributes of Blame/Attack or those leading to high/low MSV could occur anywhere within each message.

Each participant's STRT was measured in the number of milliseconds it took between presentation of the probe and their response to hearing the probe (i.e., striking the computer key indicating that they heard the tone). Basil (1994) stated that STRTs

typically range from 200 to 800 milliseconds, and that repeated measures within-subjects designs such as the one employed in this study are necessary to examine the slight STRT differences between and within messages. Recall that theoretically, STRT speeds change as a function of resources available and/or resources required.

Recognition Memory. Lang and colleagues (2005) posited that recognition measures indicate if information was encoded. Thus, if upon prompting, an individual states that the information was present (usually accomplished by a "yes/no" task) then some level of encoding took place. Decreases in recognition are due to insufficient resources available for encoding or to cognitive overload caused by additional message resource requirements.

This study examines recognition memory for presented PSAs. A total of 40, 2-second audio clips from the PSAs viewed (i.e., probes) as well as 40, 2-second audio clips from PSAs used in the pre-test but not viewed in the experiment (i.e., foils) were used as stimuli. Clips were randomly selected from the beginning and end of each PSA with the limitations being that the clip was not taken from the first or last 5-seconds of the PSA. The stipulation being that clips had to contain some type of audio information (e.g., words) other than sound effects or music. This was done so that each clip contained a portion of the advertisement that likely evoked information processing (Bolls, 2002).

Prior to the task, participants were instructed that they should indicate as quickly as possible with a "yes" or "no" keyboard response to whether or not each clip, containing only audio content, was one they had previously viewed. In order to help them become familiar with the keyboard commands as well as the task, participants were able

to practice using four clips prior to recognition measurement. Audio recognition was used in this study as a ceiling effect is more likely to occur with visual recognition.

Signal detection theory proposes that in a "yes/no" recognition experiment, individuals must discriminate between two possible answers to each presented probe: hits/misses, and two possible answers to each presented foil: false alarms/correct rejections. Thus, when answering whether the presented message is familiar, individuals can be very accurate in their decisions (i.e., suggesting that their resources available for encoding were sufficient as they are able to discriminate between stimuli and foils) or simply guess a lot, often making their decisions inaccurate (i.e., resources were insufficient) (A. Lang, 2000; Macmillan & Creelman, 2005). The non-SDT measure of accuracy, or the percentage of hits an individual has, was measured in this study as were the SDT measures of discrimination sensitivity and response bias (i.e., individual's tendency to be liberal or conservative in the extent to which a probe must be familiar in order for them to say that it was). Sensitivity was measured using A' (A-prime) which indexes the average between minimum and maximum performance by calculating "yes" responses of hit rate (H) and false alarm rate (F). Response bias was measured using the related measure of B" (B-double prime) which also indexes performance using H and F.

In terms of sensitivity A' scores below .5 indicate more inaccurate decisions (i.e., could not distinguish between probes and foils) while A' scores above .5 indicate more accurate decisions (i.e., able to distinguish between probes and foils). A' takes into account whether or not an individual's performance was below chance (i.e., $H < F$). Maximum performance on the SDT task would be a score of 1.0 (indicating perfect performance or 100% hits and no false alarms) and minimum performance on the SDT

task is a score of 0 (indicating no hits and 100% false alarms). Consistent with Macmillan and Creelman (2005) the following formula was used to calculate A' when H is greater than or equal to F: A'= ½ + [(H-F) * (1+H-F)/4H(1-F)]. When H is less than or equal to F the following formula for A' was used: A'= ½ - [(F-H) * (1+F-H)/4F(1-H)](p. 371).

To measure the response bias of individuals (i.e., participants' tendency to answer "yes" or "no") B'' was calculated. Like A', B'' takes into account whether or not an individual's performance was below chance. Consistent with Macmillan and Creelman (2005) the following formula was used to calculate B" when H is greater than or equal to F: B" = [H(1-H) - F(1-F)] / [H(1-H) + F(1-F)]. When H is less than or equal to F the following formula for B" was used: B"= [F(1-F) - H(1-H)] / [H(1-H) + F(1-F)] (p. 371). Possible scores range from -1.0 to +1.0 with B" scores on the first measure (where H > F) indicating the individual's tendency to say "no" and B" scores on the second measure (where F > H) indicating the individual's tendency to say "yes."

In addition, individuals can be very quick or take a long time to respond. Response latency, when combined with sensitivity measures, can indicate how well an item was encoded. Fast response times associated with high hit rates indicate very good encoding as participants recognized items both accurately and quickly. However, fast response times associated with high false alarm rates indicate guessing (Klatzky, 1980). Each participant's response latency was measured in the number of milliseconds it took between presentation of the audio clip and their response (i.e., yes/no) to whether or not it was part of a PSA they had previously viewed.

Measures of subject characteristics

Socio-demographics. Participants were asked to complete socio-demographic questions regarding age, gender, ethnicity, level of education, English proficiency, and parent's income. This subject information could help provide alternative explanations for any findings. As noted by Perloff (1993), a number of things such as beliefs, opinions, situations, and experiences influence attitudes and behaviors, thereby influencing message processing. In addition, some characteristics were examined because they have been shown to correlate with the dependent variables. For example, studies have shown that males are more likely to be receptive to pro-tobacco messages and promotional items than females (Niederdeppe, Lindsey, Girlando, Ulasevich, & Farrelly, 2003). Conversely, males have been shown to be less effected than females to Attack campaigns such as 'truth' (Sly, Hopkins, Trapido, & Ray, 2001). Lower income and less educated individuals are more likely to smoke (Campaign for Tobacco Free Kids, 2005b). Furthermore, Hispanics and Caucasians are more likely than African Americans to be receptive to pro-tobacco messages and promotional items (Niederdeppe, Lindsey, Girlando, Ulasevich, & Farrelly, 2003).

In addition, attitudes and processing activities have been shown to be affected by individual reactions to the presenting medium. Studies of the effects of television indicate that age and gender play a role in attention to television messages. For example, males are more likely to attend to television than females. In addition, as age increases, attention to television decreases (Anderson & Burns, 1991).

Sensation Seeking. Sensation Seeking (SS) is an individual characteristic believed to influence risky behaviors such as smoking, drinking, and doing drugs. For this research SS was measured using Stephenson and colleagues' (2003) Brief Sensation Seeking Scale-4 (BSSS-4) which examines participation in risky behaviors on 5-point (1=strongly disagree, 5=strongly agree) scales using four questions: "I would like to explore strange places"; "I like to do frightening things"; "I like new and exciting experiences, even if I have to break the rules"; and "I prefer friends who are exciting and unpredictable." This scale taps the dimensions of experience seeking, thrill seeking, disinhibition, and boredom susceptibility respectively. Sensation Seeking responses were summed across the four items and averaged into a single score ranging from 1-5. Individual scores were calculated using a median split, wherein participants with a low score were considered low sensation seekers, and participants with a high score were considered high sensation seekers.

The BSSS-4 was used in this study because, as noted by Stephenson and colleagues (2003), the abbreviated SS scale removes problems associated with measurement as individuals will not feel they are being asked the same questions multiple times. In addition, a shorter scale does not put as many constraints on the amount of time taken to measure SS tendencies. Furthermore, the BSSS-4 has been shown to closely correlate with both longer (the 19-item ImpSS, and the 8-item BSSS) and shorter (the 2-item BSS-2) Sensation Seeking scales with Cronbach alpha reliability coefficients of .81, .89, and .58 respectively. Furthermore, it has shown convergent validity by being positively correlated to substance use scores for tobacco use (r=.28),

alcohol use (r=.30), and marijuana use (r=.27) (Stephenson, Hoyle, Palmgreen, & Slater, 2003). For the current study, the BSSS-4 scale exhibited a Cronbach's alpha of .72.

Tobacco Use. Tobacco use (TU) was measured by asking participants to indicate on ordinal scales how often they used tobacco products (cigarettes, chewing tobacco, cigars) in the last week, in the past month, and in the last year. The scale consisted of a total of 11 questions regarding: 1) current cigarette smoking status, 2) past cigarette smoking status, 3) cigarettes smoked per day, 4) current cigar smoking status, 5) past cigar smoking status, 6) current chewing tobacco use, 7) past chewing tobacco use, 8) what type of smoker they were, 9) tobacco use per month, 10) tobacco use per week, and 11) tobacco use per year. Responses to TU questions were combined into one measure which represented an overall usage index. Higher scores on the scale indicated more individual tobacco use. The median was used to group individuals into low, moderate, and high TU. Individuals whose scores were below the median were low TU, those at the median were moderate TU, and those above the median were high TU.

Pilot Test

A pilot study was conducted prior to the experiment in order to address problems arising from software issues, timing/order of events, and fatigue. A total of 34 participants from undergraduate journalism courses took part in the pilot test, with most reporting that they were freshman (*n*= 23, 67.6%). Participants were mostly female (*n*= 24, 70.6%) and all were between the ages of 18-20. The majority were Caucasian (*n*= 24, 70.6%), and most indicated that English was their primary language (*n*= 25, 73.5%). A

total of 17 (50%) participants indicated that they had smoked a cigarette at one time in their life and 12 indicated that they currently smoked (35.3%).

Software difficulties caused problems with the pilot test as initially MediaLab was set up to run the full experiment through one file. However, transferring from MediaLab to DirectRT and then back to MediaLab multiple times to gather MAM, STRT, and recognition memory data caused numerous computer crashes. Specifically, the program would collect MAM and STRT data and then freeze before collecting recognition memory data. It was decided to split the experiment into two files: one which collected what was called the first part of the experiment (i.e. demographics, MAM, and STRTs), and a separate file that would collect data for the second part of the experiment (i.e., recognition memory). Both portions of the study were still divided by the distracter task. This removed the computer crashes, however, this change did result in more interaction between the participants and the researcher/lab assistants as each file had to be "set-up" separately for the participants during the experiment. Previously, the researcher/lab assistants only had interactions at the beginning and end of the experiment.

In addition, the overall orientation of the responses to each portion of the study (specifically, sections with Likert-type scales) was changed following the pilot test as several participants were observed simply "clicking" the same section of the screen repeatedly to get through the questions faster. For example, leaving the cursor over the "1" key and just clicking it for every question. To remove this issue, the spatial orientation of each scale was varied from vertical to horizontal on each computer screen or "page" so that participants could not simply "click" the same position each time, but had to move the cursor to select an answer for each question.

The same written consent form, socio-demographic, Sensation Seeking, and tobacco use questions, Mini-MAM II, dependent measures, distracter task, and debriefing script used in the final experiment were used for the pilot test.

Procedure

For the final experiment participants were assigned to individual experimental sessions based on their availability. When they arrived, participants were greeted by the primary researcher or a lab assistant, who explained the purpose of the study, addressed questions and concerns, and obtained informed consent. During this introduction, participants were assured that they could decline or withdraw from the study at any time. They were also informed that their responses would be kept strictly confidential. The written consent form can be found in Appendix 7.

Following the informed consent process, participants were seated at the laptop, and the computer chair, monitor, and headphones were positioned to the participant's comfort. The volume levels were individually set loud enough for participants to not only hear the audio track but also for them to hear the secondary task audio tone on each computer. Participants first completed an on-screen questionnaire that addressed socio-demographics, their personal tobacco use, and their Sensation Seeking behaviors. The questionnaire can be found in Appendix 8.

Participants were then instructed that they would view a series of photos and be asked to rate their emotional response to each photo following. They were given the opportunity to practice this task using two additional slides: flower (#5010) and shark (#1931). Consistent with Mini-MAM II procedures, participants were shown 35 IAPS

slides for a total of 6-seconds each and asked to rate how arousing, positive, and negative each photo made them feel (A. Lang, Wang, & Bradley, 2004). The name and identification number of the photos used and Mini-MAM II measures can be found in Appendix 9.

Afterward, participants were instructed as to how the experiment portion proceeded, and they were given the opportunity to warm-up by completing two practice trials using stimuli not selected from the pre-test to become familiar with the secondary task as well as the laptop commands. This helped to ensure that participants understood the tasks they were asked to perform. Once participants were comfortable with the study, the experiment began.

Each participant viewed a total of 20, 30-second PSAs with an equal number of Attack/Blame, low sensation/high sensation messages. Multiple messages were used in each level of the experimental design in order to represent multiple advertising executions, thereby minimizing the effects of individual PSAs. The order of each viewing was randomized in order to control for any carryover effects of prior messages.[7] Consistent with STRT procedures, participants were instructed to concentrate on the message content of each PSA for the primary task because they would be given a subsequent memory test. The secondary task consisted of responding as quickly and accurately as possible to a superfluous auditory tone (i.e., beep) inserted by the researcher into each PSA prior to the study. A total of two tones were inserted into each PSA.

After viewing each individual PSA, participants completed questions regarding persuasiveness (i.e., Aad, evaluation of argument, and behavioral intent) and affect (i.e.,

[7] This type of counterbalancing does not remove the main effects of order, rather it distributes the effects over the levels of the stimuli so that they are not confounded, thus order becomes a control variable (Stevens, 2002).

hedonic valence and arousal). These measures can be found in Appendix 10. After they viewed all 20 PSAs, participants were given a Suduko puzzle as a distracter task to work on for 5 minutes. The distracter task can be found in Appendix 11.

Participants were then instructed as to how the recognition task proceeded, and were then given the opportunity to warm-up by completing four practice trials using two stimuli not selected from the pre-test as well as two stimuli used in the final experiment in order to become familiar with the recognition task as well as the new laptop commands. Participants were instructed to push the shift button on the right side of the computer keyboard for "yes" responses and the shift button on the left side for "no" responses. These keys were alternated for each participant in order to control for hand dominance. Hence, "yes" was the right shift key only half the time. Once participants were comfortable with this portion of the study, the recognition memory task began. During this task, participants were asked to quickly and accurately key into the laptop whether or not a series of 80, 2-second audio clips (40 probes, 40 foils) were part of the series of PSAs they had previously viewed during the STRT task.

After completing the experiment, participants were given a participation receipt, and were debriefed as to the overall premise of the study and again asked if they had any questions or concerns. They were also asked if they could identify the purpose of the experiment. The entire process took approximately 1 hour to complete. The debriefing script can be found in Appendix 13.

The script for the experimental process and instructions given to participants by the researcher/lab assistants can be found in Appendix 12. Prior to, and following, each

session, the researcher/lab assistants checked the laptop and computer programs to see if they were functioning properly.

Chapter 8
Results

This research was guided by the overall question: In terms of message processing, which type of appeal – Blame or Attack – is more effective, at what message sensation level, and for individuals with what type of Motivation Activation? A total of three sets of hypotheses and one research question were examined based on previous findings regarding information processing and the LC4MP, Motivation Activation, and MSV. These were:

H1a: Blame messages will cause high PO individuals (Risk Takers and Coactives) to allocate more resources to processing the message (faster STRTs) than Attack messages.

H1b: Attack messages will cause high NB individuals (Risk Avoiders and Inactives) to allocate more resources to processing the message (faster STRTs) than Blame messages.

H2a: High MSV messages will elicit better message encoding (better recognition memory) for low NB individuals (Risk Takers and Inactives).

H2b: Low MSV messages will elicit better message encoding (better recognition memory) for high NB individuals (Risk Avoiders and Coactives).

H3a: High MSV Attack PSAs will elicit more positive attitudes toward the ad than other PSAs.

H3b: High MSV Attack PSAs will elicit more positive evaluations of the argument than other PSAs.

H3c: High MSV Attack PSAs will elicit greater intent not to smoke than other PSAs.

H3d: High MSV Attack PSAs will elicit greater arousal responses than other PSAs.

H3e: High MSV Attack PSAs will elicit greater positive emotional responses than other PSAs.

RQ1: What are the relationships among Positivity Offset, Negativity Bias, SS, and TU in the current study?

Independent variables were message type, MSV, and Motivation Activation (PO and NB). Dependent variables examined were persuasiveness, STRTs, recognition memory, and emotional response. Socio-demographic variables such as: gender, age, ethnicity, education, parents' income level, sensation seeking behavior, and tobacco use were also collected.

Data Preparation & Analysis Procedures

Prior to analysis, data cleaning procedures included examining both STRT and recognition memory responses for errors such as jumping the gun, failure to respond, and equipment errors as each error represents "noise" instead of valid responses. After identifying each type of error, participant STRT responses associated with equipment error (e.g., STRT "beeps" and/or recognition memory audio did not work properly) were removed from the data set (n= 23) as were participants who failed to respond to more than half the secondary tasks or recognition memory questions (n= 17). Consistent with STRT data cleaning procedures described by Lang and colleagues (2006), outliers beyond two times the interquartile range of the quartiles were removed and replaced with the maximum allowable value. Of the 9,040 STRTs collected a total of 448 were replaced (5%). Consistent with response latency data cleaning techniques described by Cameron

and Frieske (1994) recognition memory outliers whose responses were either extremely fast (e.g., under 200 milliseconds from the beginning of the ad) or extremely slow (i.e., over 1,500 milliseconds from the end of the ad) were identified and were truncated to 200 or 1,500 milliseconds respectively with the understanding that the final score could contain up to 2,000 milliseconds of the PSA as the computer measured response latency from the onset of the recognition item. Of the 18,080 response times collected, a total of 575 response times, including those for foils, were replaced (3%).

The statistical software package SPSS 11.5 was used to analyze the collected data. Preliminary analyses performed on the data included Cronbach alpha reliability coefficients for the SS, Aad, evaluation of the argument, and BI scales. As noted earlier, median splits were also performed on the continuous measure of SS, PO, and NB. The median was also used to turn TU into categorical data. In addition, responses to each of the measures were averaged across messages to create an overall measure for each DV based on message type. For example, the 10 STRT times for Attack, high MSV (AHMSV) messages were averaged so that the mean STRT for AHMSV messages was used in the repeated measures design. This was done because messages vary on a lot of things besides the feature of interest, thus creating “noise.” An average of the sampled messages helps to protect against atypical messages (Basil, 1994). Thus, by combining data about a message type it is possible to draw generalizations about those messages.

In terms of analyzing data for the research questions and hypotheses, the statistical methods employed were repeated measures ANOVA, and indexes of sensitivity (A') and response bias (B") associated with SDT. In addition, Spearman correlations were used to verify relationships among the sensation seeking, tobacco use, and Motivation

Activation (PO and NB) data. This was done prior to changing SS, PO, and NB into categorical data. Assumptions associated with Pearson Correlations (i.e., normality, linear relationship) were inspected prior to the analysis and it was determined that use of the Spearman correlation was necessary as significant violations of normality and linear relationships existed (Pedhazur, 1997).

A significance criterion of .05 was adopted for each hypothesis test to protect against Type I error. Prior to the study, power was set at .80 to ensure that the experiment was sensitive enough to detect real effects. The overall power of the experiment was also increased by efficiently using subjects in a repeated measures factorial design with both within and between-subject variables. Consistent with Cohen (1992) the number of subjects tested in this study was sufficiently large enough to detect between-subject differences at a .25 medium effects size with a minimum of 45 subjects in each of the four groups. As noted earlier, the current study resulted in the following: Risk Takers (n= 53), Risk Avoiders (n= 57), Inactives (n= 54), and Coactives (n= 62).

Repeated measures factorial ANOVAs were used to examine the interactive effects of the multiple categorical independent variables on the continuous dependent variables of STRTs and recognition memory measures. In addition, repeated measures factorial ANOVAs were used to examine the continuous dependent variables of Aad, Evaluation of the Argument, Behavioral Intent, Arousal, Positive Valence, and Negative Valence. Pearson correlations conducted on the Persuasion variables (Aad, Evaluation, Behavior) as well as the Emotional Response variables (Arousal, Positive, Negative) were determined to be interrelated making ANOVAs necessary. Consistent with arguments by Tabachnick and Fidell (2007) and Huberty and Morris (1989) MANOVAs

should only be used when dependent variables are moderately correlated (i.e., below .65) to control for familywise Type I error. In the current study, over half of the variables were correlated at or above the .65 level and so separate ANOVAs were conducted.

Prior to conducting each repeated measures ANOVA, standardized residuals were inspected for outliers. Case analyses were conducted on outliers, and if the results changed drastically outliers were removed before performing final analyses[8]. Assumptions associated with repeated measures analyses, such as multivariate normality, between-groups equality of variance, independence of observations, sphericity[9], and homogeneity of the covariance matrices were examined prior to performing the analyses. If equality of variance was violated a more conservative alpha (e.g., .01) was used. Though violatons of sphericity were not an issue for repeated measures ANOVAs using PO, NB, or SS as independent variables, the more conservative multivariate Greenhouse-Geisser adjusted F test with degrees of freedom rounded down to the nearest whole number (as opposed to Wilks' Lambda) was used (Stevens, 2002). This was done to protect against Type I error by producing a more accurate *p* value based on adjusting the degrees of freedom downwards (Baguley, 2004).

For each repeated measures ANOVA two-way, three-way, four-way, simple interactions, and main effects of the independent variables on the dependent variables were examined using post hoc analyses with Bonferroni corrections to adjust for multiple family-wise comparisons. When an interaction effect was not present, the main effect of

[8] The results of case analyses that concluded in the removal of outliers are recorded in the notes sections of the tables which follow.
[9] Though the Greenhouse-Geisser correction was used for each analysis to control for Type I errors, sphericity was only examined for Tobacco Use as it was the only IV to have more than two levels. When a violation of sphericity was found it is recorded in the notes section of the tables which follow.

each independent variable was generalized against the levels of the other independent variables.

The following section first examines results for each of the hypotheses and the research question. Additional results not hypothesized are given in each section according to the dependent variable addressed in the hypothesis. Thus, the dependent variables are presented in the following order: 1) STRTs, 2) Recognition Memory Hits (i.e., accuracy), 3) Recognition Memory Response Latency, 4) Recognition Memory A' (i.e., sensitivity), 5) Recognition Memory B" (i.e., response bias), 6) Attitude Toward the Ad, 7) Evaluation of the Argument, 8) Behavioral Intent, 9) Arousal, 10) Positive Valence, and 11) Negative Valence. Finally, although not hypothesized, results examining TU and SS as independent variables are shown following the same dependent variable format.

Tests of the Hypotheses and Research Question

The following section focuses on the impact of Positivity Offset (PO) and Negativity Bias (NB) on each of the dependent variables using 2 (PO – low/high) X 2 (NB – low/high) X 2 (Message Type – Attack/Blame) X 2 (MSV – low/high) ANOVAs with repeated measures on Message Type and MSV for each of the dependent variables. For each repeated measures ANOVA findings regarding the hypotheses are first addressed followed by any significant main effects and interactions found that were not part of the hypotheses. When interactions among PO (low/high), NB (low/high), Message Type (Attack/Blame), and MSV (low/high) were present, post hoc tests were conducted to examine simple effects of 1) *PO* = whether participants in either PO group differed across messages, 2) *NB* = whether participants in either NB group differed across

messages, 3) *Message Type* = whether compared groups differed for Attack/Blame messages, and 4) *MSV* = whether compared groups differed for high/low MSV messages.

Effect of PO and NB on STRTs

Hypotheses 1a and 1b were tested together. Hypothesis 1a predicted that Blame messages would cause high PO individuals (i.e., Risk Takers and Coactives) to allocate more resources to processing the message (i.e., faster STRTs) than Attack messages. Hypothesis 1b predicted that Attack messages would cause high NB individuals (i.e. Risk Avoiders and Inactives) to allocate more resources to processing Attack messages (i.e., faster STRTs) than Blame messages.

Regarding hypothesis 1a, there was no significant interaction between Message Type and PO, $F(1,222) = .70$, $p > .05$, $n^2_p = .00$, power = .13 on STRTs. Therefore, hypothesis 1a was not supported because high PO individuals did not have faster STRTs for Blame versus Attack messages. Regarding hypothesis 1b, there was no significant interaction between Message Type and NB, $F(1,222) = .43$, $p > .05$, $n^2_p = .00$, power = .10 on STRTs. Therefore, hypotheses 1b was not supported as no significant differences emerged for high NB individuals for Attack versus Blame messages (See Table 4a).

Table 4a
Analysis of Variance for Motivation Activation Type by Message with STRTs as Dependent Variable

Source	*Sum of Squares*	*df*	*Mean Square*	*F*	*p*	*Partial eta Squared*	*Power*
Between							
PO	7027.65	1	7027.65	.66	n.s.	.00	.13
NB	225.77	1	225.77	.02	n.s.	.00	.05
PO * NB	24.56	1	24.56	.00	n.s.	.00	.05
Error	2353766.86	222	10602.55				
Within							
Message	64414.48	1	64414.48	63.12	.001	.22	1.0
Message * PO	714.24	1	714.24	.70	n.s.	.00	.13
Message * NB	445.25	1	445.25	.43	n.s.	.00	.10
Message * PO * NB	212.70	1	212.70	.20	n.s.	.00	.07
Error (Message)	226552.25	222	1020.50				
MSV	124783.19	1	124783.19	150.61	.001	.40	1.0
MSV * PO	6208.78	1	6208.78	7.49	.01	.03	.77
MSV * NB	640.18	1	640.18	.77	n.s.	.00	.14
MSV * PO * NB	69.87	1	69.87	.08	n.s.	.00	.06
Error (MSV)	183930.62	222	828.51				
Message * MSV	64322.94	1	64322.94	69.79	.001	.23	1.0
Message * MSV * PO	465.48	1	465.48	.50	n.s.	.00	.10
Message * MSV * NB	65.63	1	65.63	.07	n.s.	.00	.05
Message * MSV * PO * NB	89.12	1	89.12	.09	n.s.	.00	.06
Error (Message * MSV)	204588.17	222	921.56				

Notes. Significance criterion used was $p < .05$.

Although not hypothesized, results indicated that there was a significant interaction between MSV and PO, $F(1,222) = 7.49$, $p < .05$, $n^2_p = .03$, power = .77 on STRTs. Post hoc tests using the Bonferroni adjustment indicated that high PO participants had significantly faster STRTs for low MSV (M=456.29) versus high MSV messages (M=485.08). Likewise, low PO participants had significantly faster STRTs for low MSV (M=467.13) versus high MSV messages (M=485.42).

There was a significant main effect of Message Type, $F(1,222) = 63.10$, $p < .05$, $n^2_p = .29$, power = 1.0 on STRTs. Post hoc tests using the Bonferroni adjustment

indicated that participants exhibited faster STRTs for Attack (*M*=465.02) versus Blame messages (*M*=481.94). There was also a significant main effect of MSV, $F(1,222) = 150.61$, $p < .05$, $n^2_p = .40$, power = 1.0 on STRTs. Post hoc tests using the Bonferroni adjustment indicated that participants exhibited faster STRTs for low MSV (*M*=461.71) versus high MSV messages (*M*=485.25).

Both main effects are dependent upon the other as indicated by the significant interaction between Message Type and MSV, $F(1,222) = 69.79$, $p < .05$, $n^2_p = .24$, power = 1.0 on STRTs. Post hoc tests using the Bonferroni adjustment indicated that participants had significantly faster STRTs for low MSV Blame (*M*=461.71) versus high MSV Blame (*M*=502.16) messages, and for low MSV Attack (*M*=461.70) versus high MSV Attack (*M*=468.34) messages. In addition, participants had significantly faster STRTs for high MSV Attack (*M*=468.34) versus high MSV Blame (*M*=502.16) messages. That is, the interaction occurred because both high MSV Attack and Blame messages were slower than low MSV Attack and Blame messages. Table 4b shows the means and standard deviations for each message by group.

Table 4b
Mean STRTs and Standard Deviations for the Four Motivation Activation Groups for Each Message

	Message			
	Attack		Blame	
Group	High MSV	Low MSV	High MSV	Low MSV
Inactive (low PO, low NB), *n*= 62				
M	469.52	469.61	501.78	462.85
SD	56.95	62.26	52.06	50.22
Risk Avoider (low PO, high NB), *n*= 57				
M	467.85	467.86	502.53	468.20
SD	56.77	65.38	55.14	54.05
Risk Taker (high PO, low NB), *n*= 53				
M	468.72	453.06	502.36	455.95
SD	56.74	63.52	52.39	51.87
Coactive (high PO, high NB), *n*= 54				
M	467.29	456.29	501.97	459.87
SD	61.37	65.75	60.35	58.27
Total, *n*= 226				
M	468.34^{ac}	461.70^{a}	502.16^{bc}	461.71^{b}
SD	57.56	64.16	54.62	53.40

Notes: Lower scores indicate faster STRTs.
Means in the same row sharing the same letter superscript differ at $p < .05$.

Effect of PO and NB on Recognition Memory

Hypotheses 2a and 2b were tested together. Hypothesis 2a predicted that high MSV messages would elicit better message encoding (i.e., better recognition memory) for low NB individuals (i.e., Risk Takers and Inactives). Hypothesis 2b predicted that low MSV messages would elicit better message encoding (i.e., better recognition memory) for high NB individuals (i.e., Risk Avoiders and Coactives).

As noted earlier, signal detection theory proposes that there are four possible answers to each presented probe/foil: hits, misses, false alarms, and correct rejections. However, when making these decisions a number of things often occur. Individuals can be very accurate (i.e., hits and correct rejections) in their decisions or simply guess a lot -

making their decisions inaccurate (i.e., misses, false alarms). However, by answering the same way to each presented image (e.g. saying "yes" all of the time) it is likely that a participant would be highly accurate on hits and highly inaccurate on correct rejections and vice versa. It was also expected that response latency findings regarding recognition memory will correspond to sensitivity as fast responses associated with higher hit rates should indicate accuracy (Shapiro, 1994).

To measure participants' ability to discriminate between probes and foils in the recognition memory task, nonparametric A' (A-prime) was used as an index of sensitivity that takes into account both hit rates (H) as well as false alarm rates (F), including instances where H or F are 0 or 1. In addition, A' serves as a robust measure of sensitivity for recognition memory tasks where variance of distributions is usually unequal (Verde, Macmillan, & Rotello, 2006). In terms of conservative vs. liberal responses to the recognition task, a measure of response bias indicated participants' attempts to either maximize correct answers or minimize incorrect answers, that is, whether they consistently answered more with "yes" or "no" in order to make as few errors as possible (Kornbrot, 2006). Macmillan and Creelman (2005) posited that "a positive bias is a tendency to say "no," whereas a negative bias is a tendency to say "yes," (p. 29). The consistency of responses was indexed using B" as a measure of yes-no response bias which indicates the tendency to answer "no" when H > F and the tendency to answer "yes" when H < F. That is, when judging the familiarity of an item, if an individual needs to perceive the item as very familiar before they say "yes" to a target, then that constitutes a conservative bias. Conversely, if a person needs to perceive the item as less familiar in order to say "yes" to a target, then a liberal bias exists.

Recognition Memory Accuracy (Hits). Recall that hypothesis 2a stated that high MSV messages would elicit better message encoding (better recognition memory) for low NB individuals (Risk Takers and Inactives) and that hypothesis 2b stated that low MSV messages would elicit better message encoding (better recognition memory) for high NB individuals (Risk Avoiders and Coactives). Results regarding average hits indicated that there was no significant interaction between NB and MSV, $F(1,211) = .00$, $p > .01$, $n^2_p = .00$, power = .05 on recognition memory accuracy (See Table 5a). Therefore, hypotheses 2a & 2b were not supported as no significant differences for recognition memory accuracy emerged between high versus low NB individuals in regard to MSV.

Table 5a
Analysis of Variance for Motivation Activation Type by Message with Recognition Memory Accuracy (Hits) as Dependent Variable

Source	*Sum of Squares*	*df*	*Mean Square*	*F*	*p*	*Partial eta Squared*	*Power*
Between							
PO	.00	1	.00	.03	n.s.	.00	.05
NB	.16	1	.16	5.86	.01	.02	.67
PO * NB	.02	1	.02	.88	n.s.	.00	.15
Error	6.04	211	.02				
Within							
Message	.53	1	.53	44.63	.001	.17	1.0
Message * PO	.02	1	.02	2.13	n.s.	.01	.30
Message * NB	.00	1	.00	.04	n.s.	.00	.05
Message * PO * NB	.00	1	.00	.35	n.s.	.00	.09
Error (Message)	2.53	211	.01				
MSV	.07	1	.07	6.14	.01	.02	.69
MSV * PO	.02	1	.02	2.30	n.s.	.01	.32
MSV * NB	.00	1	.00	.00	n.s.	.00	.05
MSV * PO * NB	.00	1	.00	.01	n.s.	.00	.05
Error (MSV)	2.45	211	.01		n.s.		
Message * MSV	.00	1	.00	.14	n.s.	.00	.06
Message * MSV * PO	.01	1	.01	1.40	n.s.	.00	.21
Message * MSV * NB	.06	1	.06	5.27	n.s.	.02	.62
Message * MSV * PO * NB	.01	1	.01	1.45	n.s.	.00	.22
Error (Message * MSV)	2.75	211	.01				

Notes. Significance criterion used was $p < .01$.

Although not hypothesized, there was a significant main effect of NB, $F(1,211) = 5.86$, $p < .01$, $n^2_p = .02$, power = .67 on recognition memory accuracy. Post hoc tests using the Bonferroni adjustment indicated that high NB participants (M=.83) had significantly more hits than low NB participants (M=.80).

There was a significant main effect of Message Type, $F(1,211) = 44.63$, $p < .01$, $n^2_p = .17$, power = 1.0 on recognition memory accuracy. Post hoc tests using the Bonferroni adjustment indicated that participants had significantly more hits for Attack (M=.84) versus Blame (M=.79) messages.

Finally, there was a significant main effect of MSV, $F(1,211) = 6.14$, $p < .01$, $n^2_p = .02$, power = .69 on recognition memory accuracy. Post hoc tests using the Bonferroni adjustment indicated that participants had significantly more hits for high MSV (M=.82) versus low MSV messages (M=.80). Table 5b shows the means and standard deviations for each message by group.

Table 5b
Mean Recognition Memory Accuracy (Hits) and Standard Deviations for the Four Motivation Activation Groups for Each Message

	Message			
	Attack		Blame	
Group	High MSV	Low MSV	High MSV	Low MSV
Inactive (low PO, low NB), *n*= 58				
M	.82	.83	.77	.75
SD	.14	.14	.13	.15
Risk Avoider (low PO, high NB), *n*= 55				
M	.86	.86	.81	.80
SD	.10	.10	.10	.12
Risk Taker (high PO, low NB), *n*= 50				
M	.82	.81	.81	.76
SD	.14	.14	.09	.13
Coactive (high PO, high NB), *n*= 52				
M	.87	.81	.79	.80
SD	.10	.13	.12	.11
Total, *n*= 215*				
M	.84	.83	.79	.77
SD	.12	.13	.13	.13

Notes: Higher scores indicate greater recognition accuracy.
*Following examination of standardized residuals and a case analysis, a total of 11 outliers were removed before performing the repeated measures ANOVA.

Recognition Memory Response Latency. Recall that hypothesis 2a stated that high MSV messages would elicit better message encoding for low NB individuals (Risk Takers and Inactives) and that hypothesis 2b stated that low MSV messages would elicit

better message encoding for high NB individuals (Risk Avoiders and Coactives). That is, response latency as a measure of recognition memory should be faster for items that were better encoded. Results regarding response latency indicated that there was no significant interaction between NB and MSV, $F(1,211) = 3.72$, $p > .01$, $n^2_p = .01$, power = .48 on response latency (See Table 6a). Therefore, hypotheses 2a & 2b were not supported as no significant differences for recognition memory response latency emerged between high versus low NB individuals in regard to MSV.

Table 6a
Analysis of Variance for Motivation Activation Type by Message with Recognition Memory Response Latency as Dependent Variable

Source	*Sum of Squares*	*df*	*Mean Square*	*F*	*p*	*Partial eta Squared*	*Power*
Between							
PO	324.69	1	324.69	.00	n.s.	.00	.05
NB	1701392.08	1	1701392.08	3.72	n.s.	.01	.48
PO * NB	24803.73	1	24803.73	.05	n.s.	.00	.05
Error	96470568.92	211	457206.48				
Within							
Message	1607324.96	1	1607324.96	41.68	.001	.16	1.0
Message * PO	75522.35	1	75522.35	1.95	n.s.	.00	.28
Message * NB	32278.40	1	32278.40	.83	n.s.	.00	.14
Message * PO * NB	14135.68	1	14135.68	.36	n.s.	.00	.09
Error (Message)	8135851.44	211	38558.53				
MSV	44583.70	1	44583.70	.93	n.s.	.00	.16
MSV * PO	107795.85	1	107795.85	2.25	n.s.	.01	.32
MSV * NB	57284.91	1	57284.91	1.19	n.s.	.00	.19
MSV * PO * NB	1165.95	1	1165.95	.02	n.s.	.00	.05
Error (MSV)	10108238.45	211	47906.34				
Message * MSV	57776.60	1	57776.60	1.16	n.s.	.00	.18
Message * MSV * PO	253.96	1	253.96	.00	n.s.	.00	.05
Message * MSV * NB	4987.65	1	4987.65	.10	n.s.	.00	.06
Message * MSV * PO * NB	370.20	1	370.20	.00	n.s.	.00	.05
Error (Message * MSV)	10497225.99	211	49749.88				

Notes. Significance criterion used was $p < .01$.

Although not hypothesized, there was a significant main effect of Message Type, $F(4,778) = 62.87$, $p < .01$, $n^2_p = .23$, power = 1.0 on response latency. Post hoc tests using the Bonferroni adjustment indicated that participant responses for Attack messages (M=2355.11) were significantly slower than responses for Blame messages (M=2268.42)[10]. Table 6b shows the means and standard deviations for each message by group.

Table 6b
Mean Recognition Memory Response Latency and Standard Deviations for the Four Motivation Activation Groups for Each Message

	Message			
	Attack		Blame	
Group	High MSV	Low MSV	High MSV	Low MSV
Inactive (low PO, low NB), *n*= 58				
M	2297.41	2316.25	2230.24	2227.67
SD	326.78	345.41	314.28	319.66
Risk Avoider (low PO, high NB), *n*= 57				
M	2416.07	2417.60	2329.71	2280.91
SD	308.19	405.26	359.14	328.38
Risk Taker (high PO, low NB), *n*= 49				
M	2254.70	2290.10	2231.16	2181.27
SD	301.88	375.18	358.53	333.27
Coactive (high PO, high NB), *n*= 51				
M	2370.65	2412.15	2299.47	2335.49
SD	336.54	367.16	348.60	366.98
Total, *n*= 215*				
M	2337.97	2361.37	2274.08	2258.58
SD	322.94	375.36	345.08	339.40

Notes: Lower scores indicate faster response latency.
*Following examination of standardized residuals and a case analysis, a total of 11 outliers were removed before performing the repeated measures ANOVA.

Recognition Memory Sensitivy (A'). Recall that hypothesis 2a stated that high MSV messages would elicit better message encoding for low NB individuals (Risk

[10] Response latencies were calculated from the beginning of the 2 second audio clip making the latency times reported here more than 2,000 milliseconds.

Takers and Inactives) and that hypothesis 2b stated that low MSV messages would elicit better message encoding for high NB individuals (Risk Avoiders and Coactives). That is, certain participants should have encoded items better resulting in increased recognition memory sensitivity for those messages. Results regarding A'[11] or recognition memory sensitivity indicated that there was no significant interaction between NB and MSV, $F(1,214) = .01$, $p > .01$, $n^2_p = .00$, power = .05 on recognition memory sensitivity (See Table7a). Therefore hypotheses 2a & 2b were not supported as no significant differences emerged for recognition response sensitivity for high versus low NB individuals in regard to MSV.

[11] Hits > False Alarms, so the formula used to calculate A' was A' = ½ + [(H-F) * (1+H-F)/ 4H(1-F)].

Table 7a
Analysis of Variance for Motivation Activation Type by Message with Recognition Memory Sensitivity (A') as Dependent Variable

Source	*Sum of Squares*	*df*	*Mean Square*	*F*	*p*	*Partial eta Squared*	*Power*
Between							
PO	.00	1	.00	.03	n.s.	.00	.05
NB	.00	1	.00	.63	n.s.	.00	.12
PO * NB	.01	1	.01	1.32	n.s.	.00	.20
Error	2.61	214	.01				
Within							
Message	.05	1	.05	28.67	.001	.11	1.0
Message * PO	.00	1	.00	1.96	n.s.	.00	.28
Message * NB	.00	1	.00	.20	n.s.	.00	.07
Message * PO * NB	.00	1	.00	1.37	n.s.	.00	.21
Error (Message)	.40	214	.00				
MSV	.00	1	.00	1.90	n.s.	.00	.27
MSV * PO	.00	1	.00	1.20	n.s.	.00	.19
MSV * NB	.00	1	.00	.01	n.s.	.00	.05
MSV * PO * NB	.00	1	.00	.00	n.s.	.00	.05
Error (MSV)	.37	214	.00				
Message * MSV	.00	1	.00	.52	n.s.	.00	.11
Message * MSV * PO	.00	1	.00	.84	n.s.	.00	.15
Message * MSV * NB	.00	1	.00	3.10	n.s.	.01	.41
Message * MSV * PO * NB	.00	1	.00	2.56	n.s.	.01	.35
Error (Message * MSV)	.38	214	.00				

Notes. Significance criterion used was $p < .01$.

Although not hypothesized, there was a significant main effect of Message Type, $F(1,214) = 28.67$, $p < .01$, $n^2_p = .11$, power = 1.0 on recognition memory sensitivity. Post hoc tests using the Bonferroni adjustment indicated that participant responses for Attack messages (M=.90) were significantly more sensitive than responses for Blame messages (M=.88). Table 7b shows the means and standard deviations for each message by group.

Table 7b

Mean Recognition Memory Sensitivity (A') and Standard Deviations for the Four Motivation Activation Groups for Each Message

	Message			
	Attack		Blame	
Group	High MSV	Low MSV	High MSV	Low MSV
Inactive (low PO, low NB), *n*= 58				
M	.89 z	.90	.88	.87
SD	.07	.07	.07	.07
Risk Avoider (low PO, high NB), *n*= 57				
M	.91 z	.91	.89	.89
SD	.06	.04	.05	.06
Risk Taker (high PO, low NB), *n*= 49				
M	.89	.90	.90	.88
SD	.07	.06	.05	.06
Coactive (high PO, high NB), *n*= 54				
M	.91	.89	.88	.88
SD	.07	.06	.06	.06
Total, *n*= 218*				
M	.90	.90	.89	.88
SD	.07	.06	.06	.06

Notes: Higher scores indicate greater recognition sensitivity.
*Following examination of standardized residuals and a case analysis, a total of 8 outliers were removed before performing the repeated measures ANOVA.

Recognition Memory Response Bias (B"). Recall that there can be situational, motivational, or individual reasons for participants to be willing to say "yes" they saw an item or "no" they did not. In each instance, the propensity to say "yes" - regardless of whether or not the item is a probe or foil - would indicate that the participant was more likely to guess (i.e., answer liberally). The propensity to say "no" would indicate that the participant was less likely to guess (i.e., answer conservatively). That is, the participant's response bias reflects their tendency to be liberal or conservative in the extent to which a probe must be familiar in order for them to say that it was. In fact, a positive response bias (i.e., tendency to answer "no" or be conservative) would indicate that participants

needed to perceive the message as very familiar before saying "yes" that they previously saw the message.

Ideally, there would be no difference in response bias for any of the messages viewed as the pairing of a response bias with a higher hit rate for a particular message could indicate participants' willingness to respond a particular way to those messages. Thus, the findings regarding response bias discussed here were not hypothesized.

Findings discussed in this section are based on the participant's tendency to say "no" as participant Hits > False alarms for each message. Results indicated that there was a significant interaction for Message Type X MSV X NB, $F(1,213) = 6.71$, $p < .05$, $n^2_p = .03$, power = .73 on response bias. Post hoc tests using the Bonferroni adjustment indicated that high NB participants were significantly more conservative (i.e., more likely to say "no") for low MSV Attack (*M*=.00) than high MSV Attack (*M*= -.14) messages. High NB participants were significantly more conservative (i.e., more likely to say "no") for high MSV Blame (*M*=.10) than high MSV Attack (*M*= -.14) messages; and for low MSV Blame (*M*=.10) than low MSV Attack (*M*=.00) messages. Likewise, low NB participants were significantly more conservative (i.e., more likely to say "no") for high MSV Blame (*M*=.09) than high MSV Attack (*M*= -.06) messages; and for low MSV Blame (*M*=.14) than low MSV Attack (*M*=-.05) messages (See Table 8a).

Table 8a
Analysis of Variance for Motivation Activation Type by Message with Recognition Memory Response Bias (B”) as Dependent Variable

Source	*Sum of Squares*	*df*	*Mean Square*	*F*	*p*	*Partial eta Squared*	*Power*
Between							
PO	1.27	1	1.27	2.30	n.s.	.01	.32
NB	.00	1	.00	.00	n.s.	.00	.05
PO * NB	.50	1	.50	.91	n.s.	.00	.15
Error	118.14	213	.55				
Within							
Message	8.79	1	8.79	65.08	.001	.23	1.0
Message * PO	.32	1	.32	2.42	n.s.	.01	.34
Message * NB	.00	1	.00	.00	n.s.	.00	.05
Message * PO * NB	.03	1	.03	.22	n.s.	.00	.07
Error (Message)	28.76	213	.13				
MSV	.55	1	.55	3.87	.05	.01	.50
MSV * PO	.01	1	.01	.07	n.s.	.00	.05
MSV * NB	.00	1	.00	.00	n.s.	.00	.05
MSV * PO * NB	.04	1	.04	.33	n.s.	.00	.08
Error (MSV)	30.60	213	.14				
Message * MSV	.21	1	.21	1.39	n.s.	.00	.21
Message * MSV * PO	.30	1	.30	1.97	n.s.	.00	.28
Message * MSV * NB	1.05	1	1.05	6.71	.01	.03	.73
Message * MSV * PO * NB	.31	1	.31	2.00	n.s.	.00	.29
Error (Message * MSV)	33.32	213	.15				

Notes. Significance criterion used was $p < .05$.

There was a significant main effect of Message Type, $F(1,213) = 65.08$, $p < .05$, $n^2_p = .23$, power = 1.0 on response bias. Post hoc tests using the Bonferroni adjustment indicated that participants were significantly more conservative (i.e., more likely to say “no”) for Blame (M=.14) than Attack (M= -.05) messages. There was also a significant main effect of MSV, $F(1,213) = 3.87$, $p < .05$, $n^2_p = .01$, power = .50 on response bias. Post hoc tests using the Bonferroni adjustment indicated that participants were significantly more conservative (i.e., more likely to say “no”) for low MSV (M=.06) than

high MSV (*M*= .01) messages. Table 8b shows the means and standard deviations for each message by group.

Table 8b
Mean Recognition Memory Response Bias (B”) and Standard Deviations for the Four Motivation Activation Groups for Each Message

	Message			
	Attack		Blame	
Group	High MSV	Low MSV	High MSV	Low MSV
Inactive (low PO, low NB), *n*= 57				
M	-.03	-.09	.09	.27
SD	.52	.56	.48	.29
Risk Avoider (low PO, high NB), *n*= 53				
M	-.07	.05	.25	.18
SD	.62	.58	.39	.48
Risk Taker (high PO, low NB), *n*= 53				
M	-.08	-.002	.10	.10
SD	.56	.48	.45	.46
Coactive (high PO, high NB), *n*= 54				
M	-.19	-.02	.08	.05
SD	.53	.53	.40	.43
Total, *n*= 217*				
M	-.09	-.01	.13	.15
SD	.56	.54	.43	.43

Notes: Higher scores indicate greater propensity to be conservative with responses (i.e., say “no”).
*Following examination of standardized residuals and a case analysis, a total of 9 outliers were removed before performing the repeated measures ANOVA.

Effect of PO and NB on Persuasiveness

Hypotheses 3a, 3b, and 3c were tested using a series of repeated measures ANOVAs. Hypothesis 3a predicted that regardless of PO or NB, high MSV Attack PSAs would elicit more positive attitudes toward the ad than other PSAs. Hypothesis 3b predicted that regardless of PO or NB, high MSV Attack PSAs would elicit more positive

evaluations of the ad than other PSAs. Hypothesis 3c predicted that regardless of PO or NB, high MSV Attack PSAs would elicit greater intent not to smoke than other PSAs.

Attitude Toward the Ad. Regarding hypothesis 3a, which predicted that high MSV Attack PSAs would elicit more positive attitudes toward the ad than other PSAs, results for Aad indicated that there was a significant interaction between Message Type and MSV, $F(1,215) = 68.66$, $p < .05$, $n^2_p = .24$, power = 1.0 (See Table 9a).

Table 9a
Analysis of Variance for Motivation Activation Type by Message with Aad as Dependent Variable

Source	*Sum of Squares*	*df*	*Mean Square*	*F*	*p*	*Partial eta Squared*	*Power*
Between							
PO	1.35	1	1.35	.52	n.s.	.00	.11
NB	2.94	1	2.94	1.13	n.s.	.00	.18
PO * NB	.59	1	.59	.23	n.s.	.00	.07
Error	556.03	215	2.58				
Within							
Message	18.21	1	18.21	18.22	.001	.07	.98
Message * PO	1.19	1	1.19	1.19	n.s.	.00	.19
Message * NB	6.69	1	6.69	6.69	.01	.03	.73
Message * PO * NB	.25	1	.25	.25	n.s.	.00	.07
Error (Message)	214.90	215	1.00				
MSV	6.16	1	6.16	6.99	.01	.03	.74
MSV * PO	.23	1	.23	.26	n.s.	.00	.08
MSV * NB	.07	1	.07	.08	n.s.	.00	.05
MSV * PO * NB	.68	1	.68	.78	n.s.	.00	.14
Error (MSV)	189.58	215	.88				
Message * MSV	70.55	1	70.55	68.66	.001	.24	1.0
Message * MSV * PO	.64	1	.64	.62	n.s.	.00	.12
Message * MSV * NB	.33	1	.33	.32	n.s.	.00	.08
Message * MSV * PO * NB	.56	1	.56	.54	n.s.	.00	.11
Error (Message * MSV)	220.93	215	1.02				

Notes. Significance criterion used was $p < .05$.

Post hoc tests using the Bonferroni adjustment indicated that participants were significantly more positive for high MSV Attack (*M*=4.75) than high MSV Blame (*M*=3.94) messages. Participants were also more positive for low MSV Blame (*M*=4.33) than low MSV Attack (*M*=4.05) messages. In addition, participants were significantly more positive for high MSV Attack (*M*=4.75) than low MSV Attack (*M*=4.05) messages, and were significantly more positive for low MSV Blame (*M*=4.33) than high MSV Blame (*M*=3.94) messages. Therefore, hypothesis 3a was supported as participants expressed significantly more positive Aad for high MSV Attack messages than other PSAs (See Table 9b).

Table 9b
Mean Aad and Standard Deviations for the Four Motivation Activation Groups for Each Message

	Message			
	Attack		Blame	
Group	High MSV	Low MSV	High MSV	Low MSV
Inactive (low PO, low NB), *n*= 61				
M	4.70	5.05	4.51	4.94
SD	.92	.79	1.00	.94
Risk Avoider (low PO, high NB), *n*= 52				
M	4.60	5.00	4.35	4.52
SD	.75	.74	.93	.85
Risk Taker (high PO, low NB), *n*= 53				
M	3.97	3.88	4.05	4.05
SD	.86	.85	.89	1.11
Coactive (high PO, high NB), *n*= 53				
M	4.29	4.38	4.44	4.22
SD	.87	.95	.91	1.08
Total, *n*= 219*				
M	4.75^{ac}	4.05^{bc}	3.94^{ad}	4.33^{bd}
SD	.93	.85	.93	.95

Notes: Higher scores indicate more positive responses to the ad.
Means in the same row sharing the same letter superscript differ at $p < .05$.
*Following examination of standardized residuals and a case analysis, a total of 7 outliers were removed before performing the repeated measures ANOVA.

This interaction is dependent upon the main effect of Message Type, $F(1,215) = 18.22$, $p < .05$, $n^2_p = .07$, power = .98 on Aad, and the main effect of MSV, $F(1,215) = 6.99$, $p < .05$, $n^2_p = .03$, power = .74 on Aad. Post hoc tests using the Bonferroni adjustment indicated that overall, participants expressed significantly more positive responses to Attack (M=4.57) versus Blame (M=4.16) messages. In addition, participants expressed significantly more positive responses to high MSV (M=4.39) versus low MSV (M=4.22) messages.

Although not hypothesized, results indicated that there was a significant interaction between Messsage Type and NB, $F(1,215) = 6.69$, $p < .05$, $n^2_p = .03$, power = .73 on Aad. Post hoc tests using the Bonferroni adjustment indicated that high NB participants were significantly more positive for Attack (M=4.51) versus Blame (M=4.09) messages.

Evaluation of the Argument. Regarding hypothesis 3b, which predicted that high MSV Attack PSAs would elicit more positive evaluations of the argument than other PSAs, results for Evaluation of the Argument indicated that there was a significant interaction between Message Type and MSV, $F(1,215) = 93.14$, $p < .01$, $n^2_p = .30$, power = 1.0 (See Table 10a).

Table 10a
Analysis of Variance for Motivation Activation Type by Message with Evaluation of the Argument as Dependent Variable

Source	*Sum of Squares*	*df*	*Mean Square*	*F*	*p*	*Partial eta Squared*	*Power*
Between							
PO	2.09	1	2.09	1.42	n.s.	.00	.22
NB	11.98	1	11.98	8.17	.01	.03	.81
PO * NB	1.95	1	1.95	1.33	n.s.	.00	.21
Error	315.17	215	1.46				
Within							
Message	3.97	1	3.97	26.06	.001	.10	.99
Message * PO	.54	1	.54	3.54	n.s.	.01	.46
Message * NB	1.00	1	1.00	6.56	.01	.03	.72
Message * PO * NB	.52	1	.52	3.44	n.s.	.01	.45
Error (Message)	32.78	215	.15				
MSV	20.08	1	20.08	154.20	.001	.41	1.0
MSV * PO	.09	1	.09	.69	n.s.	.00	.13
MSV * NB	.47	1	.47	3.61	n.s.	.01	.47
MSV * PO * NB	.00	1	.00	.02	n.s.	.00	.05
Error (MSV)	28.00	215	.13				
Message * MSV	12.37	1	12.37	93.14	.001	.30	1.0
Message * MSV * PO	.10	1	.10	.81	n.s.	.00	.14
Message * MSV * NB	1.12	1	1.12	8.48	.01	.03	.82
Message * MSV * PO * NB	.19	1	.19	1.49	n.s.	.00	.22
Error (Message * MSV)	28.56	215	.13				

Notes. Significance criterion used was $p < .01$.

Post hoc tests using the Bonferroni adjustment indicated that participants were significantly more positive in their evaluations of the argument for high MSV Attack (*M*= 6.28) versus high MSV Blame (*M*= 6.19) messages. They also more positively evaluated the argument of low MSV Blame (*M*= 6.11) versus low MSV Attack (*M*= 5.75) messages. In addition, participants more positively evaluated the argument of high MSV Attack (*M*= 6.28) versus low MSV Attack (*M*= 5.75), and high MSV Blame (*M*= 6.19) versus low MSV Blame (*M*= 6.11) messages. Therefore, hypothesis 3b was supported as

participants expressed significantly more positive evaluations of the argument for high MSV Attack messages than other PSAs (See Table 10b).

Table 10b
Mean Evaluation of the Argument and Standard Deviations for the Four Motivation Activation Groups for Each Message

	Message			
	Attack		Blame	
Group	High MSV	Low MSV	High MSV	Low MSV
Inactive (low PO, low NB), *n*= 59				
M	6.28	6.52	5.95	6.55
SD	.70	.67	.92	.70
Risk Avoider (low PO, high NB), *n*= 56				
M	5.82	5.90	5.56	5.86
SD	.70	.74	.73	.82
Risk Taker (high PO, low NB), *n*= 51				
M	6.21	6.33	6.10	6.26
SD	.55	.58	.61	.61
Coactive (high PO, high NB), *n*= 53				
M	6.10	6.22	6.02	6.2**9**
SD	.50	.66	.67	.67
Total, *n*= 219*				
M	6.28^{ac}	5.75^{bc}	6.19^{ad}	6.11^{bd}
SD	.78	.75	.59	.63

Notes: Higher scores indicate more positive evaluation of the argument.
Means in the same row sharing the same letter superscript differ at $p < .05$.
*Following examination of standardized residuals and a case analysis, a total of 7 outliers were removed before performing the repeated measures ANOVA.

This interaction is dependent upon the main effect of Message Type, $F(1,215) = 26.06$, $p < .01$, $n^2_p = .10$, power = .99 on evaluation of the argument, and the main effect of MSV, $F(1,215) = 154.20$, $p < .01$, $n^2_p = .41$, power = 1.0 on evaluation of the argument. Post hoc tests using the Bonferroni adjustment indicated that overall, participants expressed significantly more positive responses to Blame (M=6.19) versus Attack (M=6.06) messages. In addition, participants expressed significantly more positive responses to high MSV (M=6.28) versus low MSV (M=5.97) messages.

Although not hypothesized, results indicated that there was significant interaction for Message X MSV X NB, $F(1,215) = 8.48$, $p < .01$, $n^2_p = .03$, power = .82 on evaluation of the argument. Post hoc tests using the Bonferroni adjustment indicated that participants with high NB significantly rated the arguments of high MSV Attack (*M*=6.49) messages more positively than high MSV Blame (*M*=6.29) messages. High NB participants also rated low MSV Blame (*M*=6.23) messages more positively than low MSV Attack (*M*=5.84) messages. Likewise, low NB participants rated the arguments of low MSV Blame (*M*=6.00) messages more positively than low MSV Attack (*M*=5.65) messages.

In addition, high NB participants significantly rated the arguments of high MSV Attack (*M*=6.49) messages more positively than low MSV Attack (*M*=5.84) messages. Low NB participants significantly rated the arguments of high MSV Attack (*M*=6.07) messages more positively than low MSV Attack (*M*=5.65) messages. Low NB participants also significantly rated the arguments of high MSV Blame (*M*=6.09) messages more positively than low MSV Blame (*M*=6.00) messages.

Finally, high NB (*M*=6.49) participants significantly rated the arguments of high MSV Attack messages more positively than low NB (*M*=6.07) participants; high NB (*M*=6.29) participants significantly rated the arguments of high MSV Blame messages more positively than low NB (*M*=6.09) participants; and high NB (*M*=6.23) participants significantly rated the arguments of low MSV Blame messages more positively than low NB (*M*=6.00) participants.

There was also a significant interaction between Message and NB, $F(1,215) = 6.56$, $p < .01$, $n^2_p = .03$, power = .72 on evaluation of the argument. Post hoc tests using

the Bonferroni adjustment indicated that participants with low NB significantly rated the arguments of Blame (*M*=6.04) messages higher than that of Attack (*M*=5.86) messages. Likewise, participants with high NB significantly rated the arguments of Blame (*M*=6.26) messages higher than that of Attack (*M*=6.17) messages. In addition, the arguments of Attack messages were rated higher for high NB (*M*=6.17) versus low NB (*M*=5.86) participants, while the arguments of Blame messages were rated higher for high NB (*M*=6.26) versus low NB (*M*=6.04) participants.

Finally, there was a significant main effect of NB, $F(1,215) = 8.17$, $p < .01$, $n^2_p = .03$, power = .81 on evaluation of the argument. Post hoc tests using the Bonferroni adjustment indicated that overall, high NB (*M*=6.24) participants more positively evaluated PSA arguments than low NB (*M*=6.01) participants.

Behavioral Intent. In regard to hypothesis 3c, which predicted that high MSV Attack PSAs would elicit greater intent not to smoke than other PSAs, results for Behavioral Intent or likelihood to smoke in the future indicated that there was a significant interaction between Message Type and MSV, $F(1,213) = 17.79$, $p < .01$, $n^2_p = .07$, power = .98 (See Table 11a).

Table 11a
Analysis of Variance for Motivation Activation Type by Message with Behavioral Intent as Dependent Variable

Source	*Sum of Squares*	*df*	*Mean Square*	*F*	*p*	*Partial eta Squared*	*Power*
Between							
PO	4.67	1	4.67	5.09	n.s.	.02	.61
NB	1.01	1	1.01	1.10	n.s.	.00	.18
PO * NB	4.25	1	4.25	4.63	n.s.	.02	.57
Error	195.43	213	.91				
Within							
Message	7.50	1	7.50	178.82	.001	.45	1.0
Message * PO	.02	1	.02	.56	n.s.	.00	.11
Message * NB	.02	1	.02	.59	n.s.	.00	.12
Message * PO * NB	.00	1	.00	.20	n.s.	.00	.07
Error (Message)	8.94	213	.04		n.s.		
MSV	.04	1	.04	3.66	n.s.	.01	.47
MSV * PO	.00	1	.00	.23	n.s.	.00	.07
MSV * NB	.00	1	.00	.48	n.s.	.00	.10
MSV * PO * NB	.00	1	.00	.27	n.s.	.00	.08
Error (MSV)	2.85	213	.01				
Message * MSV	.19	1	.19	17.79	.001	.07	.98
Message * MSV * PO	.00	1	.00	.26	n.s.	.00	.08
Message * MSV * NB	.04	1	.04	3.69	n.s.	.01	.48
Message * MSV * PO * NB	.00	1	.00	.51	n.s.	.00	.11
Error (Message * MSV)	2.28	213	.01				

Notes. Significance criterion used was $p < .01$.

Post hoc tests using the Bonferroni adjustment indicated that participants were significantly more likely to say they would not smoke in the future for high MSV Attack (*M*=1.59) versus high MSV Blame (*M*=1.39) messages, and for low MSV Attack (*M*=1.55) versus low MSV Blame (*M*=1.41) messages. In addition, participants were significantly more likely to say they would not smoke in the future for high MSV Attack (*M*=1.59) versus low MSV Attack (*M*=1.55) messages. Therefore, hypothesis 3c was supported as participants expressed significantly higher intent not to smoke in the future for high MSV Attack messages than other PSAs (See Table 11b).

Table 11b
Mean Behavioral Intent and Standard Deviations for the Four Motivation Activation Groups for Each Message

	Message			
	Attack		Blame	
Group	High MSV	Low MSV	High MSV	Low MSV
Inactive (low PO, low NB), *n*= 61				
M	1.38	1.47	1.66	1.47
SD	.38	.45	.58	.51
Risk Avoider (low PO, high NB), *n*= 57				
M	1.35	1.41	1.61	1.42
SD	.36	.45	.57	.46
Risk Taker (high PO, low NB), *n*= 49				
M	1.17	1.22	1.48	1.24
SD	.37	.50	.64	.49
Coactive (high PO, high NB), *n*= 50				
M	1.17	1.26	1.47	1.26
SD	.35	.54	.65	.52
Total, *n*= 217*				
M	1.59	1.55	1.39	1.41
SD	.49	.47	.51	.53

Notes: Higher scores on this scale indicated greater intent not to smoke in the future.
Means in the same row sharing the same letter superscript differ at $p < .05$.
*Following examination of standardized residuals and a case analysis, a total of 9 outliers were removed before performing the repeated measures ANOVA.

Although not hypothesized, there was a significant main effect of Message Type, $F(1,213) = 7.50$, $p > .01$, $n^2_p = .45$, power = 1.0 on behavioral intent. Post hoc tests using the Bonferroni adjustment indicated that participants were significantly more likely to indicate they would not smoke in the future for Attack (M=1.47) versus Blame (M=1.29) messages.

Effect of PO and NB on Emotional Response

Hypotheses 3d and 3e were tested using a series of repeated measures ANOVAs. Hypothesis 3d predicted that high MSV Attack PSAs would elicit greater arousal responses than other PSAs. Hypothesis 3e predicted that high MSV Attack PSAs would elicit greater positive emotional responses than other PSAs. The responses of arousal, positive valence, and negative valence were examined separately.

Arousal. In regard to hypothesis 3d, which predicted that high MSV Attack PSAs would elicit greater arousal responses than other PSAs, results regarding Arousal indicated that there was a significant interaction between Message Type and MSV, $F(1,221) = 17.64$, $p < .01$, $n^2_p = .07$, power = .98 (See Table 12a).

Table 12a
Analysis of Variance for Motivation Activation Type by Message with Arousal as Dependent Variable

Source	*Sum of Squares*	*df*	*Mean Square*	*F*	*p*	*Partial eta Squared*	*Power*
Between							
PO	2.93	1	2.93	.20	n.s.	.00	.07
NB	7.87	1	7.87	.54	n.s.	.00	.11
PO * NB	21.94	1	21.94	1.51	n.s.	.00	.23
Error	3197.81	221	14.47				
Within							
Message	2.78	1	2.78	5.26	n.s.	.02	.62
Message * PO	.24	1	.24	.46	n.s.	.00	.10
Message * NB	.00	1	.00	.01	n.s.	.00	.05
Message * PO * NB	.00	1	.00	.01	n.s.	.00	.05
Error (Message)	116.66	221	.52				
MSV	86.58	1	86.58	100.99	.001	.31	1.0
MSV * PO	1.03	1	1.03	1.20	n.s.	.00	.19
MSV * NB	4.72	1	4.72	5.50	n.s.	.02	.64
MSV * PO * NB	6.39	1	6.39	7.46	.01	.03	.77
Error (MSV)	189.46	221	.85				
Message * MSV	8.19	1	8.19	17.64	.001	.07	.98
Message * MSV * PO	.34	1	.34	.74	n.s.	.00	.13
Message * MSV * NB	.15	1	.15	.33	n.s.	.00	.08
Message * MSV * PO * NB	.07	1	.07	.15	n.s.	.00	.06
Error (Message * MSV)	102.64	221	.46				

Notes. Significance criterion used was $p < .01$.

Post hoc tests using the Bonferroni adjustment indicated that participants were significantly more aroused by low MSV Attack (*M*=3.58) than low MSV Blame (*M*=3.27) messages. In addition, participants were more aroused by high MSV Attack (*M*=4.01) versus low MSV Attack (*M*=3.58), and high MSV Blame (*M*=4.09) versus low MSV Blame (*M*=3.27) messages. Therefore, hypothesis 3d was not supported as high MSV Attack messages did not have the highest overall arousal rating (See Table 12b).

Table 12b

Mean Arousal and Standard Deviations for the Four Motivation Activation Groups for Each Message

	Message			
	Attack		Blame	
Group	High MSV	Low MSV	High MSV	Low MSV
Inactive (low PO, low NB), *n*= 62				
M	4.13	3.77	4.22	3.42
SD	2.02	1.83	2.02	1.55
Risk Avoider (low PO, high NB), *n*= 57				
M	3.63	3.34	3.72	2.95
SD	2.11	2.06	2.21	1.75
Risk Taker (high PO, low NB), *n*= 53				
M	3.89	3.53	3.84	3.46
SD	2.00	1.75	2.18	1.67
Coactive (high PO, high NB), *n*= 53				
M	4.26	3.38	4.33	3.22
SD	2.50	1.88	2.72	1.93
Total, *n*= 225*				
M	4.01^{b}	3.58^{ab}	4.09^{c}	3.27^{ac}
SD	2.15	1.88	2.28	1.72

Notes: Higher scores indicate higher levels of arousal.
Means in the same row sharing the same letter superscript differ at $p < .05$.
*Following examination of standardized residuals and a case analysis, a total of 1 outlier was removed before performing the repeated measures ANOVA.

Although not hypothesized, results indicated that there was a significant interaction between MSV X PO X NB, $F(1,221) = 7.46$, $p < .01$, $n^2_p = .03$, power = .77 on arousal. Post hoc tests using the Bonferroni adjustment indicated that low PO, low NB (Inactive) participants were significantly more aroused by high MSV (M=4.20) messages than low MSV (M=3.62) messages. Low PO, high NB (Risk Avoider) participants were significantly more aroused by high MSV (M=3.67) messages than low MSV (M=3.14) messages. High PO, low NB (Risk Taker) participants were significantly more aroused by high MSV (M=3.90) messages than low MSV (M=3.52) messages. Finally, high PO,

high NB (Coactive) participants were significantly more aroused by high MSV (M=4.41) messages than low MSV (M=3.40) messages.

There was also a significant main effect of MSV, $F(1,221) = 100.99$, $p < .01$, $n^2_p = .31$, power = 1.0 on arousal. Post hoc tests using the Bonferroni adjustment indicated that participants rated high MSV (M=4.03) messages more arousing than low MSV (M=3.41) messages.

Positive Valence. In regard to hypothesis 3e, which predicted that high MSV Attack PSAs would elicit greater positive emotional responses than other PSAs, results regarding Positive Valence indicated that there was a significant interaction between Message Type and MSV, $F(1,209) = 161.38$, $p < .01$, $n^2_p = .43$, power = 1.0 (See Table 13a).

Table 13a
Analysis of Variance for Motivation Activation Type by Message with Positive Valence as Dependent Variable

Source	*Sum of Squares*	*df*	*Mean Square*	*F*	*p*	*Partial eta Squared*	*Power*
Between							
PO	.20	1	.20	.06	n.s.	.00	.05
NB	7.28	1	7.28	2.51	n.s.	.01	.35
PO * NB	.76	1	.76	.26	n.s.	.00	.08
Error	606.33	209	2.90				
Within							
Message	117.17	1	117.17	138.08	.001	.39	1.0
Message * PO	1.05	1	1.05	1.24	n.s.	.00	.19
Message * NB	.97	1	.97	1.15	n.s.	.00	.18
Message * PO * NB	1.12	1	1.12	1.32	n.s.	.00	.20
Error (Message)	177.34	209	.84				
MSV	216.28	1	216.28	302.19	.001	.59	1.0
MSV * PO	.58	1	.58	.81	n.s.	.00	.14
MSV * NB	.00	1	.00	.00	n.s.	.00	.05
MSV * PO * NB	1.45	1	1.45	2.03	n.s.	.01	.29
Error (MSV)	149.58	209	.71				
Message * MSV	94.16	1	94.16	161.38	.001	.43	1.0
Message * MSV * PO	.07	1	.07	.12	n.s.	.00	.06
Message * MSV * NB	.36	1	.36	.62	n.s.	.00	.12
Message * MSV * PO * NB	.17	1	.17	.30	n.s.	.00	.08
Error (Message * MSV)	121.94	209	.58				

Notes. Significance criterion used was $p < .01$.

Post hoc tests using the Bonferroni adjustment indicated that participants expressed significantly more positive emotions for low MSV Attack (*M*=4.86) versus high MSV Attack (*M*=4.53) messages, and for low MSV Blame (*M*=4.85) versus high MSV Blame (*M*=3.20) messages. In addition, participants expressed significantly more positive emotions for high MSV Attack (*M*=4.53) than high MSV Blame (*M*=3.20) messages. However, since it was predicted that high MSV Attack messages would be perceived as more positive these findings do not support hypothesis 3e as low MSV

Attack messages resulted in more positive emotional reactions than high MSV Attack messages (See Table 13b).

Table 13b
Mean Positive Valence and Standard Deviations for the Four Motivation Activation Groups for Each Message

	Message			
	Attack		Blame	
Group	High MSV	Low MSV	High MSV	Low MSV
Inactive (low PO, low NB), *n*= 62				
M	4.54	4.80	3.29	4.99
SD	.79	.82	1.23	1.28
Risk Avoider (low PO, high NB), *n*= 54				
M	4.28	4.85	2.89	4.62
SD	1.04	1.04	1.03	1.53
Risk Taker (high PO, low NB), *n*= 46				
M	4.62	4.96	3.10	4.84
SD	.79	.67	.96	1.57
Coactive (high PO, high NB), *n*= 51				
M	4.56	4.76	3.07	4.62
SD	.99	.81	1.33	1.48
Total, *n*= 213*				
M	4.53^{ab}	4.86^{b}	3.20^{ac}	4.85^{c}
SD	.91	.85	1.16	1.46

Notes: Higher scores indicate more positive emotional responses.
Means in the same row sharing the same letter superscript differ at $p < .05$.
*Following examination of standardized residuals and a case analysis, a total of 13 outliers were removed before performing the repeated measures ANOVA.

However, the interaction is dependent upon the main effect of Message Type, $F(1,209) = 138.08$, $p < .01$, $n^2_p = .39$, power = 1.0 on positive valence, and the main effect of MSV, $F(1,209) = 302.19$, $p < .01$, $n^2_p = .59$, power = 1.0 on positive valence. Post hoc tests using the Bonferroni adjustment indicated that participants significantly rated Attack (M= 4.67) messages more positively than Blame (M= 3.93) messages. Participants also significantly rated low MSV (M= 4.81) messages more positively than high MSV (M= 3.79) messages.

Negative Valence. Conversely, since hypothesis 3e predicted that high MSV Attack PSAs would elicit greater positive emotional responses than other PSAs, then the opposite should also be true. That is, high MSV Blame PSAs should elicit greater negative emotional responses than other PSAs. Results regarding Negative Valence indicated that there was a significant interaction between Message Type and MSV, $F(1,210) = 208.64$, $p < .05$, $n^2_p = .49$, power = 1.0 (See Table 14a).

Table 14a
Analysis of Variance for Motivation Activation Type by Message with Negative Valence as Dependent Variable

Source	*Sum of Squares*	*df*	*Mean Square*	*F*	*p*	*Partial eta Squared*	*Power*
Between							
PO	4.25	1	4.25	1.44	n.s.	.00	.22
NB	.04	1	.04	.01	n.s.	.00	.05
PO * NB	.16	1	.16	.05	n.s.	.00	.056
Error	617.10	210	2.93				
Within							
Message	69.84	1	69.84	76.57	.001	.26	1.0
Message * PO	2.92	1	2.92	3.20	n.s.	.01	.43
Message * NB	1.07	1	1.07	1.18	n.s.	.00	.19
Message * PO * NB	.41	1	.41	.45	n.s.	.00	.10
Error (Message)	191.55	210	.91				
MSV	157.75	1	157.75	227.60	.001	.52	1.0
MSV * PO	.45	1	.45	.65	n.s.	.00	.12
MSV * NB	5.57	1	5.57	8.04	.01	.03	.80
MSV * PO * NB	.00	1	.00	.00	n.s.	.00	.05
Error (MSV)	145.55	210	.69				
Message * MSV	111.95	1	111.95	208.64	.001	.49	1.0
Message * MSV * PO	1.55	1	1.55	2.88	n.s.	.01	.39
Message * MSV * NB	2.55	1	2.55	4.75	.05	.02	.58
Message * MSV * PO * NB	.11	1	.11	.21	n.s.	.00	.07
Error (Message * MSV)	112.67	210	.53				

Notes. Significance criterion used was $p < .05$.

Post hoc tests using the Bonferroni adjustment indicated that participants expressed significantly more negative emotions for high MSV Attack (M=4.11) than low

MSV Attack (*M*=3.98) messages. They also expressed more negative emotions for high MSV Blame (*M*=5.34) than low MSV Blame (*M*=3.83) messages. In addition, participants expressed significantly more negative emotions for high MSV Blame (*M*=5.34) versus high MSV Attack (*M*=4.11) messages. Therefore, hypothesis 3e was supported as high MSV Blame messages were ranked more negatively than high MSV Attack messages (See Table 14b).

Table 14b
Mean Negative Valence and Standard Deviations for the Four Motivation Activation Groups for Each Message

	Message			
	Attack		Blame	
Group	High MSV	Low MSV	High MSV	Low MSV
Inactive (low PO, low NB), *n*= 59				
M	4.08	3.90	5.28	4.11
SD	.68	.82	1.20	1.19
Risk Avoider (low PO, high NB), *n*= 54				
M	4.11	3.91	5.64	3.91
SD	.94	1.01	1.18	1.40
Risk Taker (high PO, low NB), *n*= 50				
M	4.13	4.15	5.47	3.86
SD	.66	.75	1.20	1.31
Coactive (high PO, high NB), *n*= 51				
M	4.11	3.91	5.57	3.57
SD	.79	.84	1.28	1.45
Total, *n*= 214*				
M	4.11^{ab}	3.98^{b}	5.34^{ac}	3.83^{c}
SD	.77	.86	1.22	1.34

Notes: Higher scores indicate more negative emotional responses.
Means in the same row sharing the same letter superscript differ at $p < .05$.
*Following examination of standardized residuals and a case analysis, a total of 12 outliers were removed before performing the repeated measures ANOVA.

This interaction is dependent upon the main effect of Message Type, $F(1,209) = 76.57$, $p < .05$, $n^2_p = .26$, power = 1.0 on negative valence and the main effect of MSV, $F(1,209) = 227.60$, $p < .05$, $n^2_p = .52$, power = 1.0 on negative valence. Post hoc tests

using the Bonferroni adjustment indicated that participants significantly rated Blame (*M*= 4.58) messages more negatively than Attack (*M*= 4.01) messages. Participants also significantly rated high MSV (*M*= 4.73) messages more negatively than low MSV (*M*= 3.87) messages.

Although not hypothesized, results indicated that there was a significant interaction for Message Type X MSV X NB, $F(1,210) = 4.75$, $p < .05$, $n^2_p = .02$, power = .58 on negative valence. Post hoc tests using the Bonferroni adjustment indicated that low NB participants significantly rated high MSV Blame (*M*= 5.18) messages as more negative than high MSV Attack (*M*= 4.14) messages. Likewise, high NB participants significantly rated high MSV Blame (*M*= 5.51) messages as more negative than high MSV Attack (*M*= 4.08) messages. In addition, high NB participants significantly rated high MSV Attack (*M*= 4.08) messages as more negative than low MSV Attack (*M*= 3.89) messages, and high MSV Blame (*M*= 5.51) messages as more negative than low MSV Blame (*M*= 3.73) messages. Low NB participants also rated high MSV Blame (*M*= 5.18) messages as more negative than low MSV Blame (*M*= 3.93) messages.

Finally, there was a significant interaction between MSV and NB, $F(1,210) = 8.04$, $p < .05$, $n^2_p = .03$, power = .80 on negative valence. Post hoc tests using the Bonferroni adjustment indicated that low NB participants significantly rated high MSV (*M*= 4.66) messages more negatively than low MSV (*M*= 4.00) messages. Likewise, high NB participants significantly rated high MSV (*M*= 4.79) messages more negatively than low MSV (*M*= 3.81) messages.

Results of the Research Question

The final research question asked what the relationship among PO, NB, SS and TU was in the current study. Normal distribution of the data was checked using histograms, skew, kurtosis, and a Kolomogorov-Smirnov test. These tests determined that TU and SS were not normally distributed in the data set with TU being positively skewed (more low-tobacco users than high) and SS being negatively skewed (more high sensation-seekers than low). In addition, linear relationships among the data were tested using scatterplots which showed non-linear relationships between TU and SS, PO, and NB. Therefore, even though all four variables are continuous variables because the normality and linear relationship assumptions necessary to perform a Pearson correlation were not met, a Spearman Rank Order correlation was conducted instead.

The first Spearman correlation examined the relationships among TU, SS, PO, and NB. Results indicated a weak, positive, and significant relationship, $r_s(224) = .20$, $p < .01$, between TU and SS. As tobacco use increased, sensation seeking tendencies tended to increase. There was also a weak, positive, and significant relationship, $r_s(224) = .16$, $p < .05$, between TU and PO. As tobacco use increased, positivity offset tended to increase. Finally, there was no significant relationship between TU and NB, $r_s(224) = -.07$, $p > .05$.

The second Spearman correlation examined the relationships among SS, PO, and NB. Results indicated a weak, positive, and significant relationship, $r_s(224) = .21$, $p < .01$, between SS and PO. As sensation seeking tendencies increased, positivity offset tended to increase. There was no significant relationship between SS and NB, $r_s(224) = -.06$, $p > .05$.

General Results Regarding Tobacco Use

Although not hypothesized, tobacco use (TU) was examined as an independent variable which could have affected the continuous dependent variables of STRTs, recognition memory, response latency, persuasiveness of the ad, and emotional response to the ad. As noted earlier, TU was broken into three categories: low (n=67), moderate (n=89), and high (n=70) with each representing an individual's overall TU. For each repeated measures ANOVA interactions and main effects of TU on the dependent variables were examined and reported only when significant. When an interaction between group (low, moderate, or high TU), Message Type (Attack/Blame), and MSV (high/low) was present, post hocs were conducted to examine simple interactions of 1) *Group* = whether participants in a specific TU group differed across messages, 2) *Message Type* = whether compared groups differed for Attack/Blame messages, and 3) *MSV* = whether compared groups differed for high/low MSV messages.

Effect of TU on Secondary Task Reaction Time

A 3 (Tobacco Use – low/moderate/high) X 2 (Message Type – Attack/Blame) X 2 (MSV – low/high) ANOVA with repeated measures on Message Type and MSV was performed on participant's STRTs. There was a significant interaction between Message Type and MSV, $F(1,223) = 73.26$, $p < .05$, $n^2_p = .24$, power = 1.0 on STRT (See Table 15a).

Table 15a

Analysis of Variance for Tobacco Use by Message with STRTs as Dependent Variable

Source	*Sum of Squares*	*df*	*Mean Square*	*F*	*p*	*Partial eta Squared*	*Power*
Between							
TU	40541.40	2	20270.70	1.94	n.s.	.01	.40
Error	2320451.45	223	10405.61				
Within							
Message	60753.07	1	60753.07	59.64	.001	.21	1.0
Message * TU	865.51	2	432.75	.42	n.s.	.00	.11
Error (Message)	227135.96	223	1018.54				
MSV	125859.76	1	125859.76	150.65	.001	.40	1.0
MSV * TU	4450.58	2	2225.29	2.66	n.s.	.02	.52
Error (MSV)	186303.46	223	835.44				
Message * MSV	65931.89	1	65931.89	73.26	.001	.24	1.0
Message * MSV * TU	4556.41	2	2278.20	2.53	n.s.	.02	.50
Error (Message * MSV)	200676.63	223	899.89				

Notes. Significance criterion used was $p < .05$.

Post hoc tests using the Bonferroni adjustment indicated that participants had significantly faster STRTs for low MSV Blame (*M*=462.22) versus high MSV Blame (*M*=503.22) messages, and for low MSV Attack (*M*=462.91) versus high MSV Attack (*M*=469.48) messages. In addition, participants had significantly faster STRTs for high MSV Attack (*M*=469.48) versus high MSV Blame (*M*=503.22) messages (See Table 15b).

Table 15b
Mean STRTs and Standard Deviations for the Three Tobacco Use (TU) Groups for Each Message

	Message			
	Attack		Blame	
Group	High MSV	Low MSV	High MSV	Low MSV
Low TU, *n*= 67				
M	473.03	469.96	510.07	461.92
SD	58.97	65.74	51.88	56.57
Moderate TU, *n*= 89				
M	457.04	454.79	491.93	458.22
SD	57.14	63.68	55.36	55.46
High TU, *n*= 70				
M	477.48	462.58	505.05	465.19
SD	58.97	64.67	56.04	49.53
Total, *n*= 226				
M	469.48^{ac}	462.91^{a}	503.22^{bc}	462.22^{b}
SD	57.82	64.56	54.95	53.84

Notes: Lower scores indicate faster STRTs.
Means in the same row sharing the same letter superscript differ at $p < .05$.

This interaction is dependent upon the main effect of Message Type, $F(1,223) = 59.64$, $p < .05$, $n^2_p = .21$, power = 1.0 on STRT and the main effect of MSV, $F(1,223) = 150.65$, $p < .05$, $n^2_p = .40$, power = 1.0 on STRT. Post hoc tests using the Bonferroni adjustment indicated that participants had significantly faster STRTs for Attack (M=466.20) versus Blame (M=482.72) messages. In addition, they had significantly faster STRTs for low MSV (M=462.57) versus high MSV (M=486.35) messages.

Effect of TU on Recognition Memory

A series of 3 (Tobacco Use – low/moderate/high) X 2 (Message Type – Attack/Blame) X 2 (MSV – low/high) ANOVAs with repeated measures on Message Type and MSV was performed on participant's recognition memory measured by: hits, response latency, A', and B''.

Recognition Memory Accuracy (Hits). In regard to average hits there was a significant main effect of Message Type, $F(1,223) = 30.99$, $p < .01$, $n^2_p = .12$, power = 1.0 on recognition memory accuracy (See Table 16a).

Table 16a
Analysis of Variance for Tobacco Use by Message with Recognition Memory Accuracy (Hits) as Dependent Variable

Source	*Sum of Squares*	*df*	*Mean Square*	*F*	*p*	*Partial eta Squared*	*Power*
Between							
TU	.12	2	.06	.89	n.s.	.00	.20
Error	15.94	223	.07				
Within							
Message	.45	1	.45	30.99	.001	.12	1.0
Message * TU	.02	2	.01	.83	n.s.	.00	.19
Error (Message)	3.23	223	.01				
MSV	.04	1	.04	3.88	n.s.	.01	.50
MSV * TU	.01	2	.00	.39	n.s.	.00	.11
Error (MSV)	2.75	223	.01				
Message * MSV	.00	1	.00	.04	n.s.	.00	.05
Message * MSV * TU	.01	2	.00	.42	n.s.	.00	.11
Error (Message * MSV)	2.90	223	.01				

Notes. Significance criterion used was $p < .01$.

Post hocs using the Bonferroni adjustment indicated that participants exhibited significantly more hits for Attack (M=.81) than Blame (M=.77) messages (See Table 16b).

Table 16b
Mean Recognition Memory Accuracy (Hits) and Standard Deviations for the Three Tobacco Use (TU) Groups for Each Message

	Message			
	Attack		Blame	
Group	High MSV	Low MSV	High MSV	Low MSV
Low TU, *n*= 67				
M	.86	.84	.81	.80
SD	.13	.12	.12	.15
Moderate TU, *n*= 89				
M	.83	.83	.79	.77
SD	.13	.14	.11	.13
High TU, *n*= 70				
M	.85	.82	.80	.77
SD	.14	.14	.12	.12
Total, *n*= 226				
M	.84	.83	.80	.78
SD	.13	.13	.12	.13

Notes: Higher scores indicate greater recognition accuracy.

Response Latency. In regard to response latency, there were no significant differences found (See Table 17a). Table 17b shows the means and standard deviations for response latency by group.

Table 17a
Analysis of Variance for Tobacco Use by Message with Recognition Memory Response Latency as Dependent Variable

Source	*Sum of Squares*	*df*	*Mean Square*	*F*	*p*	*Partial eta Squared*	*Power*
Between							
TU	2944897.09	2	1472448.54	2.06	n.s.	.01	.42
Error	159070736.99	223	713321.69				
Within							
Message	705335.88	1	705335.88	3.34	n.s.	.01	.44
Message * TU	767640.64	2	383820.32	1.81	n.s.	.01	.37
Error (Message)	47060368.94	223	211033.04				
MSV	753528.64	1	753528.64	3.39	n.s.	.01	.45
MSV * TU	563686.10	2	281843.05	1.27	n.s.	.01	.27
Error (MSV)	49507490.85	223	222006.68				
Message * MSV	122482.47	1	122482.47	.51	n.s.	.00	.11
Message * MSV * TU	968733.90	2	484366.95	2.04	n.s.	.01	.41
Error (Message * MSV)	52739969.10	223	236502.10				

Notes. Significance criterion used was $p < .05$.

Table 17b
Mean Recognition Memory Response Latency and Standard Deviations for the Three Tobacco Use (TU) Groups for Each Message

	Message			
	Attack		Blame	
Group	High MSV	Low MSV	High MSV	Low MSV
Low TU, *n*= 67				
M	2426.84	2528.39	2382.34	2374.61
SD	444.46	532.70	385.99	400.08
Moderate TU, *n*= 89				
M	2352.96	2344.14	2242.47	2259.50
SD	359.31	392.95	358.63	517.93
High TU, *n*= 70				
M	2288.12	2299.58	2203.81	2439.48
SD	381.14	491.69	440.28	1504.86
Total, *n*= 226				
M	2354.78	2384.96	2271.96	2349.37
SD	394.86	476.26	398.58	923.18

Notes: Lower scores indicate faster response times.

Recognition Memory Sensitivity (A'). In regard to A'[12] or sensitivity of the recognition measure, there was a significant main effect of Message Type, $F(1,223) = 6.70$, $p < .01$, $n^2_p = .02$, power = .73 on recognition memory sensitivity (See Table 18a).

[12] Hits > False Alarms, so the formula used to calculate A' was A' = ½ + [(H-F) * (1+H-F)/ 4H(1-F)].

Table 18a
Analysis of Variance for Tobacco Use by Message with Recognition Memory Sensitivity (A') as Dependent Variable

Source	*Sum of Squares*	*df*	*Mean Square*	*F*	*p*	*Partial eta Squared*	*Power*
Between							
TU	.19	2	.09	2.28	n.s.	.02	.46
Error	9.49	223	.04				
Within							
Message	.02	1	.02	6.70	.01	.02	.73
Message * TU	.02	2	.01	2.59	n.s.	.02	.51
Error (Message)	.90	223	.00				
MSV	.00	1	.00	.61	n.s.	.00	.12
MSV * TU	.00	2	.00	.08	n.s.	.00	.06
Error (MSV)	.88	223	.00				
Message * MSV	.00	1	.00	.00	n.s.	.00	.05
Message * MSV * TU	.00	2	.00	1.07	n.s.	.01	.23
Error (Message * MSV)	.90	223	.00				

Notes. Significance criterion used was $p < .01$.

Post hocs using the Bonferroni adjustment indicated that participants exhibited significantly more sensitive decisions for Attack (*M*=.88) versus Blame (*M*=.87) messages (See Table 18b).

Table 18b
Mean Recognition Memory Sensitivity (A') and Standard Deviations for the Three Tobacco Use (TU) Groups for Each Message

	Message			
	Attack		Blame	
Group	High MSV	Low MSV	High MSV	Low MSV
Low TU, *n*= 67				
M	.91	.90	.89	.89
SD	.07	.07	.07	.07
Moderate TU, *n*= 89				
M	.91	.91	.89	.89
SD	.06	.06	.06	.06
High TU, *n*= 70				
M	.90	.90	.89	.88
SD	.08	.06	.06	.06
Total, *n*= 226				
M	.91	.90	.89	.89
SD	.07	.06	.06	.06

Notes: Higher scores indicate greater recognition sensitivity.

Recognition Memory Response Bias (B"). In regard to B"[13] or participants' tendency to say "no" (i.e., be conservative with their answers) during the recognition task, there was a significant main effect of Message Type, $F(2, 201) = 3.71$, $p < .05$, $n^2_p = .04$, power = .67 on recognition memory response bias (See Table 19a).

Table 19a
Analysis of Variance for Tobacco Use by Message with Recognition Memory Response Bias (B") as Dependent Variable

Source	*Sum of Squares*	*df*	*Mean Square*	*F*	*p*	*Partial eta Squared*	*Power*
Between							
TU	2.13	2	1.06	1.86	n.s.	.01	.38
Error	127.49	223	.57				
Within							
Message	6.99	1	6.99	47.09	.001	.17	1.0
Message * TU	.06	2	.03	.22	n.s.	.00	.08
Error (Message)	33.10	223	.14				
MSV	.41	1	.41	2.80	n.s.	.01	.38
MSV * TU	.24	2	.12	.82	n.s.	.00	.19
Error (MSV)	33.25	223	.14				
Message * MSV	.19	1	.19	1.15	n.s.	.00	.18
Message * MSV * TU	.22	2	.11	.67	n.s.	.00	.16
Error (Message * MSV)	37.21	223	.16				

Notes. Significance criterion used was $p < .05$.

Post hocs using the Bonferroni adjustment indicated that participants exhibited significantly greater tendency to say "no" to Blame (M=.10) versus Attack (M=-.06) messages (See Table 19b).

[13] Hits > False Alarms, so the formula used to calculate B" was B" = [H(1-H) – F(1-F)] / [H(1-H) + F(1-F)].

Table 19b
Mean Recognition Memory Response Bias (B”) and Standard Deviations for the Three Tobacco Use (TU) Groups for Each Message

	Message			
	Attack		Blame	
Group	High MSV	Low MSV	High MSV	Low MSV
Low TU, *n*= 67				
M	-.14	-.06	.06	-.002
SD	.58	.52	.43	.54
Moderate TU, *n*= 89				
M	.006	-.003	.28	.27
SD	.53	.61	.36	.32
High TU, *n*= 70				
M	-.14	-.01	.10	.15
SD	.58	.53	.46	.40
Total, *n*= 226				
M	-.09	-.02	.15	.15
SD	.56	.55	.42	.44

Notes: Higher scores indicate greater propensity to say “no” or be conservative.

Effect of TU on Persuasiveness

A series of 3 (Tobacco Use – low/moderate/high) X 2 (Message Type – Attack/Blame) X 2 (MSV – low/high) ANOVAs with repeated measures on Message Type and MSV was performed on participant’s persuasive response measured by: attitude toward the ad (Aad), evaluation of the ad, and behavioral intent.

Attitude Toward the Ad. In regard to Aad, there was a significant interaction between Tobacco Use X Message Type X MSV, $F(2,223) = 4.79$, $p < .05$, $n^2_p = .04$, power = .79 (See Table 20a). Post hocs using the Bonferroni adjustment indicated that low TU participants significantly evaluated high MSV Attack (*M*=4.93) messages more positively than high MSV Blame (*M*=4.04) messages. Moderate TU participants significantly evaluated high MSV Attack (*M*=4.77) messages more positively than high MSV Blame (*M*=3.79) messages, and significantly evaluated low MSV Blame (*M*=4.51) messages more positively than low MSV Attack (*M*=3.89) messages. High TU

participants significantly evaluated high MSV Attack (*M*=4.57) messages more positively than high MSV Blame (*M*=4.03) messages. In addition, low TU participants significantly evaluated high MSV Attack (*M*=4.93) messages more positively than low MSV Attack (*M*=4.34) messages. Moderate TU participants significantly evaluated high MSV Attack (*M*=4.77) messages more positively than low MSV Attack (*M*=3.89) messages, and significantly evaluated low MSV Blame (*M*=4.51) messages more positively than high MSV Blame (*M*=3.79) messages. Finally, high TU participants significantly evaluated high MSV Attack (*M*=4.57) messages more positively than low MSV Attack (*M*=3.97) messages, and significantly evaluated low MSV Blame (*M*=4.28) messages more positively than high MSV Blame (*M*=4.30) messages.

Table 20a
Analysis of Variance for Tobacco Use by Message with Aad as Dependent Variable

Source	*Sum of Squares*	*df*	*Mean Square*	*F*	*p*	*Partial eta Squared*	*Power*
Between							
TU	3.90	2	1.95	.66	n.s.	.00	.16
Error	656.38	223	2.94				
Within							
Message	16.81	1	16.81	16.73	.001	.07	.98
Message * TU	7.15	2	3.57	3.55	.05	.03	.65
Error (Message)	224.12	223	1.00				
MSV	5.89	1	5.89	6.74	.01	.02	.73
MSV * TU	.94	2	.47	.54	n.s.	.00	.13
Error (MSV)	195.05	223	.87				
Message * MSV	60.99	1	60.99	62.86	.001	.22	1.0
Message * MSV * TU	9.30	2	4.65	4.79	.01	.04	.79
Error (Message * MSV)	216.38	223	.97				

Notes. Significance criterion used was $p < .05$.

There was also a significant interaction between Message Type and TU, $F(2,223) = 3.55$, $p < .05$, $n^2_p = .03$, power = .65 on Aad. Post hocs using the Bonferroni adjustment

indicated that low TU participants significantly evaluated Attack messages (*M*=4.64) more positively than Blame (*M*=4.10) messages.

Finally, there was a significant interaction between Message Type and MSV, $F(1,223) = 62.86$, $p < .05$, $n^2_p = .22$, power = 1.0 on Aad. Post hocs using the Bonferroni adjustment indicated that participants significantly evaluated high MSV Attack (*M*=4.75) messages more positively than high MSV Blame (*M*=3.96) messages, and low MSV Blame (*M*=4.32) messages more positively than low MSV Attack (*M*=4.07) messages. Finally, participants significantly evaluated high MSV Attack (*M*=4.75) messages more positively than low MSV Attack (*M*=4.07) messages, and low MSV Blame (*M*=4.32) messages more positively than high MSV Blame (*M*=3.96) messages (See Table 20b).

Table 20b
Mean Aad and Standard Deviations for the Three Tobacco Use (TU) Groups for Each Message

	Message			
	Attack		Blame	
Group	High MSV	Low MSV	High MSV	Low MSV
Low TU, *n*= 67				
M	4.93^{ab}	4.34^{b}	4.04^{a}	4.16
SD	1.06	.96	1.00	1.05
Moderate TU, *n*= 89				
M	4.77^{ac}	3.89^{bc}	3.77^{ad}	4.51^{bd}
SD	.81	.79	.88	.85
High TU, *n*= 70				
M	4.57^{ab}	3.97^{b}	4.03^{ac}	4.28^{c}
SD	1.03	.80	.86	.96
Total, *n*= 226				
M	4.75^{ac}	4.07^{bc}	3.96^{ad}	4.32^{bd}
SD	.97	.86	.93	.95

Notes: Higher scores indicate more positive Aad.
Means in the same row sharing the same letter superscript differ at $p < .05$.

This interaction is dependent upon the main effect of Message Type, $F(1,223) = 16.73$, $p < .05$, $n^2_p = .07$, power = .98 on Aad and the main effect of MSV, $F(1,223) = 6.74$, $p < .05$, $n^2_p = .02$, power = .73 on Aad. Post hoc tests using the Bonferroni

adjustment indicated that overall, participants expressed significantly more positive attitudes for Attack (*M*=4.41) versus Blame (*M*=4.14) messages. Participants also expressed significantly more positive attitudes for high MSV (*M*=4.35) versus low MSV (*M*=4.19) messages.

Evaluation of the Argument. In regard to evaluation of the argument, there was a significant interaction between Tobacco Use X Message Type X MSV, $F(2,223) = 11.76$, $p < .01$, $n^2_p = .09$, power = .99 (See Table 21a).

Table 21a
Analysis of Variance for Tobacco Use by Message with Evaluation of the Argument as Dependent Variable

Source	*Sum of Squares*	*df*	*Mean Square*	*F*	*p*	*Partial eta Squared*	*Power*
Between							
TU	8.95	2	4.47	2.62	n.s.	.02	.51
Error	380.38	223	1.70				
Within							
Message	3.19	1	3.19	17.20	.001	.07	.98
Message * TU	3.67	2	1.83	9.90	.001	.08	.98
Error (Message)	41.39	223	.18				
MSV	19.58	1	19.58	135.61	.001	.37	1.0
MSV * TU	1.30	2	.65	4.50	.01	.03	.76
Error (MSV)	32.20	223	.14				
Message * MSV	10.01	1	10.01	74.92	.001	.25	1.0
Message * MSV * TU	3.14	2	1.57	11.76	.001	.09	.99
Error (Message * MSV)	29.81	223	.13				

Notes. Significance criterion used was $p < .01$.

Post hoc tests using the Bonferroni adjustment indicated that moderate TU participants more positively evaluated low MSV Blame (*M*=6.23) versus low MSV Attack (*M*=5.60) messages. In addition, high TU participants more positively evaluated low MSV Blame (*M*=5.95) versus low MSV Attack (*M*=5.62) messages. Low TU

participants more positively evaluated high MSV Attack (*M*=6.35) versus low MSV Attack (*M*=6.09) messages, and high MSV Blame (*M*=6.24) versus low MSV Blame (*M*=6.18) messages. Moderate TU participants more positively evaluated high MSV Attack (*M*=6.33) versus low MSV Attack (*M*=5.60) messages. High TU participants more positively evaluated high MSV Attack (*M*=6.15) versus low MSV Attack (*M*=5.62) messages, and high MSV Blame (*M*=6.07) versus low MSV Blame (*M*=5.95) messages. Moderate TU (*M*=6.23) participants significantly evaluated low MSV Blame messages more positively than high TU (*M*=5.95) participants. Finally, low TU (*M*=6.09) participants significantly evaluated low MSV Attack messages more positively than both moderate TU (*M*=5.60) and high TU (*M*=5.62) participants. Table 21b shows the means and standard deviations for each message by group.

Table 21b
Mean Evaluation of the Argument and Standard Deviations for the Three Tobacco Use (TU) Groups for Each Message

	Message			
	Attack		Blame	
Group	High MSV	Low MSV	High MSV	Low MSV
Low TU, *n*= 67				
M	6.35	6.09	6.24	6.12
SD	.85	.86	.56	.57
Moderate TU, *n*= 89				
M	6.33	5.60[a]	6.24	6.23[a]
SD	.71	.58	.61	.62
High TU, *n*= 70				
M	6.15	5.62	6.07	5.95
SD	.77	.73	.58	.68
Total, *n*= 226				
M	6.28[ac]	5.75[bc]	6.19[ad]	6.11[bd]
SD	.77	.75	.59	.63

Notes: Higher scores indicate more positive Evaluations of the Argument.
Means in the same row sharing the same letter superscript differ at $p < .05$.

There was a significant interaction between MSV and TU, $F(2,223) = 4.50$, $p < .01$, $n^2_p = .07$, power = .98 on evaluation of the argument. Post hoc tests using the

Bonferroni adjustment indicated that low TU participants more positively evaluated high MSV (*M*=6.30) versus low MSV (*M*=6.11) messages, as did moderate TU participants (high MSV *M* = 6.29, low MSV *M*= 5.92) and high TU participants (high MSV *M* = 6.11, low MSV *M*= 5.78). In addition, low TU (*M*=6.11) participants significantly rated low MSV messages more positively than high TU (*M*=5.78) participants.

There was also a significant interaction between Message Type and TU, $F(2,223) = 9.09$, $p < .01$, $n^2_p = .03$, power = .76 on evaluation of the argument. Post hoc tests using the Bonferroni adjustment indicated that moderate TU participants more positively evaluated Blame (*M*=6.24) messages than Attack (*M*=5.96) messages. Likewise, high TU participants more positively evaluated Blame (*M*=6.01) messages than Attack (*M*=5.89) messages. In addition, low TU participants significantly rated Attack (*M*=6.22) messages versus Blame (*M*=5.89) messages more positively than high TU participants.

Finally, there was a significant interaction between Message Type and MSV, $F(1,215) = 18.22$, $p < .05$, $n^2_p = .25$, power = 1.0 on evaluation of the argument. Post hoc tests using the Bonferroni adjustment indicated that participants rated high MSV Attack (*M*=6.28) messages more positively than high MSV Blame (*M*=6.18) messages, and low MSV Blame (*M*=6.10) messages more positively than low MSV Attack (*M*=5.77) messages. They also rated high MSV Attack (*M*=6.28) messages more positively than low MSV Attack (*M*=5.77) messages, and high MSV Blame (*M*=6.18) messages more positively than low MSV Blame (*M*=6.10) messages.

This interaction is dependent upon the main effect of Message Type, $F(1,223) = 17.02$, $p < .01$, $n^2_p = .07$, power = .98 on evaluation of the argument, and the main effect of MSV, $F(1,223) = 135.61$, $p < .01$, $n^2_p = .37$, power = 1.0 on evaluation of the argument.

Post hoc tests using the Bonferroni adjustment indicated that overall, participants expressed significantly more positive evaluations of Blame (*M*=6.14) arguments than Attack (*M*=6.02) arguments. In addition, participants expressed significantly more positive evaluations of high MSV (*M*=6.23) than low MSV (*M*=5.93) message arguments.

Behavioral Intent. In regard to behavioral intent, there was a significant interaction between TU and Message Type, $F(2,223) = 45.94$, $p < .01$, $n^2_p = .29$, power = 1.0 (See Table 22a). Post hocs using the Bonferroni adjustment indicated that low TU participants were significantly less likely to smoke in the future for Attack (*M*=1.19) versus Blame (*M*=1.10) messages as were moderate TU (Attack *M*= 1.43, Blame *M*= 1.11) and high TU (Attack *M*= 2.09, Blame *M*= 2.01) participants. In addition, high TU (*M*=2.09) participants were less likely to smoke in the future than both moderate TU (*M*=1.43) and low TU (*M*=1.19) participants for Attack messages, while moderate TU (*M*=1.43) was significantly less likely than low TU (*M*=1.19). High TU (*M*=2.01) participants were less likely to smoke in the future than moderate TU (*M*=1.11) participants for Blame messages, and high TU (*M*=2.01) participants were less likely to smoke in the future than low TU (*M*=1.10) participants for Blame messages.

Table 22a
Analysis of Variance for Tobacco Use by Message with Behavioral Intent as Dependent Variable

Source	*Sum of Squares*	*df*	*Mean Square*	*F*	*p*	*Partial eta Squared*	*Power*
Between							
TU	137.18	2	68.59	49.70	.001	.30	1.0
Error	307.72	223	1.38				
Within							
Message	5.68	1	5.68	166.99	.001	.42	1.0
Message * TU	3.12	2	1.56	45.94	.001	.29	1.0
Error (Message)	7.59	223	.03				
MSV	.02	1	.02	1.63	n.s.	.00	.24
MSV * TU	.09	2	.04	3.62	n.s.	.03	.66
Error (MSV)	2.97	223	.01				
Message * MSV	.18	1	.18	14.74	.001	.06	.96
Message * MSV * TU	.04	2	.02	1.73	n.s.	.01	.36
Error (Message * MSV)	2.86	223	.01				

Notes. Significance criterion used was $p < .01$.

There was a significant interaction between Message Type and MSV, $F(2,223) = 14.74$, $p < .01$, $n^2_p = .06$, power = .96 on behavioral intent. Post hocs using the Bonferroni adjustment indicated that participants were less likely to smoke in the future for high MSV (*M*=1.59) Attack than high MSV Blame (*M*=1.40) messages, and for low MSV Attack (*M*=1.55) versus low MSV Blame (*M*=1.42) messages. Furthermore, they were less likely to smoke in the future for high MSV Attack (*M*=1.59) versus low MSV Attack (*M*=1.55) messages, and for low MSV Blame (*M*=1.42) versus high MSV Blame (*M*=1.40) messages (See Table 22b).

Table 22b
Mean Behavioral Intent and Standard Deviations for the Three Tobacco Use (TU) Groups for Each Message

	Message			
	Attack		Blame	
Group	High MSV	Low MSV	High MSV	Low MSV
Low TU, *n*= 67				
M	1.20	1.19	1.10	1.11
SD	.32	.31	.22	.24
Moderate TU, *n*= 89				
M	1.44	1.37	1.08	1.07
SD	.22	.22	.26	.22
High TU, *n*= 70				
M	1.85	1.82	1.70	1.76
SD	.62	.57	.67	.67
Total, *n*= 226				
M	1.59^{ac}	1.55^{ad}	1.40^{bc}	1.42^{bd}
SD	.47	.45	.49	.50

Notes: Higher scores indicate greater intent not to smoke in the future.
Means in the same row sharing the same letter superscript differ at $p < .05$.

There was a significant main effect of TU, $F(2,223) = 49.70$, $p < .01$, $n^2_p = .30$, power = 1.0 on behavioral intent. Post hocs using the Bonferroni adjustment indicated that high TU (M=2.05) participants were significantly more likely to indicate that they would not smoke in the future than both moderate TU (M=1.27) and low TU (M=1.14) participants.

Finally, there was a significant main effect of Message Type, $F(2,223) = 166.99$, $p < .01$, $n^2_p = .42$, power = 1.0 on behavioral intent. Post hocs using the Bonferroni adjustment indicated that participants were more likely to state that they would not smoke in the future for Attack (M=1.57) versus Blame (M=1.41) messages.

Effect of TU on Emotional Response

A series of 3 (Tobacco Use- low/moderate/high) X 2 (Message Type – Attack/Blame) X 2 (MSV – low/high) ANOVAs with repeated measures on Message

Type and MSV was performed on participant's emotional response measured by: arousal, positive valence, and negative valence.

Arousal. In regard to arousal, there was a significant interaction of Message Type and MSV, $F(1,223) = 21.58$, $p < .01$, $n^2_p = .08$, power = .99 (See Table 23a).

Table 23a
Analysis of Variance for Tobacco Use by Message with Arousal as Dependent Variable

Source	*Sum of Squares*	*df*	*Mean Square*	*F*	*p*	*Partial eta Squared*	*Power*
Between							
TU	21.94	2	10.97	.74	n.s.	.00	.17
Error	3272.67	223	14.67				
Within							
Message	3.23	1	3.23	6.04	.01	.02	.68
Message * TU	.00	2	.00	.00	n.s.	.00	.05
Error (Message)	119.11	223	.53				
MSV	88.82	1	88.82	98.98	.001	.30	1.0
MSV * TU	1.51	2	.75	.84	n.s.	.00	.19
Error (MSV)	200.11	223	.89				
Message * MSV	9.93	1	9.93	21.58	.001	.08	.99
Message * MSV * TU	2.56	2	1.28	2.78	n.s.	.02	.54
Error (Message * MSV)	102.60	223	.46				

Notes. Significance criterion used was $p < .01$.

Post hocs using the Bonferroni adjustment indicated that participants significantly expressed that low MSV Attack (*M*=3.59) messages were more arousing than low MSV Blame (*M*=3.26) messages. Furthermore, participants also significantly evaluated high MSV Attack (*M*=4.01) messages as more arousing than low MSV Attack (*M*=3.59) messages, and high MSV Blame (*M*=4.10) messages as more arousing than low MSV Blame (*M*=3.26) messages (See Table 23b).

Table 23b
Mean Arousal and Standard Deviations for the Three Tobacco Use (TU) Groups for Each Message

	Message			
	Attack		Blame	
Group	High MSV	Low MSV	High MSV	Low MSV
Low TU, *n*= 67				
M	3.90	3.45	4.02	3.10
SD	2.21	1.95	2.31	1.74
Moderate TU, *n*= 89				
M	3.93	3.49	3.89	3.30
SD	2.30	2.01	2.29	1.80
High TU, *n*= 70				
M	4.16	3.79	4.36	3.37
SD	1.87	1.70	2.22	1.58
Total, *n*= 226				
M	4.01^{a}	3.59^{ac}	4.10^{b}	3.26^{bc}
SD	2.15	1.92	2.28	1.71

Notes: Higher scores indicate higher levels of arousal.
Means in the same row sharing the same letter superscript differ at $p < .05$.

This interaction is dependent upon the main effect of Message Type, $F(1,223) = 6.04$, $p < .01$, $n^2_p = .02$, power = .68 on arousal, and the main effect of MSV, F(1,223) = 98.98, $p < .01$, $n^2_p = .30$, power = 1.0 on arousal. Post hoc tests using the Bonferroni adjustment indicated that overall, participants were more aroused by Attack (*M*=3.80) versus Blame (*M*=3.68) messages. In addition, participants were more aroused by high MSV (*M*=4.06) versus low MSV (*M*=3.43) messages.

Positive Valence. In regard to positive valence of the ad, there was a significant interaction between Tobacco Use X Message Type X MSV, $F(2,223) = 15.83$, $p < .01$, $n^2_p = .12$, power = .99 (See Table 24a). Post hocs using the Bonferroni adjustment indicated that low TU participants significantly evaluated high MSV Attack (*M*=4.63) messages more positively than high MSV Blame (*M*=3.45) messages, and low MSV Attack (*M*=4.83) messages more positively than low MSV Blame (*M*=4.42) messages. Moderate

TU participants significantly evaluated high MSV Attack (*M*=4.35) messages more positively than high MSV Blame (*M*=2.77) messages, and significantly evaluated low MSV Blame (*M*=5.19) messages more positively than low MSV Attack (*M*=4.78) messages. High TU participants significantly evaluated high MSV Attack (*M*=4.65) messages more positively than high MSV Blame (*M*=3.50) messages. In addition, low TU participants significantly evaluated low MSV Attack (*M*=4.83) messages more positively than high MSV Attack (*M*=4.63) messages, and low MSV Blame (*M*=4.42) messages more positively than high MSV Blame (*M*=3.45) messages. Moderate TU participants significantly evaluated low MSV Attack (*M*=4.78) messages more positively than high MSV Attack (*M*=4.35) messages, and significantly evaluated low MSV Blame (*M*=5.19) messages more positively than high MSV Blame (*M*=2.77) messages. High TU participants significantly evaluated low MSV Attack (*M*=4.99) messages more positively than high MSV Attack (*M*=4.65) messages, and significantly evaluated low MSV Blame (*M*=4.85) messages more positively than high MSV Blame (*M*=3.50) messages. Finally, high TU (*M*=3.50) participants had significantly more positive emotional responses for high MSV Blame messages than moderate TU (*M*=2.77) participants, and low TU (*M*=3.45) participants had significantly more positive emotional responses for high MSV Blame messages than moderate TU (*M*=2.77) participants. Moderate TU (*M*=5.19) participants had significantly more positive emotional responses for low MSV Blame messages than low TU (*M*=4.42) participants.

Table 24a
Analysis of Variance for Tobacco Use by Message with Positive Valence as Dependent Variable

Source	*Sum of Squares*	*df*	*Mean Square*	*F*	*p*	*Partial eta Squared*	*Power*
Between							
TU	8.47	2	4.23	1.06	n.s.	.00	.23
Error	887.65	223	3.98				
Within							
Message	101.76	1	101.76	107.73	.001	.32	1.0
Message * TU	1.81	2	.90	.95	n.s.	.00	.21
Error (Message)	210.64	223	.94				
MSV	200.62	1	200.62	307.18	.001	.57	1.0
MSV * TU	29.34	2	14.67	22.46	.001	.16	1.0
Error (MSV)	145.64	223	.65				
Message * MSV	87.87	1	87.87	167.11	.001	.42	1.0
Message * MSV * TU	16.65	2	8.32	15.83	.001	.12	.99
Error (Message * MSV)	117.25	223	.52				

Notes. Significance criterion used was $p < .01$.

There was also a significant interaction between MSV and TU, $F(2,223) = 22.46$, $p < .01$, $n^2_p = .16$, power = 1.0 on positive valence. Post hocs using the Bonferroni adjustment indicated that low TU participants had more positive emotional responses to low MSV (M=4.62) than high MSV (M=4.04) messages; moderate TU participants had more positive emotional responses to low MSV (M=4.98) than high MSV (M=3.56) messages; and high TU participants had more positive emotional responses to low MSV (M=4.92) than high MSV (M=4.08) messages. In addition, low TU (M=4.04) participants had significantly more positive responses to high MSV messages than moderate TU (M=3.56) participants, while high TU (M=4.08) participants also had significantly more positive responses to high MSV messages than moderate TU (M=3.56) participants.

Finally, there was a significant interaction between Message Type and MSV, $F(1,223) = 167.11$, $p < .01$, $n^2_p = .42$, power = 1.0 on positive valence. Post hocs using the Bonferroni adjustment indicated that participants had significantly more positive

emotional responses to high MSV Attack (*M*=4.54) messages than high MSV Blame (*M*=3.24) messages. Participants also had significantly more positive emotional responses to low MSV Attack (*M*=4.86) messages than high MSV Attack (*M*=4.54) messages, and low MSV Blame (*M*=4.82) messages more positive than high MSV Blame (*M*=3.24) messages (See Table 24b).

Table 24b
Mean Positive Valence and Standard Deviations for the Three Tobacco Use (TU) Groups for Each Message

	Message			
	Attack		Blame	
Group	High MSV	Low MSV	High MSV	Low MSV
Low TU, *n*= 67				
M	4.69	4.91	3.31	4.33
SD	.89	.61	1.40	1.39
Moderate TU, *n*= 89				
M	4.30	4.71	2.71	5.13
SD	.86	1.00	.87	1.43
High TU, *n*= 70				
M	4.70	5.04	3.50	4.84
SD	.96	.82	1.18	1.59
Total, *n*= 226				
M	4.54^{ab}	4.87^{6b}	3.24^{ac}	4.82^{c}
SD	.92	.86	1.18	1.50

Notes: Higher scores indicate more positive emotional responses.
Means in the same row sharing the same letter superscript differ at $p < .05$.

This interaction is dependent upon the main effect of Message Type, $F(1,223) = 107.73$, $p < .01$, $n^2_p = .32$, power = 1.0 on positive valence, and the main effect of MSV, $F(1,223) = 307.18$, $p < .01$, $n^2_p = .57$, power = 1.0 on positive valence. Post hoc tests using the Bonferroni adjustment indicated that overall, participants expressed significantly more positive responses for Attack (*M*=4.70) versus Blame (*M*=4.03) messages. Participants also expressed significantly more positive responses for low MSV (*M*=4.84) versus high MSV (*M*=3.89) messages.

Negative Valence. In regard to negative valence of the ad, there was a significant interaction for Tobacco Use X Message Type X MSV, $F(2,223) = 12.31$, $p < .01$, $n^2_p = .93$, power = .99 (See Table 25a). Post hocs using the Bonferroni adjustment indicated that participants low TU participants significantly evaluated high MSV Blame (*M*=5.08) messages more negatively than high MSV Attack (*M*=4.09) messages. Moderate TU participants significantly evaluated high MSV Blame (*M*=5.58) messages more negatively than high MSV Attack (*M*=4.15) messages, and significantly evaluated low MSV Attack (*M*=4.14) messages more negatively than low MSV Blame (*M*=3.69) messages. High TU participants significantly evaluated high MSV Blame (*M*=5.17) messages more negatively than high MSV Attack (*M*=4.08) messages. In addition, low TU participants significantly evaluated high MSV Attack (*M*=4.09) messages more negatively than low MSV Attack (*M*=3.79) messages, and high MSV Blame (*M*=5.08) messages more negatively than low MSV Blame (*M*=3.90) messages. Moderate TU participants significantly evaluated high MSV Blame (*M*=5.68) messages more negatively than low MSV Blame (*M*=3.69) messages. High TU participants significantly evaluated high MSV Blame (*M*=5.17) messages more negatively than low MSV Blame (*M*=3.97) messages. Finally, moderate TU (*M*=5.68) participants had significantly more negative emotional responses for high MSV Blame messages than low TU (*M*=5.08) participants.

Table 25a
Analysis of Variance for Tobacco Use by Message with Negative Valence as Dependent Variable

Source	*Sum of Squares*	*df*	*Mean Square*	*F*	*p*	*Partial eta Squared*	*Power*
Between							
TU	6.38	2	3.19	.83	n.s.	.00	.19
Error	850.75	223	3.81				
Within							
Message	66.38	1	66.38	64.43	.001	.22	1.0
Message * TU	.017	2	.00	.00	n.s.	.00	.05
Error (Message)	229.74	223	1.03				
MSV	141.67	1	141.67	190.27	.001	.46	1.0
MSV * TU	5.33	2	2.66	3.58	n.s.	.03	.66
Error (MSV)	166.05	223	.74				
Message * MSV	97.00	1	97.00	173.50	.001	.43	1.0
Message * MSV * TU	13.77	2	6.88	12.31	.001	.09	.99
Error (Message * MSV)	124.67	223	.55				

Notes. Significance criterion used was $p < .01$.

There was also a significant interaction between Message Type and MSV, $F(1,223) = 173.50$, $p < .01$, $n^2_p = .43$, power = 1.0 on negative valence. Post hocs using the Bonferroni adjustment indicated that participants significantly evaluated high MSV Blame (M=5.31) messages more negatively than high MSV Attack (M=4.10) messages. Finally, participants significantly evaluated high MSV Attack (M=4.10) messages more negatively than low MSV Attack (M=3.97) messages, and low MSV Blame (M=5.31) messages more negatively than high MSV Blame (M=3.85) messages (See Table 25b).

Table 25b
Mean Negative Valence and Standard Deviations for the Three Tobacco Use (TU) Groups for Each Message

	Message			
	Attack		Blame	
Group	High MSV	Low MSV	High MSV	Low MSV
Low TU, *n*= 67				
M	4.02	3.72	5.09	3.87
SD	.91	.77	1.49	1.52
Moderate TU, *n*= 89				
M	4.15	4.10	5.72	3.68
SD	.87	1.06	1.33	1.44
High TU, *n*= 70				
M	4.08	3.94	5.20	3.86
SD	.73	.82	1.18	1.41
Total, *n*= 226				
M	4.10^{ab}	3.97^{b}	5.31^{ac}	3.85^{c}
SD	.84	.92	1.36	1.45

Notes: Higher scores indicate more negative emotional responses.
Means in the same row sharing the same letter superscript differ at $p < .05$.

This interaction is dependent upon the main effect of Message Type, $F(1,223) = 64.43$, $p < .01$, $n^2_p = .22$, power = 1.0 on negative valence, and the main effect of MSV, $F(1,223) = 190.27$, $p < .01$, $n^2_p = .46$, power = 1.0 on negative valence. Post hoc tests using the Bonferroni adjustment indicated that overall, participants expressed significantly more negative emotional responses for Blame (M=4.58) versus Attack (M=4.04) messages. Participants also expressed significantly more negative responses for high MSV (M=4.71) versus low MSV (M=3.91) messages.

General Results Regarding Sensation Seeking

Although not hypothesized, Sensation Seeking (SS) was examined as an independent variable which could have affected the continuous dependent variables of STRTs, recognition memory, response latency, persuasiveness of the ad, and emotional response to the ad. As noted earlier, SS was broken into two categories: low (n=119) and

high (n=107) with each representing an individual's overall sensation seeking tendencies. For each repeated measures ANOVA interactions and main effects of SS on the dependent variables were examined and reported only when significant. When an interaction between group (low/ high SS), Message Type (Attack/Blame), and MSV (high/low) was present, post hocs were conducted to examine simple interactions of 1) *Group* = whether participants in a specific SS group differed across messages, 2) *Message Type* = whether compared groups differed for Attack/Blame messages, and 3) *MSV* = whether compared groups differed for high/low MSV messages.

Effect of SS on Secondary Task Reaction Time

A 2 (Sensation Seeking – low/high) X 2 (Message Type – Attack/Blame) X 2 (MSV – low/high) ANOVA with repeated measures on Message Type and MSV was performed on participant's STRTs. There was a significant interaction between Message Type and MSV, $F(1,224) = 70.89$, $p < .01$, $n^2_p = .24$, power = 1.0 on STRT (See Table 26a).

Table 26a
Analysis of Variance for Sensation Seeking by Message with STRTs as Dependent Variable

Source	*Sum of Squares*	*df*	*Mean Square*	*F*	*p*	*Partial eta Squared*	*Power*
Between							
SS	6775.60	1	6775.60	.64	n.s.	.00	.12
Error	2354217.25	224	10509.89				
Within							
Message	64035.67	1	64035.67	63.08	.001	.22	1.00
Message * SS	619.17	1	619.17	.61	n.s.	.00	.12
Error (Message)	227382.31	224	1015.10				
MSV	123912.70	1	123912.70	147.31	.001	.39	1.00
MSV * SS	2341.71	1	2341.71	2.78	n.s.	.01	.38
Error (MSV)	188412.33	224	841.12				
Message * MSV	64930.99	1	64930.99	70.89	.001	.24	1.00
Message * MSV * SS	73.86	1	73.86	.08	n.s.	.00	.05
Error (Message * MSV)	205159.17	224	915.88				

Notes. Significance criterion used was $p < .01$.

Post hoc tests using the Bonferroni adjustment indicated that participants had significantly faster STRTs for high MSV Attack (*M*=468.38) versus high MSV Blame (*M*=502.15) messages. In addition, participants had significantly faster STRTs for low MSV Blame (*M*=461.87) versus high MSV Blame (*M*=502.15) messages (See Table 26b).

Table 26b
Mean STRTs and Standard Deviations for the Two Sensation Seeking (SS) Groups for Each Message

	Message			
	Attack		Blame	
Group	High MSV	Low MSV	High MSV	Low MSV
Low SS, *n*= 119				
M	469.96	467.28	502.70	464.93
SD	56.96	61.57	54.18	51.96
High SS, *n*=107				
M	466.61	456.34	501.53	458.46
SD	58.44	66.74	55.35	55.00
Total, *n*= 226				
M	468.38 [a]	462.10	502.15 [ab]	461.87 [b]
SD	57.56	64.165	54.62	53.40

Notes: Lower scores indicate faster STRTs.
Means in the same row sharing the same letter superscript differ at $p < .05$.

This interaction is dependent upon the main effect of Message Type, $F(1,224) = 63.08$, $p < .01$, $n^2_p = .22$, power = 1.0 on STRT and the main effect of MSV, $F(1,224) = 147.31$, $p < .01$, $n^2_p = .39$, power = 1.0 on STRT. Post hoc tests using the Bonferroni adjustment indicated that participants had significantly faster STRTs for Attack (*M*=465.05) versus Blame (*M*=481.91) messages. In addition, they had significantly faster STRTs for low MSV (*M*=461.75) versus high MSV (*M*=485.20) messages.

Effect of SS on Recognition Memory

A series of 2 (Sensation Seeking – low/high) X 2 (Message Type – Attack/Blame) X 2 (MSV – low/high) ANOVAs with repeated measures on Message Type and MSV was performed on participant's recognition memory measured by: hits, response latency, A', and B''.

Recognition Memory Accuracy (Hits). In regard to average hits there was a significant main effect of Message Type, $F(1,224) = 40.12$, $p < .05$, $n^2_p = .15$, power = 1.0 on recognition memory accuracy. There was also a significant main effect of MSV, $F(1,224) = 5.49$, $p < .05$, $n^2_p = .02$, power = .64 on recognition memory accuracy (See Table 27a).

Table 27a
Analysis of Variance for Sensation Seeking by Message with Recognition Memory Accuracy (Hits) as Dependent Variable

Source	*Sum of Squares*	*df*	*Mean Square*	*F*	*p*	*Partial eta Squared*	*Power*
Between							
SS	.05	1	.05	1.99	n.s.	.00	.29
Error	6.32	214	.03				
Within							
Message	.51	1	.51	40.12	.001	.15	1.00
Message * SS	.00	1	.00	.07	n.s.	.00	.05
Error (Message)	2.72	214	.01				
MSV	.06	1	.06	5.49	.02	.02	.64
MSV * SS	.01	1	.01	.83	n.s.	.00	.14
Error (MSV)	2.50	214	.01				
Message * MSV	.00	1	.00	.23	n.s.	.00	.07
Message * MSV * SS	.04	1	.04	3.36	n.s.	.01	.44
Error (Message * MSV)	2.81	214	.01				

Notes. Significance criterion used was $p < .05$.

Post hocs using the Bonferroni adjustment indicated that participants exhibited significantly more hits for Attack (*M*=.83) than Blame (*M*=.78) messages. In addition, participants exhibited significantly more hits for high MSV (*M*=.82) than low MSV (*M*=.80) messages (See Table 27b).

Table 27b
Mean Recognition Memory Accuracy (Hits) and Standard Deviations for the Two Sensation Seeking (SS) Groups for Each Message

	Message			
	Attack		Blame	
Group	High MSV	Low MSV	High MSV	Low MSV
Low SS, *n*= 114				
M	.84	.82	.77	.77
SD	.13	.13	.12	.13
High SS, *n*=102				
M	.84	.84	.81	.77
SD	.12	.13	.10	.12
Total, *n*= 216*				
M	.84	.83	.79	.77
SD	.13	.13	.11	.13

Notes: Higher scores indicate greater recognition accuracy.
*Following examination of standardized residuals and a case analysis, a total of 10 outliers were removed before performing the repeated measures ANOVA.

Response Latency. In regard to response latency, there was a significant interaction between Message Type and SS, $F(1,213) = 6.46$, $p < .01$, $n^2_p = .02$, power = .71 on response latency (See Table 28a). Post hoc tests using the Bonferroni adjustment indicated that low SS participants had significantly faster response times for Blame (*M*=2262.53) versus Attack (*M*=2382.36) messages. In addition, high SS participants had significantly faster response times for Blame (*M*=2274.19) versus Attack (*M*=2326.62) messages.

Table 28a
Analysis of Variance for Sensation Seeking by Message with Recognition Memory Response Latency as Dependent Variable

Source	*Sum of Squares*	*df*	*Mean Square*	*F*	*p*	*Partial eta Squared*	*Power*
Between							
SS	104061.31	1	104061.31	.22	n.s.	.00	.07
Error	98072316.65	213	460433.41				
Within							
Message	1589095.98	1	1589095.98	42.25	.001	.16	1.00
Message * SS	243268.45	1	243268.45	6.46	.01	.02	.71
Error (Message)	8009988.17	213	37605.57				
MSV	34262.82	1	34262.82	.71	n.s.	.00	.13
MSV * SS	1907.58	1	1907.58	.04	n.s.	.00	.05
Error (MSV)	10271922.06	213	48224.98				
Message * MSV	48210.12	1	48210.12	.99	n.s.	.00	.16
Message * MSV * SS	126330.28	1	126330.28	2.59	n.s.	.01	.36
Error (Message * MSV)	10376379.98	213	48715.39				

Notes. Significance criterion used was $p < .01$.

There was also a significant main effect of Message Type, $F(1,213) = 42.25$, $p < .01$, $n^2_p = .16$, power = 1.0 on response latency. Post hocs using the Bonferroni adjustment indicated that participants exhibited significantly faster response times for Blame (M=2268.36) than Attack (M=2354.49) messages (See Table 28b).

Table 28b
Mean Recognition Memory Response Latency and Standard Deviations for the Two Sensation Seeking (SS) Groups for Each Message

	Message			
	Attack		Blame	
Group	High MSV	Low MSV	High MSV	Low MSV
Low SS, *n*= 114				
M	2354.90	2409.82	2274.36	2250.70
SD	332.13	414.32	364.47	356.96
High SS, *n*=101				
M	2326.43	2326.81	2264.71	2283.66
SD	347.92	412.06	392.68	457.72
Total, *n*= 215*				
M	2341.52	2370.82	2269.83	2266.18
SD	339.14	414.38	377.13	406.76

Notes: Lower scores indicate faster response times.
*Following examination of standardized residuals and a case analysis, a total of 11 outliers were removed before performing the repeated measures ANOVA.

Recognition Memory Sensitivity (A'). In regard to A'[14] or sensitivity of the recognition measure, interaction among Message Type X MSV X SS, $F(1,216) = 4.11$, $p < .05$, $n^2_p = .01$, power = .52 on recognition memory sensitivity (See Table 29a). Post hoc tests using the Bonferroni adjustment indicated that high SS participants (*M*=.90) exhibited significantly more sensitive decisions for high MSV Blame messages than low SS participants (*M*=.88). Furthermore, low SS participants exhibited significantly more sensitive decisions for high MSV Attack (*M*=.90) versus high MSV Blame (*M*=.88) messages. Low SS participants also exhibited significantly more sensitive decisions for low MSV Attack (*M*=.89) versus low MSV Blame (*M*=.88) messages. In addition, high SS participants exhibited significantly more sensitive decisions for low MSV Attack (*M*=.90) versus low MSV Blame (*M*=.88) messages. High SS participants also exhibited significantly more sensitive decisions for low MSV Blame (*M*=.90) versus high MSV Blame (*M*=.88) messages.

[14] Hits > False Alarms, so the formula used to calculate A' was A' = ½ + [(H-F) * (1+H-F)/ 4H(1-F)].

Table 29a
Analysis of Variance for Sensation Seeking by Message with Recognition Memory Sensitivity (A') as Dependent Variable

Source	*Sum of Squares*	*df*	*Mean Square*	*F*	*p*	*Partial eta Squared*	*Power*
Between							
SS	.02	1	.02	1.60	n.s.	.00	.24
Error	2.62	216	.01				
Within							
Message	.05	1	.05	29.75	.001	.12	1.00
Message * SS	.00	1	.00	.01	n.s.	.00	.05
Error (Message)	.41	216	.00				
MSV	.00	1	.00	1.86	n.s.	.00	.27
MSV * SS	.00	1	.00	.93	n.s.	.00	.16
Error (MSV)	.37	216	.00				
Message * MSV	.00	1	.00	.62	n.s.	.00	.12
Message * MSV * SS	.00	1	.00	4.11	.05	.01	.52
Error (Message * MSV)	.39	216	.00				

Notes. Significance criterion used was $p < .05$.

There was also a significant main effect of Message Type, $F(1,216) = 29.75$, $p < .05$, $n^2_p = .12$, power = 1.0 on recognition memory sensitivity. Post hocs using the Bonferroni adjustment indicated that participants exhibited significantly more sensitive decisions for Attack (M=.90) versus Blame (M=.88) messages (See Table 29b).

Table 29b

Mean Recognition Memory Sensitivity (A') and Standard Deviations for the Two Sensation Seeking (SS) Groups for Each Message

	Message			
	Attack		Blame	
Group	High MSV	Low MSV	High MSV	Low MSV
Low SS, *n*= 114				
M	$.90^{a}$	$.89^{b}$	$.88^{a}_{e}$	$.88^{b}$
SD	.07	.06	.06	.06
High SS, *n*=104				
M	.90	$.90^{d}$	$.90^{c}_{e}$	$.88^{cd}$
SD	.06	.05	.05	.06
Total, *n*= 218*				
M	.90	.90	.89	.88
SD	.07	.06	.06	.06

Notes: Higher scores indicate greater recognition sensitivity.
Means in the same row sharing the same letter superscript differ at $p < .05$.
Means in the same column sharing the same letter subscript differ at $p < .05$.
*Following examination of standardized residuals and a case analysis, a total of 8 outliers were removed before performing the repeated measures ANOVA.

Recognition Memory Response Bias (B"). In regard to B"[15] or participants' tendency to say "no" (i.e., be conservative with their answers) during the recognition task, there was a significant main effect of Message Type, $F(1,224) = 47.95$, $p < .05$, $n^2_p = .17$, power = 1.0 on recognition memory response bias (See Table 30a).

[15] Hits > False Alarms, so the formula used to calculate B" was B" = [H(1-H) – F(1-F)] / [H(1-H) + F(1-F)].

Table 30a
Analysis of Variance for Sensation Seeking by Message with Recognition Memory Response Bias (B") as Dependent Variable

Source	*Sum of Squares*	*df*	*Mean Square*	*F*	*p*	*Partial eta Squared*	*Power*
Between							
SS	.01	1	.01	.02	n.s.	.00	.05
Error	129.61	224	.57				
Within							
Message	7.10	1	7.10	47.95	.001	.17	1.00
Message * SS	.00	1	.00	.03	n.s.	.00	.05
Error (Message)	33.16	224	.14				
MSV	.36	1	.36	2.46	n.s.	.01	.34
MSV * SS	.00	1	.00	.02	n.s.	.00	.05
Error (MSV)	33.49	224	.15				
Message * MSV	.12	1	.12	.76	n.s.	.00	.14
Message * MSV * SS	.26	1	.26	1.60	n.s.	.00	.24
Error (Message * MSV)	37.17	224	.16				

Notes. Significance criterion used was $p < .05$.

Post hocs using the Bonferroni adjustment indicated that participants exhibited significantly greater tendency to say "no" to Blame (*M*=.11) versus Attack (*M*=-.06) messages (See Table 30b).

Table 30b
Mean Recognition Memory Response Bias (B") and Standard Deviations for the Two Sensation Seeking (SS) Groups for Each Message

	Message			
	Attack		Blame	
Group	High MSV	Low MSV	High MSV	Low MSV
Low SS, *n*= 119				
M	-.12	-.01	.12	.10
SD	.53	.52	.44	.46
High SS, *n*=107				
M	-.06	-.04	.09	.13
SD	.58	.57	.48	.45
Total, *n*= 226				
M	-.09	-.02	.10	.12
SD	.55	.54	.46	.46

Notes: Higher scores indicate greater propensity to say "no" or be conservative.

Effect of SS on Persuasiveness

A series of 2 (Sensation Seeking – low/high) X 2 (Message Type – Attack/Blame) X 2 (MSV – low/high) ANOVAs with repeated measures on Message Type and MSV was performed on participant's persuasive response measured by: attitude toward the ad (Aad), evaluation of the ad, and behavioral intent.

Attitude Toward the Ad. In regard to Aad, there was a significant interaction between SS X MSV, $F(1,217) = 4.49$, $p < .05$, $n^2_p = .02$, power = .55 (See Table 31a). Post hocs using the Bonferroni adjustment indicated that high SS participants significantly evaluated high MSV (M=4.46) messages more positively than low MSV (M=4.16) messages.

Table 31a
Analysis of Variance for Sensation Seeking by Message with Aad as Dependent Variable

Source	*Sum of Squares*	*df*	*Mean Square*	*F*	*p*	*Partial eta Squared*	*Power*
Between							
SS	.20	1	.20	.07	n.s.	.00	.05
Error	560.18	217	2.58				
Within							
Message	18.09	1	18.09	17.67	.001	.07	.98
Message * SS	.03	1	.03	.03	n.s.	.00	.05
Error (Message)	222.15	217	1.02				
MSV	6.68	1	6.68	7.78	.01	.03	.79
MSV * SS	3.85	1	3.85	4.49	.05	.02	.55
Error (MSV)	186.36	217	.85				
Message * MSV	65.87	1	65.87	66.70	.001	.23	1.00
Message * MSV * SS	.47	1	.47	.48	n.s.	.00	.10
Error (Message * MSV)	214.31	217	.98				

Notes. Significance criterion used was $p < .05$.

There was also a significant interaction between Message Type and MSV, $F(1,217) = 66.70$, $p < .05$, $n^2_p = .23$, power = 1.0 on Aad. Post hocs using the Bonferroni

adjustment indicated that participants significantly evaluated high MSV Attack (*M*=4.83) messages more positively than high MSV Blame (*M*=3.99) messages, and low MSV Blame (*M*=4.37) messages more positively than low MSV Attack (*M*=4.11) messages. Finally, participants significantly evaluated high MSV Attack (*M*=4.83) messages more positively than low MSV Attack (*M*=4.11) messages, and low MSV Blame (*M*=4.37) messages more positively than high MSV Blame (*M*=3.99) messages (See Table 31b).

Table 31b
Mean Aad and Standard Deviations for the Two Sensation Seeking (SS) Groups for Each Message

	Message			
	Attack		Blame	
Group	High MSV	Low MSV	High MSV	Low MSV
Low SS, *n*= 117				
M	4.80	4.16	3.92	4.48
SD	.93	1.62	.95	.98
High SS, *n*= 102				
M	4.86	4.05	4.06	4.26
SD	.90	1.69	.95	.94
Total, *n*= 219*				
M	4.83^{ac}	4.11^{bc}	3.99^{ad}	4.37^{bd}
SD	.92	1.65	.95	.97

Notes: Higher scores indicate more positive responses to the ad.
Means in the same row sharing the same letter superscript differ at $p < .05$.
*Following examination of standardized residuals and a case analysis, a total of 7 outliers were removed before performing the repeated measures ANOVA.

This interaction is dependent upon the main effect of Message Type, $F(1,217) = 17.67$, $p < .05$, $n^2_p = .07$, power = .98 on Aad and the main effect of MSV, $F(1,217) = 7.87$, $p < .05$, $n^2_p = .03$, power = .79 on Aad. Post hoc tests using the Bonferroni adjustment indicated that overall, participants expressed significantly more positive attitudes for Attack (*M*=4.47) versus Blame (*M*=4.18) messages. Participants also expressed significantly more positive attitudes for high MSV (*M*=4.41) versus low MSV (*M*=4.24) messages.

Evaluation of the Argument. In regard to evaluation of the argument, there was a significant interaction between SS X MSV, $F(1,216) = 4.19$, $p < .05$, $n^2_p = .01$, power = .53 (See Table 32a). Post hoc tests using the Bonferroni adjustment indicated that low SS participants more positively evaluated the arguments of high MSV (M=6.30) versus low MSV (M=6.04) messages. In addition, high SS participants more positively evaluated the arguments of high MSV (M=6.28) versus low MSV (M=5.92) messages.

Table 32a
Analysis of Variance for Sensation Seeking by Message with Evaluation of the Argument as Dependent Variable

Source	*Sum of Squares*	*df*	*Mean Square*	*F*	*p*	*Partial eta Squared*	*Power*
Between							
SS	1.06	1	1.06	.71	n.s.	.00	.13
Error	320.06	216	1.48				
Within							
Message	3.63	1	3.63	22.72	.001	.09	.99
Message * SS	.19	1	.19	1.19	n.s.	.00	.19
Error (Message)	34.55	216	.16				
MSV	20.67	1	20.67	159.75	.001	.42	1.00
MSV * SS	.54	1	.54	4.19	.05	.01	.53
Error (MSV)	27.95	216	.12				
Message * MSV	12.78	1	12.78	94.58	.001	.30	1.00
Message * MSV * SS	.15	1	.15	1.14	n.s.	.00	.18
Error (Message * MSV)	29.19	216	.13				

Notes. Significance criterion used was $p < .05$.

There was also a significant interaction between Message Type and MSV, $F(1,216) = 94.58$, $p < .05$, $n^2_p = .30$, power = 1.0 on evaluation of the argument. Post hocs using the Bonferroni adjustment indicated that participants were significantly more positive in their evaluation of the argument for high MSV Attack (M=6.34) messages more positively than high MSV Blame (M=6.23) messages, and the arguments of low

MSV Blame (*M*=6.17) messages more positively than low MSV Attack (*M*=5.79) messages. Finally, participants significantly evaluated the arguments of high MSV Attack (*M*=6.34) messages more positively than low MSV Attack (*M*=5.79) messages, and the arguments of high MSV Blame (*M*=6.23) messages more positively than low MSV Blame (*M*=6.17) messages (See Table 32b).

Table 32b
Mean Evaluation of the Argument and Standard Deviations for the Two Sensation Seeking (SS) Groups for Each Message

	Message			
	Attack		Blame	
Group	High MSV	Low MSV	High MSV	Low MSV
Low SS, *n*= 116				
M	6.32	5.85	6.27	6.22
SD	.75	.74	.58	.60
High SS, *n*= 102				
M	6.36	5.73	6.19	6.10
SD	.79	.76	.59	.64
Total, *n*= 218*				
M	6.34^{ac}	5.79^{bc}	6.23^{ad}	6.17^{bd}
SD	.77	.75	.58	.62

Notes: Higher scores indicate more positive evaluation of the argument.
Means in the same row sharing the same letter superscript differ at $p < .05$.
*Following examination of standardized residuals and a case analysis, a total of 8 outliers were removed before performing the repeated measures ANOVA.

This interaction is dependent upon the main effect of Message Type, $F(1,216) = 22.72$, $p < .05$, $n^2_p = .09$, power = .99 on evaluation of the argument and the main effect of MSV, $F(1,216) = 159.75$, $p < .05$, $n^2_p = .42$, power = 1.0 on evaluation of the argument. Post hoc tests using the Bonferroni adjustment indicated that participants were significantly more positive in their evaluation of the argument for Blame (*M*=6.20) versus Attack (*M*=6.07) messages. Participants also more positively evaluated of the arguments of high MSV (*M*=6.29) versus low MSV (*M*=5.98) messages.

Behavioral Intent. In regard to behavioral intent, there was a significant interaction between Message Type and MSV, $F(1,212) = 17.62$, $p < .01$, $n^2_p = .07$, power = .98 on behavioral intent (See Table 33a).

Table 33a
Analysis of Variance for Sensation Seeking by Message with Behavioral Intent as Dependent Variable

Source	*Sum of Squares*	*df*	*Mean Square*	*F*	*p*	*Partial eta Squared*	*Power*
Between							
SS	11.03	1	11.03	14.36	.001	.06	.96
Error	162.87	212	.76				
Within							
Message	7.97	1	7.97	203.97	.001	.49	1.00
Message * SS	.00	1	.00	.01	n.s.	.00	.05
Error (Message)	8.29	212	.03				
MSV	.07	1	.07	5.90	.01	.02	.67
MSV * SS	.00	1	.00	.00	n.s.	.00	.05
Error (MSV)	2.52	212	.01				
Message * MSV	.17	1	.17	17.62	.001	.07	.98
Message * MSV * SS	.00	1	.00	.36	n.s.	.002	.09
Error (Message * MSV)	2.12	212	.01				

Notes. Significance criterion used was $p < .01$.

Post hoc tests using the Bonferroni adjustment indicated that participants were less likely to smoke in the future for high MSV Attack (*M*=1.47) versus low MSV Attack (*M*=1.42) messages. In addition, participants were less likely to smoke in the future for high MSV Attack (*M*=1.47) versus high MSV Blame (*M*=1.25) messages and low MSV Attack (*M*=1.42) versus low MSV Blame (*M*=1.26) messages (See Table 33b).

Table 33b
Mean Behavioral Intent and Standard Deviations for the Two Sensation Seeking (SS) Groups for Each Message

	Message			
	Attack		Blame	
Group	High MSV	Low MSV	High MSV	Low MSV
Low SS, *n*= 116				
M	1.36	1.32	1.15	1.15
SD	.37	.33	.34	.36
High SS, *n*= 98				
M	1.60	1.55	1.37	1.38
SD	.53	.51	.58	.57
Total, *n*= 214*				
M	1.47^{ab}	1.42^{ac}	1.25^{b}	1.26^{c}
SD	.46	.44	.48	.48

Notes: Higher scores indicate greater intent not to smoke in the future.
Means in the same row sharing the same letter superscript differ at $p < .05$.
*Following examination of standardized residuals and a case analysis, a total of 12 outliers were removed before performing the repeated measures ANOVA.

This interaction is dependent upon the main effect of Message Type, $F(1,212) = 203.97$, $p < .01$, $n^2_p = .49$, power = 1.0 on behavioral intent, and the main effect of MSV, $F(1,212) = 5.90$, $p < .01$, $n^2_p = .02$, power = .67 on behavioral intent. Post hoc tests using the Bonferroni adjustment indicated that participants were less likely to smoke in the future for Attack (M=1.46) versus Blame (M=1.26) messages. In addition, they were less likely to smoke in the future for high MSV (M=1.37) versus low MSV (M=1.35) messages.

Finally, there was a significant main effect of SS, $F(1,212) = 14.36$, $p < .01$, $n^2_p = .06$, power = .96 on behavioral intent. Post hoc tests using the Bonferroni adjustment showed that high SS participants (M=1.47) indicated that they were less likely to smoke in the future than low SS participants (M=1.25).

Effect of SS on Emotional Response

A series of 2 (Sensation Seeking- low/high) X 2 (Message Type – Attack/Blame) X 2 (MSV – low/high) ANOVAs with repeated measures on Message Type and MSV was performed on participant's emotional response measured by: arousal, positive valence, and negative valence.

Arousal. In regard to arousal, there was a significant interaction of Message Type and MSV, $F(1,224) = 19.81$, $p < .01$, $n^2_p = .08$, power = .99 on arousal (See Table 34a).

Table 34a
Analysis of Variance for Sensation Seeking by Message with Arousal as Dependent Variable

Source	*Sum of Squares*	*df*	*Mean Square*	*F*	*p*	*Partial eta Squared*	*Power*
Between							
SS	44.63	1	44.63	3.07	n.s.	.01	.41
Error	3249.98	224	14.50				
Within							
Message	3.36	1	3.36	6.35	.01	.02	.70
Message * SS	.43	1	.43	.82	n.s.	.00	.14
Error (Message)	118.68	224	.53				
MSV	88.33	1	88.33	98.88	.001	.30	1.00
MSV * SS	1.52	1	1.52	1.71	n.s.	.00	.25
Error (MSV)	200.09	224	.89				
Message * MSV	9.24	1	9.24	19.81	.001	.08	.99
Message * MSV * SS	.69	1	.69	1.48	n.s.	.00	.22
Error (Message * MSV)	104.47	224	.46				

Notes. Significance criterion used was $p < .05$.

Post hocs using the Bonferroni adjustment indicated that participants significantly expressed that low MSV Attack (M=3.59) messages were more arousing than low MSV Blame (M=3.27) messages. Furthermore, participants also significantly evaluated high MSV Attack (M=4.01) messages as more arousing than low MSV Attack (M=3.59)

messages, and high MSV Blame (*M*=4.09) messages as more arousing than low MSV Blame (*M*=3.27) messages (See Table 34b).

Table 34b
Mean Arousal and Standard Deviations for the Two Sensation Seeking (SS) Groups for Each Message

	Message			
	Attack		Blame	
Group	High MSV	Low MSV	High MSV	Low MSV
Low SS, *n*= 119				
M	3.76	3.37	3.83	3.14
SD	2.15	1.91	2.30	1.71
High SS, *n*= 107				
M	4.28	3.83	4.37	3.40
SD	2.13	1.92	2.25	1.71
Total, *n*= 226				
M	4.01^{b}	3.59^{ab}	4.09^{c}	3.27^{ac}
SD	2.15	1.92	2.28	1.71

Notes: Higher scores indicate higher levels of arousal.
Means in the same row sharing the same letter superscript differ at $p < .05$.

This interaction is dependent upon the main effect of Message Type, $F(1,224) = .35$, $p < .01$, $n^2_p = .02$, power = .70 on arousal, and the main effect of MSV, $F(1,224) = 99.88$, $p < .01$, $n^2_p = .30$, power = 1.0 on arousal. Post hoc tests using the Bonferroni adjustment indicated that participants overall, participants were more aroused by Attack (*M*=3.81) versus Blame (*M*=3.69) messages. In addition, participants were more aroused by high MSV (*M*=4.06) versus low MSV (*M*=3.44) messages.

Positive Valence. In regard to emotional response, there was a significant interaction of Message Type and MSV, $F(1,210) = 161.30$, $p < .05$, $n^2_p = .43$, power = 1.0 on positive valence (See Table 35a).

Table 35a
Analysis of Variance for Sensation Seeking by Message with Positive Valence as Dependent Variable

Source	*Sum of Squares*	*df*	*Mean Square*	*F*	*p*	*Partial eta Squared*	*Power*
Between							
SS	2.46	1	2.46	.84	n.s.	.00	.15
Error	608.39	210	2.89				
Within							
Message	117.46	1	117.46	139.60	.001	.39	1.00
Message * SS	.03	1	.03	.04	n.s.	.00	.05
Error (Message)	176.70	210	.84				
MSV	212.09	1	212.09	297.16	.001	.58	1.00
MSV * SS	1.82	1	1.82	2.55	n.s.	.01	.35
Error (MSV)	149.87	210	.71				
Message * MSV	90.62	1	90.62	161.30	.001	.43	1.00
Message * MSV * SS	.65	1	.65	1.17	n.s.	.00	.19
Error (Message * MSV)	117.97	210	.56				

Notes. Significance criterion used was $p < .05$.

Post hocs using the Bonferroni adjustment indicated that participants significantly evaluated low MSV Blame (*M*=4.77) messages more positively than high MSV Blame (*M*=3.10) messages. They also evaluated low MSV Attack (*M*=4.85) messages more positively than high MSV Attack (*M*=4.51) messages. In addition, participants significantly evaluated high MSV Attack (*M*=4.51) messages more positively high MSV Blame (*M*=3.10) messages (See Table 35b).

Table 35b
Mean Positive Valence and Standard Deviations for the Two Sensation Seeking (SS) Groups for Each Message

	Message			
	Attack		Blame	
Group	High MSV	Low MSV	High MSV	Low MSV
Low SS, *n*= 112				
M	4.43	4.81	2.99	4.79
SD	.93	.87	1.11	1.53
High SS, *n*= 100				
M	4.59	4.90	3.23	4.74
SD	.88	.79	1.19	1.38
Total, *n*= 212*				
M	4.51^{ac}	4.85^{a}	3.10^{bc}	4.77^{b}
SD	.91	.83	1.15	1.46

Notes: Higher scores indicate more positive emotional responses.
Means in the same row sharing the same letter superscript differ at $p < .05$.
*Following examination of standardized residuals and a case analysis, a total of 14 outliers were removed before performing the repeated measures ANOVA.

This interaction is dependent upon the main effect of Message Type, $F(1,210) = 139.60$, $p < .05$, $n^2_p = .39$, power = 1.0 on positive valence, and the main effect of MSV, $F(1,210) = 297.16$, $p < .05$, $n^2_p = .58$, power = 1.0 on positive valence. Post hoc tests using the Bonferroni adjustment indicated that overall, participants expressed significantly more positive emotional responses for Attack (M=4.68) versus Blame (M=3.94) messages. In addition, participants expressed significantly more positive emotional responses for low MSV (M=4.81) versus high MSV (M=3.81) messages.

Negative Valence. In regard to emotional response, there was a significant interaction of Message Type and MSV, $F(1,211) = 197.71$, $p < .05$, $n^2_p = .48$, power = 1.0 on negative valence (See Table 36a).

Table 36a
Analysis of Variance for Sensation Seeking by Message with Negative Valence as Dependent Variable

Source	*Sum of Squares*	*df*	*Mean Square*	*F*	*p*	*Partial eta Squared*	*Power*
Between							
SS	4.63	1	4.63	1.60	n.s.	.00	.24
Error	610.70	211	2.89				
Within							
Message	72.60	1	72.60	78.89	.001	.27	1.00
Message * SS	.04	1	.04	.05	n.s.	.00	.05
Error (Message)	194.16	211	.92				
MSV	152.87	1	152.87	214.73	.001	.50	1.00
MSV * SS	.39	1	.39	.55	n.s.	.00	.11
Error (MSV)	150.21	211	.71				
Message * MSV	107.92	1	107.92	197.71	.001	.48	1.00
Message * MSV * SS	1.87	1	1.87	3.43	n.s.	.01	.45
Error (Message * MSV)	115.18	211	.54				

Notes. Significance criterion used was $p < .05$.

Post hoc tests using the Bonferroni adjustment indicated that participants expressed significantly more negative emotional responses for high MSV Blame (*M*=5.37) versus high MSV Attack (*M*=4.07) messages. In addition, participants expressed significantly more negative emotional responses for high MSV Blame (*M*=5.37) versus low MSV Blame (*M*=3.80) messages; and for high MSV Attack (*M*=4.07) versus low MSV Attack (*M*=3.94) messages (See Table 36b).

Table 36b

Mean Negative Valence and Standard Deviations for the Two Sensation Seeking (SS) Groups for Each Message

	Message			
	Attack		Blame	
Group	High MSV	Low MSV	High MSV	Low MSV
Low SS, *n*= 111				
M	4.11	4.02	5.51	3.82
SD	.82	.91	1.37	1.39
High SS, *n*= 102				
M	4.03	3.84	5.21	3.79
SD	.77	.91	1.22	1.36
Total, *n*= 213*				
M	4.07^{ac}	3.94^{a}	5.37^{bc}	3.80^{b}
SD	.79	.91	1.30	1.37

Notes: Higher scores indicate more negative emotional response.
Means in the same row sharing the same letter superscript differ at $p < .05$.
*Following examination of standardized residuals and a case analysis, a total of 13 outliers were removed before performing the repeated measures ANOVA.

This interaction is dependent upon the main effect of Message Type, $F(1,211) = 78.89$, $p < .05$, $n^2_p = .27$, power = 1.0 on negative valence and the main effect of MSV, $F(1,211) = 214.73$, $p < .05$, $n^2_p = .50$, power = 1.0 on negative valence. Post hoc tests using the Bonferroni adjustment indicated that participants expressed significantly more negative emotional responses for Blame (M=4.58) versus Attack (M=4.00) messages. In addition, they expressed significantly more negative emotional responses for high MSV (M=4.72) versus low MSV (M=3.87) messages.

Chapter 9
Discussion

The overall question guiding this study was: In terms of message processing, which type of appeal – Blame or Attack – is more effective, at what message sensation level, and for individuals with what type of Motivation Activation? The current study was primarily concerned with persuasiveness of the advertisement measured through attitude, behavior, and message processing. A total of 11 dependent variables addressed resources available, recognition memory, persuasiveness, and emotional response. A total of three sets of hypotheses and one research question were examined. The following discussion section examines: 1) the results of these hypotheses, 2) results regarding message type and MSV independent of these hypotheses, and 3) results regarding PO and NB independent of these hypotheses, 4) results using TU as an independent variable, and 5) results using SS as an independent variable.

Discussion of the Hypotheses

By combining hypotheses 1 & 2 in this study it was suggested that: 1) Risk Takers would be more likely to process and recognize high MSV Blame messages, 2) Coactives would be more likely to process and recognize low MSV Blame messages, 3) Risk Avoiders would be more likely to process and recognize low MSV Attack messages, and 4) Inactives would be more likely to process and recognize high MSV Attack messages. These hypotheses were based on Lang's (2006b) assertion that "our own sense

of risk will influence the level of activation" (p. 13). That is, different messages would be better processed and recognized for different types of individuals. For example, if an individual is someone who is "at risk" (e.g. someone who needs to abstain from or give up tobacco products) then messages which specifically pertains to their situation (i.e., Blame messages which focus on individual behaviors as opposed to Attack messages which focus on the tobacco companies) and their motivation type (i.e., high MSV messages which contain faster pacing, more sound effects, and more graphic content) are more likely to affect their message processing.

However, support for these hypotheses was lacking. First, while it was hypothesized that there would be differences in message processing between high PO (Risk Takers, Coactives) and low PO (Risk Avoiders, Inactives) participants, there were no significant differences in recognition memory hits, response latency, A', or B" for high PO versus low PO participants in regard to any of the messages. The participants' level of involvement with the messages could have been to Blame for this finding. Only a few participants (15.5%) reported being either current or former smokers. These hypotheses were based on the assumption that tobacco use (TU) would influence resources allocated to message processing in that Risk Takers and Coactives, the two groups more likely to take part in TU behaviors, would be more affected by Blame messages directly outlining consequences personal to them. Thus, the lack of current and former tobacco users expected to be in either category likely made these hypotheses unsupported.

Second, there were no significant differences in the recognition memory measures for low NB (Risk Takers, Inactives) versus high NB (Risk Avoiders, Coactives)

participants in regard to message MSV. This could have been due to the fact that these hypotheses were based on the premise that low NB directly correlated with high SS behaviors. As noted in the results, the current study found that high PO significantly correlated with high SS, while NB did not significantly correlate at all. Therefore, the groups suggested to be influenced by high or low MSV messages were problematic, making these hypotheses unsupported. Regardless of PO or NB, there were significant differences between high and low MSV messages in terms of recognition memory as participants were more accurate for high MSV versus low MSV messages. In addition, there were differences for Attack versus Blame messages discussed in detail below.

The third set of hypotheses regarding persuasiveness was shown to be more valid as it made assumptions about the messages instead of individual characteristics. These hypotheses predicted that high MSV Attack messages would be viewed as more persuasive because they would garner more positive emotional responses than the other anti-tobacco messages. Results showed that high MSV Attack messages were significantly more persuasive than other messages. Participants showed more positive Aad, more positive evaluation of the argument, and greater behavioral intent not to smoke in the future following high MSV Attack ads – even though high MSV Attack ads did not garner more positive or even negative emotional responses than low MSV or Blame messages. However, regardless of message type, low MSV ads were seen as more positive, and high MSV ads were seen as more negative. This may have been due to the fact that high MSV ads were more emotional overall, thus more likely to have distinctly positive or negative emotions, while low MSV ads did not have as much emotional valence. Not surprisingly, high MSV ads were seen as more arousing.

Findings Regarding Message Type & MSV

Lang and colleagues (2006) suggested that STRTs measure available resources, reflecting the difference between resources allocated and resources required (p. 371). The more resources that are used results in fewer resources remaining to understand and remember information (Basil, 1994). Thus, if resources required increase (and resources allocated remain constant), then STRTs become slower as available resources decrease. If resources allocated increase (and resources required remain constant), then STRTs become faster as available resources increase. In addition, absent of cognitive overload, recognition memory should increase as information is encoded to a greater extent. That is, messages that require more resources (i.e., slower STRTs) should be accompanied by better recognition memory. Lang (2006b) also suggested that highly arousing messages increase resources allocated to processing. Likewise, studies have shown that message MSV increases resources allocated to processing the message. Furthermore, the user's goals can increase resource allocation. For example, if the individual's goal was learning, then they would allocate more resources to processing the message. This would mean that more resources would be available based on constant message requirements.

Results from the current study showed that STRTs were significantly faster for low MSV messages and slower for high MSV messages. In addition, recognition was significantly better for Attack versus Blame messages. Finally, these results indicate that more resources were required to process high MSV Attack messages as STRTs slowed as recognition memory increased. These differences are shown in Table 37.

Table 37
Effect of Message Type, MSV, and Message Type X MSV on Recognition and STRTs with PO and NB as IVs

Message Type	*% Correct*	*STRT*
Attack	.83	465.02
Blame	.78	481.94
MSV	*% Correct*	*STRT*
High MSV	.82	485.25
Low MSV	.80	461.71
Message Type X MSV	*% Correct*	*STRT*
ALMSV	.83	461.70
BLMSV	.77	461.71
AHMSV	.84	468.34
BHMSV	.79	502.16

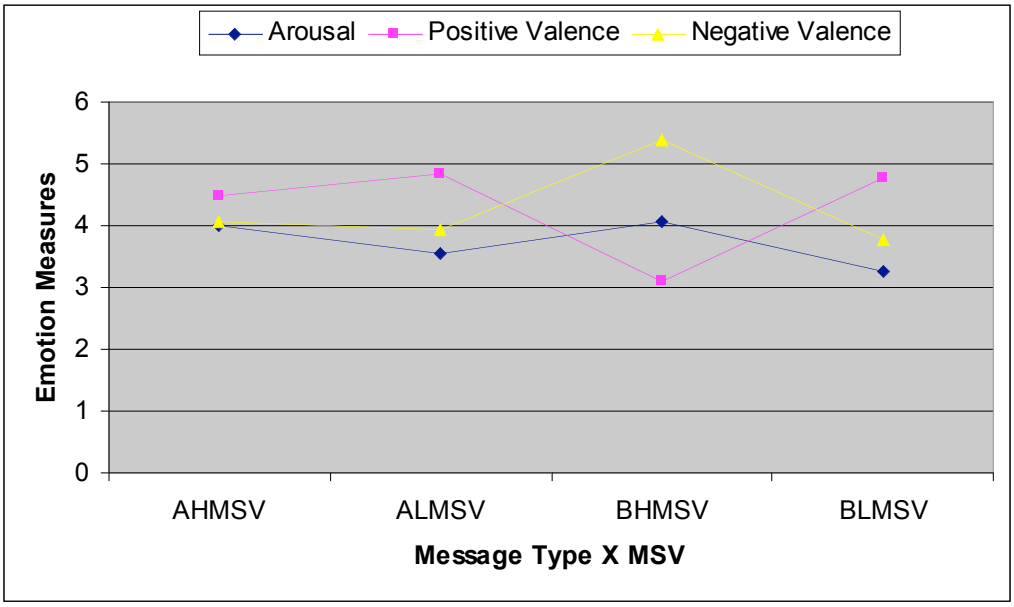
The current findings are similar to those by Lang and colleagues (2006) which showed that as message complexity increased, STRTs got slower. At the same time, recognition dropped off at the highest level of message complexity. That is, as messages got increasingly complex STRTs slowed while recognition memory improved until the point of cognitive overload. In the current study, high MSV messages (i.e., the more complex messages) likely automatically increased allocation of resources to processing. However, unlike Lang's results, STRTs for the high MSV Blame message did not get faster. This suggests that the high MSV message did not result in cognitive overload, though it may suggest that the user's goals for processing high MSV Blame messages differed somehow as message recognition decreased. Thus, the decrease in available resources may reflect fewer resources allocated. That is, this finding may reflect insufficient resources allocated to processing a message that most participants did not feel personally pertained to them. User's goals for processing may also account for the increase in recognition for low MSV Attack messages despite the similar STRT to low

MSV Blame messages. Furthermore, Lang's (2006a) results generally show lower recognition associated with faster STRTs. In the current study, Blame message had slower STRTs and worse recognition while Attack messages had faster STRTs and better recognition. This may be because Attack message are easier to process (either they increase allocation or require fewer resources). It was assumed that both types of messages, Blame and Attack, would be construed as negative stimuli – though Attack messages would be seen as "less" negative. Of the two types of ads evaluated as "more" negative in this study, high MSV Blame and high MSV Attack (both high MSV), only high MSV Attack evidenced significantly better recognition memory. Of the two ads evaluated as "less" negative in this study, low MSV Attack and low MSV Blame (both low MSV), only low MSV Attack evidenced significantly better recognition memory. This main effect for Attack messages indicates that - regardless of MSV - Attack messages are better encoded than Blame messages. However, it should be noted that previous research suggested that negative stimuli would be more likely to influence message processing, which was not the case here as high MSV Blame messages (which were rated the highest overall in terms of negativity) had slower STRTs and lower recognition accuracy than stimuli rated more positively (i.e., low MSV Attack and high MSV Attack).

In addition, this finding may be indicative of how the emotions experienced by participants influence processing. Participants in this study were generally not current or former smokers – so it may be that they experienced less emotion in reaction to Blame messages (specifically, high MSV Blame messages). It may also be likely that participants experienced conflicting emotions that influenced processing for high MSV

Attack, low MSV Attack, and low MSV Blame messages as there appears to be co-activation occurring (i.e., both positive and negative emotions) for these messages. This co-activation may have triggered both the appetitive and aversive systems making encoding a priority. Meanwhile, high MSV Blame messages elicited negative emotions which initiated the aversive system causing decreased encoding. Figure 1 shows a plot of the emotion measures of arousal, positive valence, and negative valence by Message Type and MSV.

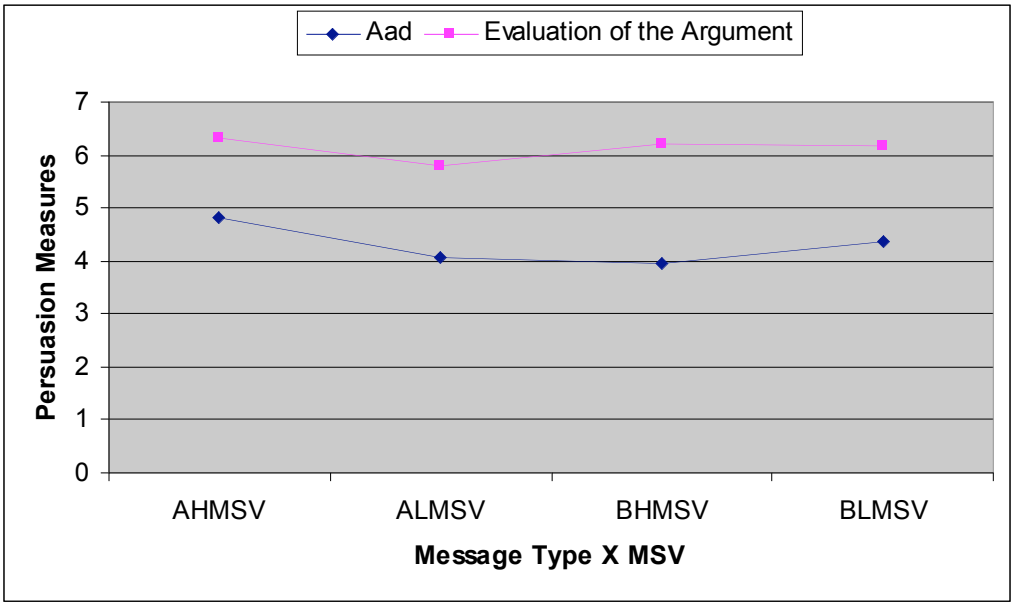
Figure 1
How Message Type and MSV Influenced Arousal, Positive Valence, and Negative Valence



Furthermore, recall that highly arousing ads lead to increased encoding or better recognition memory. In the current study, of the two ads rated as more arousing, high MSV Blame and high MSV Attack, only high MSV Attack evidenced better recognition memory. This finding suggests that regardless of positive or negative valence, arousal, or

MSV, Attack ads are better remembered than Blame ads. It does not appear as positive valence led to greater persuasiveness as low MSV Attack messages (rated as most positive) were second to high MSV Attack messages (rated negative) for Aad and Behavioral Intent, and were fourth in Evaluation of the Argument. This indicates that the "less" negative message – though not necessarily positive - was the more persuasive. In addition, it appears as though recognition memory was directly related to the persuasiveness measures of Aad and behavioral intent as the highest ranked PSAs for each of these measures (high MSV Attack) also received the greatest proportion of hits. Figure 2 shows a plot of the persuasion measures of Aad and Evaluation of the Argument by Message Type and MSV.

Figure 2
How Message Type and MSV Influenced Arousal, Positive Valence, and Negative Valence



Recall that Signal Detection as a method of analyzing recognition memory allows us to view the relationship between proportion of hits and proportion of false alarms for

each of the messages. The SDT measures A' and B" indicate the individual's sensitivity in correctly recognizing a previously viewed item and how liberal or conservative the individual is in deciding if that item was previously viewed. That is, if an item is perceived as more familiar, then the individual's sensitivity (A') should increase. In addition, individuals must decide how certain they need to be in their decision making – or how familiar the item must be before they say it was previously viewed (Shapiro, 1994). With a conservative decision criterion, an individual wants to be very certain (i.e., they try to minimize false alarms) and will likely have fewer false alarms, as well as fewer hits. With a liberal decision criterion, an individual is more likely to guess (i.e., they try to maximize hits) and will likely have more hits, as well as more false alarms.

The current results indicate that participants were more sensitive (A') with Attack messages. This directly corresponds to the proportion of hits as Attack messages were recognized to a greater extent than both Blame messages. Thus, the Attack messages were more familiar as sensitivity and hit rate were better than Blame messages (Shapiro, 1994). In addition, findings from the current study show that participants were more conservative (B") in their responses regarding Blame messages. This could be because the Blame PSAs addressed not only consequences for smokers, but the harmful side effects of second-hand smoke. This may have made the consequences of both of these ads more personal to both smokers and non-smokers alike as the consequences of smoking (and second-hand smoke) are well-known. Moreover, tobacco products negatively affect the lives of most individuals and many participants in this study likely have friends, relatives, or colleagues who have been harmed by smoking or second-hand smoke. Therefore, level of involvement may have increased participants' desire to

correctly identify Blame probes (i.e., have fewer false alarms). This, in turn, decreased the number of hits participants had for Blame messages since these were recognized significantly less than both Attack messages. This may mean that the bias shown by participants reflected their processing goals. Blame and Attack messages could very well affect those goals. For example, perhaps Blame ads are irrelevant but Attack ads are not. Regardless, the decrease in number of hits had a significant impact on sensitivity (A') as both Blame messages evidenced significantly lower sensitivity than Attack messages.

Furthermore, this particular finding could be because the Attack messages used in this study were taken from the national *Truth* campaign which has the funds to air anti-tobacco advertisements on prime-time television. The ads viewed could have been familiar to participants prior to the study as they could have seen them (or ads similar to them) on regular television spots. In comparison, the Blame ads were taken from a Media Resource Center database which stores anti-tobacco ads that are predominantly aired during FCC mandated public service announcement timeslots. These timeslots are usually not "prime-time" airings making the Blame ads, overall, less familiar to the general public (and perhaps the participants in this study) (Murray, Stam, & Lastovicka, 1996).

Recall that response latency has been used to examine how mentally accessible an item is in memory. In general, assuming an item is in memory, faster responses indicate that the item is more accessible. It was suggested that response latency would align with sensitivity (A') or response accuracy. That is, fast responses associated with lower hit rates would correspond to lower levels of sensitivity (i.e., more guessing took place). Results of the current study support this conclusion. The two messages with the faster

response times, low MSV Blame and high MSV Blame, were also the two messages with the lowest response sensitivity. This suggests that despite the fact that participants were more conservative in their responses to these two messages (see above), they did not do a "complete" memory search for these messages and chose to guess instead - though they guessed "no" most of the time.

On the other hand, response times for high MSV Attack and low MSV Attack messages were significantly slower while response sensitivity was significantly higher. This may indicate that Attack messages, though better encoded than Blame messages, had to be searched for in memory (Cameron & Frieske, 1994). Similarly, all the probe messages had significantly faster response times than foil messages indicating a more exhaustive search for familiarity of foils.

It is important to note that for each of these findings the average effect size and power of the main effect of Message Type were substantial. The average effect size was .21, a medium effect size for ANOVAs, indicating that as a treatment, Message Type accounted for a large proportion in variance in dependent measures (Murphy & Myors, 2004). The average power was .99, indicating that the ability of these tests to detect real treatment effects (i.e., accurately reject the null hypothesis) was considerable. Likewise, for each of these findings the average effect size and power of the main effect of MSV were substantial. The average effect size was .28, a medium effect size for ANOVAs, indicating that as a treatment, MSV accounted for a large proportion in variance in dependent measures (Murphy & Myors, 2004). The average power was .86, indicating that the ability of these tests to detect real treatment effects (i.e., accurately reject the null hypothesis) was considerable.

Findings regarding PO & NB

Studies by Lang and colleagues (A. Lang, 2006a; A. Lang, Shin, & Lee, 2005) have shown that individuals differ in their level of appetitive (PO) and aversive (NB) activation. Appetitively activated individuals exhibit increased encoding while aversively activated individuals exhibit initial resource allocation with eventual decreased encoding through withdrawal. In addition, high POs are more likely to encode negative stimuli better than low POs, while high NBs are more likely to encode positive stimuli better than low NBs.

There is a rich history of research correlating Sensation Seeking (SS) and Substance Use (SU), including use of alcohol, drugs, and tobacco. The current study adds to that research as SS and TU were positively correlated. Conversely, studies comparing SS to Motivation Activation have found that Risk Takers (high PO, low NB) and Inactives (low PO, low NB) are more likely to be high SS (A. Lang, 2006a). This suggests that SS is directly associated with low NB. Studies comparing SU and Motivation Activation have found that Risk Takers (high PO, low NB) and Coactives (high PO, high NB) are more likely to use harmful substances (A. Lang, Shin, & Lee, 2005). This suggests that SU is directly associated with high PO.

However, results from the current study suggest that there is not only a positive correlation between tobacco use (TU) and PO, but that there was a positive correlation between SS and PO. This finding makes sense because high SS and high PO individuals tend to use tobacco more. No significant relationships between either TU or SS and NB emerged. Thus, the current study suggests that both SS and TU are related to PO, not to

NB. Lang, Shin, and Lee (2005) found similar results and suggested that high PO individuals were more likely to approach risky objects. That is, individuals with higher positivity offsets – or a desire to "leave the nest and explore" - are more likely to use tobacco products and have high sensation seeking tendencies. However, unlike their study, this study found higher correlations between the SS and PO measures than between the SS and TU measures.

In the current study, both high PO (Risk Takers and Coactives) and low PO individuals (Risk Avoiders and Inactives) had significantly slower STRTs for high MSV messages. This indicates that there were fewer resources available to further process the message. In addition, STRTs for high MSV messages were significantly slower indicating that the resources required to process the message were greater than resources allocated. This suggests that more resources were available during low MSV messages and that high MSV messages required more resources for processing as it is unlikely that low MSV messages increased resource allocation. However, since STRTs were faster and recognition memory for low MSV messages increased as well, overload did not occur. This, paired with the fact that overall participants had slower STRTs and better recognition memory for high MSV messages suggests that: a) high MSV messages required more resources for processing than were allocated, and b) the individual's appetitive activation resulted in increased encoding.

Conversely, work by Cacioppo and colleagues (Cacioppo & Bernston, 1994; Cacioppo & Gardner, 1999) suggested that NB would hold a greater influence on attitudes and behaviors than PO, with low NB individuals having less aversive reactions to negative stimuli. Recall that the high PO, low NB group was especially attractive in

terms of anti-tobacco messages as Risk Takers (high PO, low NB) are the ones most likely to become tobacco users.

It was suggested that low NB individuals would be more likely to encode and be more influenced by negative messages than high NB individuals. Results from the current study showed that high NB individuals exhibited significantly greater recognition memory than low NB individuals for each of the messages regardless of type - the opposite of what should have been found if, in fact, anti-tobacco messages such as the ones shown are truly "negative". If, on the other hand, anti-tobacco messages in general are considered "positive" messages (as could be the case as they are not promoting risky products, but instead trying to get people to abstain from or give up using risky products), then this finding makes sense. That is, high NB individuals would be more influenced by "less negative" messages than those with low NB resulting in greater recognition memory for the messages.

It was also suggested that Attack messages should appeal to low PO individuals (Risk Avoiders, Inactives). That is, Attack messages would be seen as more persuasive (i.e., positive) for those less likely to take part in SS and TU behaviors. Results indicated the opposite - that NB held more influence on persuasiveness – as high NB individuals (Coactives, Risk Avoiders) actually showed more positive Aad for Attack versus Blame messages. Furthermore, high NB individuals evaluated the message argument for high MSV Attack messages more positively than low NB individuals. Thus, high NB individuals were more persuaded by high MSV Attack messages than low NB individuals.

Taken together, these results are not promising as high NB individuals (Risk Avoiders, Coactives) are not in the group most likely to become a tobacco user (i.e., Risk Takers). Thus, low NB individuals - who really need the information from anti-tobacco messages - were not as likely to encode or be persuaded by information from the messages. This finding is consistent with results from Southwell (2001) who found that those for whom a health message is designed and intended often do not pay as much attention to, or remember information from, the message as those for whom the message is not intended.

Findings Regarding Tobacco Use

Although not hypothesized, TU was examined as an independent variable of interest as it was assumed that high tobacco users would differ in their responses to the stimuli than low or moderate tobacco users. Much like the findings discussed above, effects of Message Type and MSV were plentiful, while interactions between Message Type, MSV, and TU were not. Regardless, results for STRTs and recognition memory were similar to those previously presented and are shown in Table 38. Likewise, results for the other recognition memory, persuasiveness, and emotional response measures were practically identical.

Table 38
Effect of Message Type, MSV, and Message Type X MSV on Recognition and STRTs with TU as IV

Message Type	*% Correct*	*STRT*
Attack	.81	466.20
Blame	.77	482.72
MSV	*% Correct*	*STRT*
High MSV	.80	486.20
Low MSV	.78	462.57
Message Type X MSV	*% Correct*	*STRT*
BLMSV	.76	461.87
ALMSV	.81	462.10
AHMSV	.82	468.38
BHMSV	.77	502.15

Though TU had no effect on message processing, a number of interesting findings emerged in terms of persuasiveness. First, regarding Aad, low TU participants significantly rated Attack messages more positively than Blame messages. This suggests that those who do not smoke agree with the anti-tobacco ads designed to fight Big Tobacco and decrease future smoking.

Second, both moderate and high TU participants rated high MSV Blame arguments more positively than arguments for other messages. This suggests that the arguments shown in high MSV Blame are more influential to the group most in need of anti-tobacco messages – current and former users. Meanwhile, the arguments portrayed in Attack messages were most effective for low TU participants who are less likely to smoke. The implication is that current and former smokers feel that arguments which stress the harmful side effects of smoking are more persuasive than simply saying that "Big Tobacco is to blame".

Conversely, interesting findings occurred regarding high and moderate TU participants and behavioral intent. First, both moderate and high TU participants stated that despite the fact that they evaluated message arguments more positively for Blame, they were less likely to smoke following Attack messages. Furthermore, high TU participants overall indicated that they were less likely than both moderate and low TU participants to not smoke in the future. Recall that the behavioral intent scale examined how likely an individual is to 1) smoke a puff or more of a cigarette, 2) try out smoking for a while, or 3) smoke a cigarette if a friend offered them one. Thus, since former tobacco users were likely in this group results may have indicated a greater intent not to start smoking again. It could also be because high TU individuals felt that they should answer in a pro-social way. That is, they knew based on the messages they had viewed what their answer should be (i.e., say they plan not to smoke anymore) and they answered accordingly. This would mean that the moderate and low TU groups' answers were probably more based on true future intentions.

In terms of emotional response to the message, there were no significant findings for any of the groups in regard to arousal. However, when it came to the valence of the messages, high TU participants rated all the messages (except low MSV Blame) significantly more positive than the moderate TU and low TU groups. In addition, high TU participants rated all the messages (again, except for low MSV Blame) between the low and high TU groups for negative valence. This tendency for high TU participants to rate anti-tobacco messages more positively – when they should feel these messages portray consequences negative to them - is difficult to explain. It could be though, that

despite their tobacco behaviors, they see the merit of such types of messages which is why they rated them more positively than negatively.

Findings Regarding Sensation Seeking

Although not hypothesized, SS was also examined as an independent variable of interest as it was assumed that high sensation seekers would differ in their responses to the stimuli than low sensation seekers. Much like the findings discussed above, effects of Message Type and MSV were plentiful, while interactions between Message Type, MSV, and SS were not. Regardless, results for STRTs and recognition memory were similar to those previously presented and are shown in Table 39. Likewise, results for the other recognition memory, persuasiveness, and emotional response measures were practically identical.

Table 39
Effect of Message Type, MSV, and Message Type X MSV on Recognition and STRTs with SS as IV

Message Type	*% Correct*	*STRT*
Attack	.83	465.05
Blame	.78	481.91
MSV	*% Correct*	*STRT*
High MSV	.82	485.20
Low MSV	.80	461.75
Message Type X MSV	*% Correct*	*STRT*
BLMSV	.77	461.87
ALMSV	.83	462.10
AHMSV	.84	468.38
BHMSV	.79	502.15

Sensation seeking did not affect either STRTs or hits, however, SS did influence response latency and recognition memory sensitivity (A'). Both high and low SS participants had significantly faster response times for Attack versus Blame messages. Additionally, both high and low SS participants exhibited significantly more sensitive decisions for Attack versus Blame messages. This indicates that overall, participants took less time in discriminating between probes and foils in the Attack condition and that their judgments for Attack messages were more accurate.

Furthermore, a number of findings emerged in terms of message persuasiveness. First, regarding Aad, high SS participants significantly rated high MSV messages more positively than low MSV messages. This result was not surprising as previous research suggested that high MSV messages would appeal to high SS individuals who crave more arousing, exciting, and stimulating messages. Second, both high and low SS participants significantly evaluated the arguments of high MSV messages more positively. This could be related to the Aad finding as a more stimulating message could be seen as having more viable claims. It is interesting, however, that high SS individuals (i.e., those more likely to smoke) were not more influenced by high MSV message arguments than low SS individuals as the arguments would likely be geared more toward them. This may be because college students such as the ones used in this study have not yet become scared of the consequences of cigarette smoking, making Blame ads negative only to the extent that the individual feels threatened. That said, also it is interesting that, overall, participants evaluated the arguments of Blame messages more positively than those of Attack messages.

Third, there was a significant main effect of SS on behavioral intent as high SS participants indicated that they were less likely to smoke in the future than low SS participants. Once again, recall that the behavioral intent scale examined how likely an individual is to 1) smoke a puff or more of a cigarette, 2) try out smoking for a while, or 3) smoke a cigarette if a friend offered them one. Thus, the fact that high SS individuals (those more likely to be current, former, or future smokers) were likely in this group results may have indicated a greater intent for current or former smokers to abstain from or give up their smoking behaviors. It could also be because like high TU individuals, high SS individuals felt that they should answer in a pro-social way. This would mean that the low SS groups' answers were probably more based on true future intentions. In terms of emotional response to the message, there were no significant findings for either SS group in regard to arousal, positive valence, or negative valence.

Chapter 10
Conclusion

This research provides evidence about the effectiveness of anti-tobacco campaigns that either attack the tobacco industry or place blame on smokers. It does so by posing questions about these two types of anti-tobacco public service campaigns aimed at reducing smoking behaviors, taking into account message characteristics such as sensation value and individual characteristics such as Motivation Activation, SS behaviors, and tobacco use. The Limited Capacity Model of Motivated Mediated Message Processing (LC4MP) identified specific outcomes associated with resources available for processing a message and encoding of information in the message: 1) when paired with increased recognition memory, faster STRTs indicate more resources allocated or fewer resources required, and 2) when paired with increased recognition memory, slower STRTs signal more resources required than resources allocated. Thus, faster STRTs coupled with increased recognition memory usually indicate more resources allocated to processing a message - though it is possible that in the current study high MSV messages encouraged automatic allocation of resources (and also that they required more). Slower STRTs coupled with increased recognition memory indicate that the message required more resources and that enough were allocated. Finally, the LC4MP also posited that faster STRTs associated with reduced recognition memory indicate cognitive overload.

In addition, findings from studies of MSV provided evidence that high MSV messages increase resources allocated to processing, improve persuasiveness of the message, and influence emotional response. The LC4MP also stated that Motivation Activation, or an individual's predisposition for appetitive and/or aversive activation, would influence the allocation of resources to processing. That is, high PO individuals would be more likely to encode information from negative stimuli than low PO, while high NB individuals would be more likely to encode positive stimuli than low NB individuals. In the current study, it was assumed that all of the stimuli viewed were negative, but that certain messages would be construed as "less" negative than others.

The current study sought to systematically examine the effectiveness of a combination of message features (MSV and Message Type) that would have the maximum effectiveness with the audience members most at risk – those with high PO, low NB (Risk Takers). Though hypothesized, participants in the current study showed few significant results for interactions between individual differences and message characteristics that increased resources allocated to any of the anti-tobacco messages. However, there were significant message effects independent of Motivation Activation.

Specifically, there was evidence of greater effectiveness of high MSV Attack messages such as those used by the *Truth* campaign. Previous experimental findings regarding Blame messages suggested that these messages would be better attended, encoded, more arousing and would result in more positive attitudes than Attack messages (Pechman, Zhao, Goldberg, & Reibling, 2003; Pechman & Reibling, 2000; Antecol, 1998). In addition, the same findings suggested that Attack messages would be more influential in influencing behavioral intent than Blame messages (Antecol, 1998). The

current study showed evidence that high MSV Attack messages required more processing resources, but were recognized better than low MSV and Blame messages. In addition, there was evidence that although participants had slower recognition memory response times for high MSV Attack messages, these messages were recognized to a greater extent, and responses to these messages were more accurate than Blame messages as was evidenced by a more sensitive, thorough memory search for high MSV Attack messages. In regard to persuasiveness, measures of Aad and behavioral intent both showed that high MSV Attack messages were superior to both low MSV and Blame messages in influencing participants. This would suggest that high MSV Attack messages are superior to Blame messages for conveying persuasive anti-tobacco information. Results from previous studies likely differed as they combined high and low MSV messages into an overall message type.

Another conclusion that could be drawn from this study is that PO may be the underlying cause of high SS and high TU behaviors as individuals are appetitively activated and therefore "drawn to" sensational acts. The current study indicated that PO, SS, and TU significantly correlated. These findings resonate with recent work by Lang, Shin, and Lee (2005) on the relationship among PO, SS, and substance use behaviors.

In addition, current findings regarding NB resonate with work by Caccioppo and colleagues (Cacioppo & Bernston, 1994; Cacioppo & Gardner, 1999) which posited that NB has a greater "sway" on attitudes and behaviors. Results indicated that high NB individuals (Risk Avoiders, Coactives) were more persuaded (i.e., Aad, Evaluation of the Argument) by high MSV Attack messages. Since this group is not as "at risk" for smoking behaviors as those with low NB this finding is not that worthy of notice.

However, results regarding Message Type, MSV, and moderate/high Tobacco Use were considerably more interesting. First, although both moderate and high TU participants rated high MSV Blame arguments more positively than arguments for other messages they were more likely to state that they were less likely to smoke following Attack messages. Second, high TU participants thought that Attack messages were more positive (or "less" negative) than Blame messages. Finally, high TU participants regarded high MSV Attack messages more positively than high MSV Blame messages. This is encouraging and consistent with previous findings as studies have shown that positive messages are more likely to be more persuasive.

Taken together, these findings suggest that a combination of Attack and high MSV messages work well in anti-tobacco persuasive efforts. The message features of high MSV and Attack influence the cognitive, affective, and persuasive outcomes. As a production feature, MSV increases resources devoted to encoding, thereby increasing the amount of information an individual takes away from an anti-tobacco message. In addition, findings from this study regarding individual differences are helpful in narrowing down the target audience for anti-tobacco messages by high PO as Risk Takers (high PO, low NB) are those most at risk for substance use behaviors, though special attention should be given to NB in terms of message design as it appears more influential in information processing as well as persuasiveness.

Caveats

While this experiment provides reasonable evidence for the relationships found between message characteristics and individual differences, there were limitations to this

study. First, one of the limitations of this study is that it is a laboratory experiment. As noted earlier, there are several advantages to this type of laboratory experiment, not the least of which is control, which strengthens internal validity and helps to eliminate confounding variables. However, this control also increases the artificiality of the experiment. For example, in the current study participants viewed PSAs in an uncluttered environment under forced exposure conditions, which may not reflect actual television viewing behaviors. Nonetheless, this type of forced exposure aided in establishing causality between messages and psychological responses.

In addition, it should also be noted that although the Cronbach's coefficient alphas of the self-report measures used in this study were within the limits of acceptable reliability, some were considerably lower than what the scale creators suggested they should be. For example, the creators of the Aad scale reported a reliability of .90, while in this study the average reliability was only .76. The fact that this is an average suggests that the scale may have been more reliable for some of the messages, and not as reliable for others. However, Bolls, Lang, and Potter (2001) suggested that self-report measures likely indicate responses to "extreme points in message content rather than responses to the message as a whole" (p. 630). That is, for the measures of persuasiveness and emotional response participants may have responded in some way to different aspects of Blame or Attack messages that were not examined in this study.

Yet another limitation was the fact that the sample studied did not accurately reflect the population of college students who smoke. Only 15 percent of the participants in this study reported that they were current or former smokers. Compared to the estimated 30 percent of college students who regularly use tobacco, this number is low

(Lee & Ferguson, 2002; Rigotti, 2000). There could be a number of reasons for this: 1) most of the participants in this study were freshman who may not have yet experimented with tobacco products, 2) the college town where the study took place recently enacted no-smoking policies in public places such as bars and restaurants possibly decreasing the number of "social" smokers, and 3) the university where the study took place was examining changing campus policies to disallow smoking making the environment somewhat hostile to smokers, possibly decreasing the likelihood that students would start/continue smoking behaviors. Finally, it is likely that smokers on this particular campus felt increasing pressure to stop smoking and may not have wanted to take part in an experiment that included them looking at anti-tobacco ads. Although it may also be likely that overall smokers didn't want to participate in a study where they would have to watch anti-tobacco PSAs. Recruiting scripts identified the type (i.e., anti-tobacco) of advertising participants were going to be subjected to (instead of simply saying they would be watching PSAs) so individuals could choose if they wanted to take part in the study. Thus, future studies may benefit my not identifying what type of PSAs will be viewed in order to get smokers to participate.

That said, it should also be noted that participants in this study were motivated volunteers (i.e., they received extra credit for participation) who due to the current climate of their university and surrounding town may have felt the need to answer questions in a socially acceptable way. This effect was noted by Bolls, Lang, and Potter (2001) as self-report measures such as the ones used in this study are highly susceptible to social response bias. Oskamp and Schultz (1998) posited that studies such as this one, which used audiovisual PSAs to influence behaviors, have shown marked influence in

subsequent or intended behaviors. However, the effects of such PSAs were usually brief and confined to either a) the situation shown in the PSA, or b) to the laboratory situation and did not transfer to real life.

Regardless, there is no reason to believe that the psychological process findings from this study should not be similar for other segments of the population. Previous studies have shown that college students do not significantly differ from other samples in investigations of underlying processes such as attention, encoding, storage, and retrieval (for a reviw see Basil, Brown, & Bocarnea, 2002). Therefore, the generalizability of the STRT and recognition memory data is not limited.

Future Research

Obviously, future research should sample more high vs. low MSV Blame and Attack messages in an attempt to replicate the results found here. This would provide more support for the effectiveness of one type of message over the other. In addition, other segments of the population should be sampled to see what messages are more effective for different age groups. Recent research by Lang (2006a) shows that the influence of PO and NB differ for younger versus older segments of the population. This line of research suggests that Motivation Activation changes over the course of a lifetime - that people go through low PO, to high PO, and back to low PO. Thus, individuals who currently are not prone to high PO activities such as SS and TU may later change and become susceptible to them. So, the question is – do we solely design messages to influence individuals who are *currently* high PO? Do we eliminate our focus on other groups assuming they won't use tobacco in the future? Or, should we design messages

with the idea that some individuals may later change and become high PO thus, any information they can get from anti-tobacco messages now may be encoded and used in that later future to help them avoid TU behaviors?

Furthermore, the current study examined college-age participants who have already been exposed to peer-smoking behaviors. Literature suggests that most individuals try smoking before middle-school (i.e., roughly age 11, or 6th grade) suggesting that it is essential to reach them with anti-tobacco information – often provided by PSAs - prior to this decision point. Thus, additional study is needed to examine how youth and teens relate to these types of messages.

Another line of study deals specifically with message characteristics. Recall that messages with very high levels of MSV cause cognitive overload. This study examined low versus high MSV messages, however, no evidence of cognitive overload to any of the high MSV messages emerged. This suggests that an extremely high level of MSV was not present in the messages used. So, what are the limits of MSV? How sensational and arousing should messages be before they are no longer effective? Physiological measures of attention and emotional response paired with STRTs and recognition memory measures may be the best way to examine these questions as they would be more accurate than the self-report measures of arousal and emotion used in the current study.

In addition, psychophysiological measures such as heart rate, electrodermal activity (EDA), and facial electromyography (EMG) could provide interesting results regarding different cognitive and emotional responses to Blame versus Attack as well as high versus low MSV messages. Previous research has shown that an individual's body

acts and reacts to emotions they experience. Bradley and Lang (2001) posited that increases in emotion affect arousal, attention, and subsequent processing. To measure the cognitive resources allocated to encoding the messages, heart rate data could be examined. Previous research has shown that heart rate decelerates as resources are allocated to processing (Lang, 1995). In addition, the intensity of emotion experienced to Attack/Blame and high/low MSV message could be examined using arousal and valence. However, EDA and EMG allow for a more accurate assessment of emotions experienced than the self-report measures used in the current study. The measures could not be used here as the collection of STRTs would have interfered with the collection of physiological measures. Currently, Lang and colleagues (2007) are validating MAM measures similar to the one used in this study with physiological measures such as startle reflex, heart rate, skin conductance, and facial EMG making future studies of this type likely.

Furthermore, some of the results of this study found that high MSV messages were more effective than low MSV messages, though no differences existed between high MSV Blame and Attack messages. This begs the question; will messages that combine Blame and Attack be more effective than those that use only one type of message? Currently, most PSAs consist of one type of message or the other. Future study should examine high MSV Blame, high MSV Attack, and a high MSV hybrid of the two to see if together – addressing the responsibility of both the industry for promoting/selling and the individual for using – they are more effective in influencing processing and changing behaviors.

Gunter (2000) pointed out that "it has been argued that experiments provide evidence on the questions of whether the media *can* produce certain effects, though not necessarily demonstrate that such effects *do* actually occur in reality" (italics his, p. 252). Therefore, it is suggested that survey studies like those conducted by Hersey and colleagues (2003); Farrelly and colleagues (2002; 2005); Sly, Hopkins, Trapido, and Ray, 2001; and Sly, Trapido, and Ray, (2002) on the effectiveness of Attack ads be extended to include a comparison to Blame ads. This would reinforce the findings of this study, that Attack ads are superior to Blame ads.

Finally, it should be noted that past campaigns have tended to rely solely on mass communication in reaching audiences. Though only the mass media aspect was examined in this study, the *Truth* campaign – which provided the stimuli used as Attack ads in this study - also provides interpersonal communication opportunities through its social functions and website. This is an interesting area for future study in regard to the dissemination and evolution of the messages transferred from person to person. Interpersonal communication as well as the counter-arguing that takes place in group discussions are often more influential in behavior modification as they help to provide an environment in which behaviors are reinforced (Moore, 2007).

Implications

Because the primary goal of anti-tobacco campaigns is to influence individuals to either abstain from, or give up, tobacco behaviors, the results of this study are particularly useful in the design of messages that will effectively influence desired groups. When designing anti-tobacco campaigns, producers make decisions regarding type of message, intended audience, etc. and design messages accordingly. Overall, the findings from this

study are important in establishing the effectiveness of high MSV Attack messages. The very type of counter-advertising message that research by Dorfman and Wallack, 1993; Farrelly and colleagues, 2002; Goldman and Glantz, 1998; Hersery and colleagues, 2003; Siegel, 1998; and Sly and colleagues, 2001, 2002, 2005 suggested was more attractive and influential for audiences.

Furthermore, these findings aid in our understanding of message processing based on Motivation Activation and message features put forth by the LC4MP (A. Lang, 2006b). Lang suggested that message features such as MSV would influence our processing and this study supports that assertion. High MSV messages led to more positive evaluations of the message argument, greater levels of arousal, and more negative emotional responses, each of which has been shown to influence processing and persuasiveness. In addition, Lang stated that an individual's personal motivation would lead them to process messages differently. The current study found that aversive activation was more influential in terms of anti-tobacco message effectiveness. Thus, while PO can be used as a targeting variable for anti-tobacco messages, NB should be taken into account for message design.

It was also hoped that results from this study would help fill the gap regarding individuals not as much at risk (Risk Avoiders, Inactives). The combination of findings regarding PO and NB indicated that these individuals were more likely to encode information from anti-tobacco messages. In addition, they were more persuaded by high MSV and Attack messages. This means that in the future, should their PO or NB change, they may have information from anti-tobacco messages that will help them in decision

making. Thus, even though anti-tobacco messages are not necessarily designed with them in mind, they are influential.

There was a surprising finding regarding the tobacco use (TU) measure which should be taken into consideration for future studies. Specifically, how participants answered questions about their tobacco use. The majority of participants indicated that they were not current (95.1%) or former cigarette smokers (89.4%). In addition, the majority of participants stated that they did not currently use cigars (93.8%) or chewing tobacco (100%); nor had they used either in the past, 84.5% and 97.3% respectively. However, when asked further questions about their smoking behaviors: 1) 18.6 percent stated that they smoked between 1-6 cigarettes per day, 2) 19.9 percent indicated that they belonged to one of the smoking groups (former, social, stress, group, daily), 3) 37.2 percent stated that they had smoked when they were younger, 4) 10.6 percent indicated that they used tobacco products in the past week, 5) 82.7 percent stated that they used tobacco products in the past month, and 6) 77.4 percent stated that they used tobacco products in the past year. This suggests that the nominal "yes/no" questions about current and former tobacco use were not as effective in tapping total participant tobacco use and offers a suggestion for future researchers that simple "yes/no" measures of tobacco use should be coupled with ordinal measures like those used here to more fully examine the tobacco use dimension. Likewise, a combination of these measures may be more effective in tapping into alcohol and drug use.

This study has also been effective in filling a gap in the research noted by Neiderdeppe (2005) and Lang (2006b) regarding use of measures of processing and persuasion. By combining measures of message processing with those of persuasion,

attitude change, and emotional response we are able to get a broader understanding of how traditional Blame and the new Attack messages influence audiences. While previous research suggested that there were "diminishing returns" for Attack ads in that since they are no longer novel (they have been around for almost 10 years), they would not be as likely to influence processing as they were when they first came out (Pechmann and Reibling, 2006, p. 911). Findings by Antecol (1998) also suggested that Attack ads were not as effective as Blame because there were no existing memory traces for Attack ads to help audience members in later retrieval. The findings from the current study are the exact opposite as those found by Antecol. Thus, the diminishing returns proposed by Pechmann and Reibling have not occurred, in fact, quite the contrary – Attack ads are superior to Blame. Through this grouping of message processing, persuasion, and emotional response measures it is possible to see that Attack messages are more influential to audience members most at risk, as well as those who are not.

APPENDIXES

Appendix 1
EXPERIMENT RECRUITING SCRIPT

As part of my doctoral dissertation, I am conducting a study regarding public service advertising effects. As part of this research project an experiment is being conducted to gather cognitive and affective information about existing anti-tobacco ads.

Please understand that you will be asked to give your opinion on a number of different anti-tobacco ads. The topic, or some of the examples shown, may be considered sensitive, offensive, or uncomfortable to you.

You are not required to take part in this study. The research consists of answering questions about demographics, Sensation Seeking, and substance use; completing a series of questions about 35 photos from the International Affective Pictures Show (IAPS); viewing a total of 24, 30-second anti-tobacco public service advertisements, and completing an auditory task during each viewing; answering questions about attitudes, beliefs, and feelings following each advertisement; and completing a recognition task regarding the anti-tobacco advertisements previously viewed. The entire process will take 1 hour.

You will not receive monetary payment for your participation. However, your instructor is offering participation points not more than 10% of your total grade for your participation in this study. Should you decide not to participate in this study and you wish to still get credit for a participating class, there is an alternative assignment available for you to do.

If you would like to take part in this study, or have any questions regarding this research project, please feel free to contact the principal investigator, Jensen Moore at jensenmoore@mizzou.edu.

Appendix 2
PSA SCRIPTS

High MSV Attack Messages
Bodybags:
The ad opens outside a major tobacco company with people placing body bags on the sidewalk.
"Excuse me, sorry to bother you but we've got a question. Do you know how many people tobacco kills every day? You know what, we are gonna leave this here for you so you can see what 1,200 people actually look like."

Death:
The ad simulates an advertisement for an upcoming movie.
"We're in a position to make a great deal of money here gentleman."
(Voiceover) "What would you do if you found out your death was being planned by someone you never even met?"
"A lot of people are dying and lot of other people are making money off of it. You just don't wipe out a population the size of Madrid and wake up and play golf the next day."
"Watch me."
(Voiceover) "Tobacco, three million deaths a year… and counting."

Crazyworld:
This ad starts off showing people entering a carnival calledd "Crazy World". A barker calls the following in the background:
"Hello, hello, hello! Hey everybody! Attention folks! Witness the bizarre but true. In 1990 seventeen million bottles of water were voluntarily recalled due to the discovery of small traces of benzene. However, the smoke from just one pack of unfiltered cigarettes has as much benzene as 169 bottles of the contaminated water. What has Big Tobacco done to correct their problem? Nothin'. Welcome to Crazy World."

Memorial:
The ad begins with a view of Washington D.C.
"As you know Washington is full of memorials to people who have died. Well today we are here to build a new one, The Tobacco Memorial. Twelve-hundred loyal customers dead, every day. These are mothers, fathers, brothers… This is so everyone in America can see what Big Tobacco is really up to. If anyone finds this offensive, so do we."

Western:
The ad opens with views of the desert, corralled horses, and people placing body bags on the horses. The people send them galloping into the desert.
"Hayahh! Let's see them put that in a magazine."

Low MSV Attack Messages
$5 Billion:
This ad begins showing a dump truck emptying its contents into the middle of a street. Soon, bull dozers add to the pile accumulating a mound of money.
"Seven out of ten smokers want to quit but can't. This is what five billion dollars would look like. That's the amount of profit the biggest tobacco company would stop making every year if those people could stop smoking. That's a lot of money."

Issues Book:
The ad opens with a view of a red curtain with the words, "The truth behind the curtain." A young woman comes into view as she pushes the curtain aside showing us we are outside on a busy street.
"This is a CEO's Issues book. It was used by a tobacco company in 1996, so their executives would know all the right answers to all the tough questions they got asked. Like, 'In light of health studies, why do you stay in the tobacco business?' Their official answer, 'We believe we can continue to operate our business successfully.' So, 440,000 people die each year. And that's a success?"

Nightclub:
This ad opens in a club showing people dancing. Two men work their way through the crowd holding onto a black bodybag. It ends with somebody holding a sign that says, "What if cigarette ads told the truth?"
"Hot lights, people hooking up. Looks like a cigarette ad to me. Hey man, I think she's checking you out."

Rip It Out:
The ad begins with a young man sitting on a couch reading a magazine. The shot switches to a man giving a presentation about the growth of Big Tobacco. As the young man rips out ads, the man giving the lecture cannot speak.
"Our rate of growth has been phenomenal. Our filtered cigarettes and tobacco products continue their upward trend. We introduce dynamic new elements…."
(cough)
(Voiceover) "Silence Big Tobacco's voice. Rip out every cigarette ad you see. Come to South Gateway Park at Navy Pier on Monday August seventh from eleven to twelve. Rip out ads and get free truth gear."

Times Square:
The ad opens with a view of a red curtain with the words, "The truth behind the curtain." A young man pushes the curtain aside showing us words written by a tobacco executive on display in Time Square.
"We're here at Time Square to talk about a memo that was written in 1978 by a tobacco company executive. It says, 'Very few consumers are aware of the effects of nicotine, i.e., its addictive nature and that nicotine is a poison.' Guess what? A lot more people are aware now."

High MSV Blame Messages
Aorta:
The ad begins with a man in a kitchen lighting his cigarette with a gas stove. The shot switches to gloved hands holding and squeezing fat out of an aorta.
(Voiceover) "Every cigarette is doing you damage. This is part of an aorta, the main artery from the heart. Smoking makes artery walls sticky and collect dangerous fatty deposits. This much was found stuck to the aortal wall of a smoker, age thirty-two. Every cigarette is doing you damage. So the sooner you quit, the better you'll be."

Bowl Cleaner:
The ad begins showing two men in a dirty bathroom stall. Only one of them is smoking.
"You might as well stick you head in that toilet and take a gulp."
"What?"
"Same stuff's in that toilet. Stick it right in there. No wonder cigarette smoking kills more people every year than AIDs and murder combined. Go ahead, smoke away."

Breathe:
This ad shows a young man floating face-down in water.
(Voiceover) "Eventually, you'll have to breathe. It has nothing to do with will power or choice. It's about need. That's the way addiction feels. Once you start smoking, you might not be able to stop. You'll need another cigarette."

Drive:
The ad starts with two people driving in a car. The passenger lights a cigarette and the driver goes off the road nearly crashing the car into trees, rocks, and hills. It ends with a quote, "Each year, 53,000 people die from second hand smoke."
"Look out for the tree! What are you doing?"
"You're endangering my life, just returning the favor."

Inside Story:
This ad begins with a cartoon character smoking cigarettes and performing all of the descriptions being rapped.
"Hey yo, his brain is lackin'. His throat is raspin'. His lungs are hackin'. His dog is gassin'. The gunk is flyin'. The spit is spewin'. Nothin' but dyin'. What he's doin'; pukin', retchin', harpen', carbon, chokin' and croakin'. And that's the inside story of smokin'."
(Voiceover) "Tobacco, it isn't pretty. It isn't healthy. And its gonna cost you."

Low MSV Blame Messages
2001:
The ad starts with a view of two space ships. One, with artificial intelligence, is talking to a man in the other ship who is smoking.
"What are you doing Steve?"
"Just having a cigarette Phil."
"You're endangering the mission Steve."
"Open the pod bay doors please Phil."
"I'm afraid I can't do that Steve."
"What?"
"Cigarette smoke is harmful to my circuits. This spaceship is my home. I can't allow you to smoke in here."
"Phil? Phil?"
"Let them know how you feel about second hand smoke."

Advice:
The ad begins with an attractive girl talking to the camera.
"Ok, here's five things all guys should know. One, don't change into something different when you're around your friends. Two, ring the doorbell, don't beep the horn. Three, hold the onions! Four, it's an invention called the telephone. Use it. Five, nix the smoking! That yellow teeth and cigarette stench thing. It's not working. Are you guy's getting this?"

Bad Breath:
This ad starts showing a view of a man in a rat suit sitting next to a woman on a park bench. It ends with the written phrase, "Most women say they don't like to kiss smokers."
"They say smokers have bad breath. But, since I've quit I've noticed considerable improvement in mine. Here, smell."
"Oh, no."
"No, common', really."
"No. Ok. Ohhh, that is awful! I mean that's terrible! That's halitosis, is what that is. You didn't quit smoking; you just put in a mint."
"No I didn't. I put in three."

Dog:
This ad is a narrated testimonial on "Guys on girls smoking." It ends with the written phrase, "Most guys don't want to be girls who smoke."
"For me, the worst thing about smoke is the smell. My parents smoke. We have this dog, and the smoke gets in his fur. And he'll jump on you, and the smell is so bad. Just this big smokey fur ball. And if a girl is wearing a sweater and I smell smoke, I'm like, gross, Fez. That's the dog, Fez."

Syringe:
The ad begins with a syringe drawing up a yellow liquid. It ends with the written phrase, "Contact your local health department."
"It's one of the most addictive substances you can put in your body. And once you start, it's incredibly difficult to stop. Your friends, family, everyone around you will suffer. Every year, it kills 53,000 Americans who don't even use it. It's second-hand smoke. Get it out of your home before someone gets hurt."

Appendix 3
STIMULI PRE-TEST RECRUITING SCRIPT

As part of my doctoral dissertation, I am conducting a study regarding public service advertising effects. As part of this research project an experiment is being conducted to gather content information about existing anti-tobacco ads.

Please understand that you will be asked to give your opinion on a number of different anti-tobacco ads. The topic, or some of the examples shown, may be considered sensitive, offensive, or uncomfortable to you.

You are not required to take part in this study. The research consists of viewing approximately 60, 30-second anti-tobacco public service announcements, answering questions about the advertisement and completing demographic questions. The entire process will take 1 hour.

You will not receive monetary payment for your participation. However, your instructor is offering participation points not more than 10% of your total grade for your participation in this study. Should you decide not to participate in this study and you wish to still get credit for a participating class, there is an alternative assignment available for you to do.

If you would like to take part in this study, or have any questions regarding this research project, please feel free to contact the principal investigator, Jensen Moore at jensenmoore@mizzou.edu.

Appendix 4
STIMULI PRE-TEST CONSENT FORM

You are invited to be in a research study regarding anti-tobacco advertising. You were selected as a possible participant because you are part of the demographic this particular type of public service advertising is targeted to. We ask that you read this form and ask any questions you may have before agreeing to be in the study.

This study is being conducted by: Jensen Moore, a doctoral candidate at the University of Missouri School of Journalism under the advisement of Dr. Glenn Leshner, a professor at the University of Missouri.

Background Information:
The purpose of this study is to examine the effects of anti-tobacco advertising.

Procedures:
If you agree to be in this study, we would ask you to carry out the following steps:

1. View a series of 40, 30-second anti-tobacco public service advertisements.
2. Complete a series of questions about message content following each advertisement.
3. Complete a questionnaire regarding demographic information.

The entire process will take approximately 1 hour.

Risks and Benefits of Being in the Study:
The anti-tobacco advertisements you will view may have graphic or disturbing material. However, they are advertisements that have already run on television and to which you may have already been exposed. Thus, the risks to participating in this study are similar to those encountered in everyday life.

The benefit is the opportunity to take part in an academic study which examines the effectiveness of socially beneficial advertising.

You will not receive monetary payment for your participation. However, some classes may offer credit for participation. Please ask your instructor prior to participating if credit is available. Should you decide not to participate in this study and you wish to still get credit for a participating class, there is an alternative assignment available for you to do.

Confidentiality:
The records of this study will be kept private. In any sort of report we might publish, we will not include any information that will make it possible to identify you as an

individual. Research records will be kept in a locked file or a password protected computer; only the researcher will have access to the records.

Voluntary Nature of the Study:
Your decision whether or not to participate will not affect your current or future relations with the University of Missouri or the School of Journalism. If you decide to participate, you are free to withdraw at any time without affecting those relationships.

Contacts and Questions:
The principal researcher conducting this study is Jensen Moore. You may ask any questions you have now. If you have questions later, you may contact her by E-mail at: jensenmoore@mizzou.edu or you may contact the research advisor at leshnerg@missouri.edu.

If you have any questions or concerns regarding the study and would like to talk to someone other than the researcher or research advisor, contact MU Campus Institutional Review Board located in 483 McReynolds Hall, phone number (573)882-9585.

Statement of Consent:
I have read the above information. I have asked questions and have received answers. By signing this consent form I am stating that I am at least 18 years of age, and that I consent to participate in the study.

Legibly write your name here: _____

Sign your name here: _____

Name of researcher: Jensen J. Moore_____

Signature of researcher: _____

Date: _____

Appendix 5
STIMULI PRE-TEST

In this experiment you are going to watch a series of short (30-second) anti-tobacco Public Service Announcements. When you are finished answering the questions on this page please turn your packet to the next page. This will signal to the researcher that you are ready to proceed.

Do not turn back to pages you have already completed!

After viewing each PSA you will be asked to indicate on a scale from 1-7 what you thought the message content was. For each section answer by circling the numbers - ***DO NOT CIRCLE THE WORDS.***

According to this ad who/what is the source of the problem?

Is it the individual smoker?

Not at all	1	2	3	4	5	6	7	Very Much

Is it the tobacco companies?

Not at all	1	2	3	4	5	6	7	Very Much

What age group do you think the ad targets?

❒ Under 13
❒ 14-17
❒ 18-24
❒ 25 +

Rate the features/content of the PSA you just saw on the following scales. For example, on the first pair of adjectives if you thought the ad had very unique features/content give it a 1. If you thought the advertisement had very common features/content give it a 7. If you thought the features/content were somewhere in between, give it a 2, 3, 4, 5, or 6. ***DO NOT CIRCLE THE WORDS – CIRCLE THE NUMBERS.***

Unique	1	2	3	4	5	6	7	Common
Powerful Impact	1	2	3	4	5	6	7	Weak Impact
Didn't give me goosebumps	1	2	3	4	5	6	7	Gave me goosebumps

Novel	1	2	3	4	5	6	7	Ordinary
Emotional	1	2	3	4	5	6	7	Unemotional
Boring	1	2	3	4	5	6	7	Exciting
Strong Visuals	1	2	3	4	5	6	7	Weak Visuals
Not Creative	1	2	3	4	5	6	7	Creative
Not Graphic	1	2	3	4	5	6	7	Graphic
Arousing	1	2	3	4	5	6	7	Not arousing
Unusual	1	2	3	4	5	6	7	Usual
Involving	1	2	3	4	5	6	7	Uninvolving
Not intense	1	2	3	4	5	6	7	Intense
Weak soundtrack	1	2	3	4	5	6	7	Strong soundtrack
Undramatic	1	2	3	4	5	6	7	Dramatic
Stimulating	1	2	3	4	5	6	7	Not stimulating
Strong sound effects	1	2	3	4	5	6	7	Weak sound effects

Demographic Questions

Please complete the following demographic questions. Keep in mind your answers are strictly confidential and will not be shared with anyone outside of this study.

1. Age today: _____years

2. Gender:

❒ Male

❒ Female

3. Please choose *one* category that best describes your ethnicity:

- ❒ African American
- ❒ Arabic/Indian
- ❒ Asian
- ❒ Caucasian
- ❒ Eskimo/Inuit
- ❒ Hispanic
- ❒ North American Indian
- ❒ Pacific Islander
- ❒ Other _____(please specify)

4. What is your current year in college?

- ❒ Freshman
- ❒ Sophomore
- ❒ Junior
- ❒ Senior
- ❒ Graduate Student

5. Do you currently smoke 1 or more cigarettes per week?

- ❒ No
- ❒ Yes

6. If you answered "yes" to question 5, how many cigarettes do you think you smoke in an average day? _____cigarettes per day

Thank you for taking part in this study. When you are finished with this questionnaire please give it to the researcher. Make sure to sign the sheet at the front of the room indicating your name and the class you wish to receive credit in for participating in this study. In addition, make sure to get a receipt of participation to give to your instructor. This will be your evidence of participation.

Appendix 6
PRE-TEST DEBRIEFING & PARTICIPATION RECEIPT

The study you just completed is part of a doctoral dissertation designed to test the effectiveness of particular anti-tobacco advertisements – specifically those that use blame or attack messages. This portion of the study was designed to pre-test possible stimuli for the final experiment. Data you provided will help the researcher to determine which stimuli to use for the final experiment.

If you do not wish for the researcher to use your data please let her know at this time.

If you have any questions about this portion of the study please ask them now.

Make sure to take your copy of the written consent form when you leave if you have any questions in the future.

Thank you again for your participation.

Tear off this portion and give it to your instructor. This is your participation receipt. Make sure to fill in your name before turning it in.

Study Name: Anti-tobacco Advertising

Student Name: _____

Date of Participation: _____

Name of Researcher: Jensen Moore

Name of Lab Assistant: _____

Signature of Researcher/Lab Assistant: _____

Appendix 7
WRITTEN CONSENT FORM

You are invited to be in a research study regarding anti-tobacco advertising. You were selected as a possible participant because you are part of the demographic this particular type of public service advertising is targeted to. We ask that you read this form and ask any questions you may have before agreeing to be in the study.

This study is being conducted by: Jensen Moore, a doctoral candidate at the University of Missouri School of Journalism under the advisement of Dr. Glenn Leshner, a professor at the University of Missouri.

Background Information:
The purpose of this study is to examine the effects of anti-tobacco advertising.

Procedures:
If you agree to be in this study, we would ask you to carry out the following steps:

1. Complete questions about demographics, Sensation Seeking, and substance use.
2. Complete a series of questions about 35 photos from the International Affective Pictures Show (IAPS).
3. View a total of 20-24, 30-second anti-tobacco public service advertisements, and complete an auditory task during each viewing.
4. Complete a series of questions about attitudes, beliefs, and feelings following each advertisement.
5. Work on a puzzle for 5 minutes between steps 4 and 6 of the experiment.
6. Complete a recognition task regarding the anti-tobacco advertisements previously viewed.

The entire process will take approximately 1 hour.

Risks and Benefits of Being in the Study:
The photos from the IAPS database you will view may have graphic or disturbing material. However, they are not unlike images you may have seen on cable television. In addition, the anti-tobacco advertisements you will view may have graphic or disturbing material. However, they are advertisements that have already run on television and to which you may have already been exposed. Thus, the risks to participating in this study are similar to those encountered in everyday life.

The benefit is the opportunity to take part in an academic study which examines the effectiveness of socially beneficial advertising. Future anti-tobacco message design may be impacted by your responses in this study.

You will not receive monetary payment for your participation. However, some classes may offer credit for participation. Please ask your instructor prior to participating if credit is available. Should you decide not to participate in this study and you wish to still get credit for a participating class, there is an alternative assignment available for you to do.

Confidentiality:
The records of this study will be kept private. In any sort of report we might publish, we will not include any information that will make it possible to identify you as an individual. Research records will be kept in a locked file or a password protected computer; only the researcher will have access to the records.

Voluntary Nature of the Study:
Your decision whether or not to participate will not affect your current or future relations with the University of Missouri or the School of Journalism. If you decide to participate, you are free to withdraw at any time without affecting those relationships.

Contacts and Questions:
The principal researcher conducting this study is Jensen Moore. You may ask any questions you have now. If you have questions later, you may contact her by E-mail at: jensenmoore@mizzou.edu or you may contact the research advisor at leshnerg@missouri.edu.

If you have any questions or concerns regarding the study and would like to talk to someone other than the researcher or research advisor, contact MU Campus Institutional Review Board located in 483 McReynolds Hall, phone number (573)882-9585.

Statement of Consent:
I have read the above information. I have asked questions and have received answers. By signing this consent form I am stating that I am at least 18 years of age, and that I consent to participate in the study.

Legibly write your name here: _____

Sign your name here: _____

Name of researcher: Jensen J. Moore_____

Signature of researcher: _____

Date: _____

Appendix 8
DEMOGRAPHICS, SENSATION SEEKING, AND TOBACCO USE QUESTIONS

Demographics
Please complete the following demographic questions. Keep in mind your answers are strictly confidential and will not be shared with anyone outside of this study.

1. Age today: _____years

2. Gender:
❒ Male
❒ Female

3. Please choose *one* category that best describes your ethnicity:
❒ African American
❒ Arabic/Indian
❒ Asian
❒ Caucasian
❒ Eskimo/Inuit
❒ Hispanic
❒ North American Indian
❒ Pacific Islander
❒ Other _____(please specify)

4. Is English your primary language?
❒ NO
❒ YES

5. What is your current year in college?
❒ Freshman
❒ Sophomore
❒ Junior
❒ Senior
❒ Graduate Student

6. Please estimate your parent's total household income before taxes:
❒ Less than $20,000
❒ $20,001 to $40,000
❒ $40,001 to $60,000
❒ $60,001 to $80,000
❒ $80,001 to $100,000
❒ $100,001 to $120,000
❒ $120,001 to $140,000
❒ More than $140,001

Sensation Seeking

Please answer the following questions as honestly as possible. Keep in mind your answers are strictly confidential and will not be shared with anyone outside of this study.

Please answer the following questions about your personal characteristics.

I would like to explore strange places.

Strongly disagree 1 2 3 4 5 Strongly agree

I like to do frightening things.

Strongly disagree 1 2 3 4 5 Strongly agree

I like new and exciting experiences, even if I have to break the rules.

Strongly disagree 1 2 3 4 5 Strongly agree

I prefer friends who are exciting and unpredictable.

Strongly disagree 1 2 3 4 5 Strongly agree

Tobacco Use

Please answer the following questions about your tobacco use.

Tobacco products

The following questions pertain to your personal use of tobacco products including cigarettes, chewing tobacco, and cigars.

Are you currently a smoker?

- ❑ Yes
- ❑ No

Have you smoked cigarettes in the past?

- ❑ Yes
- ❑ No

If you answered "yes" to either of the previous two questions, what type of smoker would you classify yourself as?

- ❑ I tried it and didn't like it.
- ❑ I smoked cigarettes a little when I was younger.
- ❑ I am a "social smoker" meaning I'll have some when partying.
- ❑ I am a "stress smoker" meaning I'll have some when under pressure, tense, or anxious.
- ❑ I am a "group smoker" meaning I'll have one when I am around others who are smoking.
- ❑ I smoke on a daily basis.
- ❑ I am a former smoker.
- ❑ Other _____(please explain).

In the *last week*, on average, how often did you use tobacco products (including cigarettes, chewing tobacco, and cigars)?

❒ Never
❒ 1 day
❒ 2 days
❒ 3 days
❒ 4 days
❒ 5 days
❒ 6 days
❒ Daily

In the *last month*, on average, how often did you use tobacco products (including cigarettes, chewing tobacco, and cigars)?

❒ Never
❒ 1 day a month
❒ 2 – 3 days a month
❒ 1-2 days a week
❒ 3-4 days a week
❒ 5-6 days a week
❒ Daily

In the *last year*, on average, how often did you use tobacco products (including cigarettes, chewing tobacco, and cigars)?

❒ Never
❒ 1 month
❒ 2-3 months
❒ 4-5 months
❒ 6-7 months
❒ 8-9 months
❒ 10-11 months
❒ All year

This question pertains to *cigarettes only*. If you did smoke in the last year, how many cigarettes did you smoke, on average, each time you smoked?

❒ None
❒ 1-3
❒ 4-6
❒ 7-9
❒ 10-12
❒ 13-15
❒ 16-18
❒ More than 18

Appendix 9
MINI MOTIVATIONAL ACTIVATION MEASUREMENT II (MINI-MAM II)

35 IAPS slides used:
Picture 1080 – Snake
Picture 1945 – Turtle
Picture 2205 – Hospital
Picture 2320 – Girl Reading
Picture 2440 – Neutral Girl
Picture 2480 – Elderly Man
Picture 2580 – Chess
Picture 2682 – Police Club
Picture 2750 – Drinking Man
Picture 2800 – Crying Child
Picture 4659 – Hardcore Couple I
Picture 4660 – Kissing Couple
Picture 4670 – Hardcore Couple II
Picture 4695 – Hardcore Couple III
Picture 5000 – Flower
Picture 5390 – Boat
Picture 5621 – Sky Diving
Picture 5720 – Farmland
Picture 6020 – Electric Chair
Picture 6831 – Police & Dead Man
Picture 7100 – Fire Hydrant
Picture 7050 – Hair Dryer
Picture 7025 – Stool
Picture 7060 – Trash Can
Picture 7150 – Umbrella
Picture 7380 – Cockroaches
Picture 7900 – Violin
Picture 8030 – Skier
Picture 8185 – Sky Divers
Picture 9041 – Dying Woman
Picture 9140 – Dead Cow
Picture 9290 – Garbage
Picture 9360 – Pool Without Water
Picture 9490 – Corpse
Picture 9830 – Cigarette

MAM Instructions:

In this portion of the experiment you are going to look at pictures. You will view each picture for 6 seconds. After looking at each picture you will be asked to rate, on 3 scales, how you felt while you were looking at it.

First, we ask you to rate how aroused you felt on a 9-point scale where 1 = not at all aroused, not at all excited, not at all awake and 9 = extremely aroused, excited, awake.

Not at all 1 2 3 4 5 6 7 8 9 Extremely

Next, we will ask you to rate both how negative and how positive you felt while viewing each picture. We want you to rate how negative and positive you felt separately. So, you can feel both negative and positive or just negative or positive.

Rate how positive you felt on a 9-point scale where 1 = not at all positive, not at all happy, not at all pleased and 9 = extremely positive, happy, pleased.

Not at all 1 2 3 4 5 6 7 8 9 Extremely

Rate how negative you felt on a 9-point scale where 1 = not at all negative, not at all unhappy, not at all annoyed and 9 = extremely negative, unhappy, annoyed.

Not at all 1 2 3 4 5 6 7 8 9 Extremely

Appendix 10
DEPENDENT MEASURES

After viewing each advertisement you will be asked to indicate different attitudes, beliefs and feelings you experienced.

Attitude Toward the Ad
Please indicate with the following statements what you think about the PSA you just saw.

Overall, what is your impression of the ad?
Disliked it very much 1 2 3 4 5 6 7 Liked it very much

To what degree did you feel positively toward the ad?
Not at all positive 1 2 3 4 5 6 7 Very positive

Overall, how well did you like the ad?
Did not like it at all 1 2 3 4 5 6 7 Liked it very much

Evaluation of the Argument
Please indicate with the following statements what you think about the PSA you just saw.

The ad claims are true.
Strongly disagree 1 2 3 4 5 6 7 Strongly agree

I believe the claims in this ad.
Strongly disagree 1 2 3 4 5 6 7 Strongly agree

The ad is sincere.
Strongly disagree 1 2 3 4 5 6 7 Strongly agree

I think the ad is dishonest.
Strongly disagree 1 2 3 4 5 6 7 Strongly agree

Emotion

Rate how aroused you felt on a 9-point scale where 1 = not at all aroused, not at all excited, not at all awake and 9 = extremely aroused, excited, awake.

Not at all 1 2 3 4 5 6 7 8 9 Extremely

Rate both how negative and how positive you felt while viewing each picture. We want you to rate how negative and positive you felt separately. So, you can feel both negative and positive or just negative or positive.

Rate how positive you felt on a 9-point scale where 1 = not at all positive, not at all happy, not at all pleased and 9 = extremely positive, happy, pleased.

Not at all 1 2 3 4 5 6 7 8 9 Extremely

Rate how negative you felt on a 9-point scale where 1 = not at all negative, not at all unhappy, not at all annoyed and 9 = extremely negative, unhappy, annoyed.

Not at all 1 2 3 4 5 6 7 8 9 Extremely

Behavioral Intent

Please indicate with the following statements what you think your future smoking behaviors will be.

In the future, you might smoke one puff or more of a cigarette.
Definitely NO 1 2 3 4 5 Definitely YES

You might try out cigarette smoking for a while.
Definitely NO 1 2 3 4 5 Definitely YES

If one of your best friends were to offer you a cigarette, you would smoke it.
Definitely NO 1 2 3 4 5 Definitely YES

Appendix 11
DISTRACTER TASK

Solving directions

To solve a Sudoku puzzle, place a number into each box so that each row across, each column down, and each small 9-box square within the larger diagram (there are 9 of these) will contain every number from 1 through 9. In other words, no number may appear more than once in any row, column, or smaller 9-box square. Working with the numbers already given as a guide, complete each diagram with the missing numbers that will lead to the correct solution.

You will have 5 minutes to work on this puzzle. At the end of this time the researcher will instruct you to continue on with the experiment.

		5		1	6			
	4	2			9		5	6
7		6	2				3	
		8	3			1		7
			6	4	1			
6		1			7	2		
	2				3	5		8
8	1		9			6	2	
			4	2		7		

Taken from *Suduko For You! Volume 1* (2006), www.dellmagazines.com.

Appendix 12
EXPERIMENT SCRIPT & INSTRUCTIONS

Step 1 – Study introduction

The following is a greeting script:
Thank you for agreeing to take part in this study regarding college students and anti-tobacco advertising. I am _____(name) a _____ (student status) and I will lead you through each portion of the experiment. The entire process will take 1 hour.

During this study you will answer a number of questions about your personal characteristics, your attitudes, your beliefs, your feelings, and your intentions. Please answer each question as honestly as possible – keeping in mind that your answers are strictly confidential and will not be shared with anyone outside of this study. Your honest answers to the questions will be of great help in determining the effectiveness of the advertisements you will see today.

You are not required to take part in this study. If at any time you wish to withdraw from the study, just let me know and I will be happy to stop the experiment.

Do you have any questions at this time?

Step 2 – Obtain Informed Consent & Give Participants a Subject ID #

A. Read the written consent form to the participant.
B. Ask if they have any questions before signing.
C. Have each participant sign two (2) copies. One is kept for our records, the other is given to them to keep.
D. Assign them a participation identification # (see below).

There are 3 places where you need to identify the participants.
1. The study sign-in sheet where you write their name, the class they are getting credit in, the date, time, your name, and the computer used.
2. In MediaLab where you will assign a number to each participant based on the computer used. 1++) Prime Lab laptop 1 ("yes" on right, "no" on left), 2++) Prime Lab laptop 2 ("yes" on left, "no" on right), 3++) Jensen's laptop. The condition will always be 1 for the experiment. Look at the last subject ID number on the computer log to see what number to assign the participant. Always assign subjects to condition #1.

3. The individual computer log where you write the ID number assigned to the participant and your name. Have participants write their subject ID # on their copy of the written consent form. That way, if they want to drop out of the study at a later time we can use the number to locate their data.

Step 3 – Make sure they are comfortable & Begin the Experiment

A. Have them adjust the seat to a comfortable position.
B. Have them adjust the computer screen to where they can easily and comfortably see everything.
C. Have them adjust the headset for comfort.
D. Begin MediaLab and play the first movie file to make sure they can see and hear everything properly. Have them adjust the audio levels on the headphones and the positioning of the screen if they cannot.
E. Let them know that directions for each portion of the experiment will show up on the computer screen. If they have any questions during the experiment, let them know where you can be found. Also, let them know that you will check in on them from time to time.
F. Have them choose "continue" at the bottom of the screen to proceed with the experiment.

Step 4 – The experiment

These are the steps the participants will be going through so you can keep track of their progress.

1. Demographics, Sensation Seeking, Tobacco Use questionnaire (approx. 5 minutes). The screen will prompt them to continue to the next portion.
2. Mini-MAM II (approx. 10 minutes) – they will see a series of IAPS pictures for 6 seconds each and be asked to rate how positive, negative, and arousing each was. *The first 2 IAPS pictures are practice ones. The computer screen will instruct them to stop before proceeding further. At this time verify that they understand the instructions. Ask them if they have any questions. When they are ready ask them to click on the "continue" button to proceed with the experiment.*
3. Secondary Task Reaction Time (approx. 20 minutes) – they will view a series of 30 second anti-tobacco PSAs. The goal of this section is for them to focus on the advertisements closely as they will be asked memory questions about them later on. During each message they will hear two different "beeps" – the goal is for them to push ***either of the shift buttons*** as quickly and accurately as possible each time they hear a beep. After each advertisement there will be a series of questions for them to answer about that ad. *The first ad is a practice trial to make sure they are comfortable with the controls and can hear everything. They will not be asked any questions between the practice advertisements. The computer screen will instruct them to stop before proceeding further. At this time verify that they*

understand the task, can hear the beep, and know which button to push. Remind them to keep their hands on the keyboard during the videos. Ask them if they have any questions. When they are ready ask them to click on the "continue" button to proceed with the experiment.

4. Distracter Task (5 minutes) - When they are finished, direct them to work on the copy of the Suduko puzzle. The computer screen will remain blank for 5 minutes and will become active again when ready to proceed to the final portion of the experiment. *Let them know that they are not expected to complete the puzzle in that time. At the end of 5 minutes, have them click "continue" at the bottom of the screen.*
5. Recognition Memory (approx. 5 minutes) - The goal of this section is for them to identify if the brief, 2-second exert they hear is one that they were shown at the beginning of the experiment. During each message they are asked to indicate as quickly and accurately as possible if "yes' it was one they saw previously or "no" it was not one they saw previously **(Red= no, Green = yes)**. *There will be 2 practice clips in this section. Make sure they can hear everything and are comfortable with the controls. Tell them to keep their hand on the computer keyboard at all times so that they can quickly react to the clips. Ask them if they have any questions. When they are ready ask them to click on the "continue" button to proceed with the experiment.*

Step 5 – Conclusion, participation receipt and debriefing

A. Write down any problems with the study in the notebook in the waiting area. This includes movies that did not play properly and any error messages that occurred.
B. Once they have completed the study ask them to tell you what they thought the study was about before you debrief them. If they say they thought it was about "effectiveness" (or something similar) just tally it on the notebook in the waiting area. If they thought it was something else (including the real reason for the study – encoding, attention, etc.) write that down in the notebook.
C. Go through the debriefing, sign and date their receipt and give it to them (along with their copy of the consent form) to keep.
D. At the end of your shift go to the online scheduling system. Under "studies" select "uncredited timeslots" and give credit to those who participated during your shift.

Appendix 13
DEBRIEFING & PARTICIPATION RECEIPT

The study you just completed is part of a doctoral dissertation designed to test the effectiveness of particular anti-tobacco advertisements – specifically those that use blame or attack messages. This experiment was designed to examine a number of variables.

1. Message Type – which message type (i.e., those that BLAME the individual or those that ATTACK the tobacco industry) influences processing and persuasion.
2. Motivation Activation Type – whether your individual motivation type (i.e., Coactive, Risk Taker, Risk Avoider, Inactive) influences processing and persuasion.
3. Message Sensation – whether the message sensation level (i.e., highly novel/interesting messages vs. less novel/interesting messages) influences processing and persuasion.
4. Substance Use – whether your personal substance use (i.e., tobacco, alcohol, drugs) correlates with your Motivation Activation type.
5. Sensation Seeking – whether your personal Sensation Seeking characteristics (i.e., experience seeking, thrill seeking, disinhibition, boredom susceptibility) correlates with your Motivation Activation type.
6. Encoding – the task you completed where you identified when you heard the auditory tone in the PSA helps us to determine resources available for encoding.
7. Recognition Memory – the task you completed where you identified whether or not the PSA segment was one you had previously viewed helps us to determine how well the message was encoded when you first saw it.
8. Persuasiveness – these measures help us to see what your overall attitudes and beliefs about each ad were and how those relate to message type, message sensation value, and your performance on the encoding tasks.
9. Emotional Affect – these measures help us to see what your overall feelings were toward each ad and how those relate to message type, message sensation value, and your performance on the encoding tasks.
10. Behavioral Intent – this measure helps us to see if your smoking behaviors were likely to change based on a particular message and how those related to message type, message sensation value, and your performance on the encoding tasks.

Data you provided will help the researcher to determine which type of message and what message sensation value is more effective for certain types of individuals. If you do not wish for the researcher to use your data please let her know at this time.

If you have any questions about this experiment please ask them now.

Make sure to take your copy of the written consent form when you leave if you have any questions in the future.

Thank you again for your participation.

This is your participation receipt. Make sure to fill in your name before turning it in to your instructor/teaching assistant. You need this receipt in order to get participation credit.

Study Name: Anti-tobacco Advertising

Student Name: _____

Date of Participation: _____

Name of Researcher: Jensen Moore

Name of Lab Assistant: _____

Signature of Researcher/Lab Assistant: _____

REFERENCES

Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior*. Englewood Cliffs, NJ: Prentice-Hall.

Anderson, D. R., & Burns, J. (1991). Paying attention to television. In J. Bryant & D. Zillmann (Eds.), *Responding to the screen: Reception and reaction processes* (pp. 3-26). Hillsdale, NJ: Lawrence Erlbaum Publishers.

Antecol, M. (1998). *Effects of individually-focused v. structurally-focused arguments in anti-smoking television commercials.* Dissertation presented at the University of Missouri, Columbia, MO.

Arheart, K. L., Sly, D. F., Trapido, E. J., Rodriguez, R. D., & Ellestad, A. J. (2004). Assessing the reliability and validity of anti-tobacco attitudes/beliefs in the context of campaign strategy. *Preventive Medicine, 39*, 909-918.

Armony, J. L., & LeDoux, J. E. (2000). How danger is encoded: Toward a systems, cellular, and computational understanding of cognitive-emotional interaction in fear. In M. S. Gazzaniga (Ed.), *The new cognitive neurosciences* (2nd ed., pp. 1067-1079). Cambridge, MA: MIT Press.

Arndt, J., Goldenberg, J. L., Greenberg, J., Pyszczynski, T., & Solomon, S. (2000). Death can be hazardous to your health: Adaptive and ironic consequences of defenses against the terror of death. In P. R. Dubenstein & J. M. Masling (Eds.), *Psychodynamic perspectives on sickness and health* (pp. 201-257). Washington D.C.: American Psychological Association.

Atkin, C., & Marshall, A. (1996). Health communication. In M. B. Salwen & D. W. Stacks (Eds.), *An integrated approach to communication theory and research* (pp. 479-495). Mahwah, NJ: Lawrence Erlbaum Associates.

Ball, M. A. (2001). Ernest G. Bormann: Roots, revelations, and results of Symbolic Convergence Theory In J. A. Kuypers & A. King (Eds.), *Twentieth-century roots of rhetorical studies*. Westport, CN: Praeger.

Baguley, T. (2004). An introduction to sphericity. Retrieved on April 17, 2005 from http://www.abdn.ac.uk/~psy317/personal/files/teaching/spheric.htm.

Bandura, A. (1977). *Social learning theory*. Englewood Cliffs, NJ: Prentice Hall.

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

Bandura, A. (1994). Social cognitive theory of mass communication. In J. Bryant & D. Zillman (Eds.), *Media effects: Advances in theory and research* (pp. 61-90). Hillsdale, NJ: Lawrence Erlbaum Associates.

Bandura, A. (1998). *Self-efficacy. The exercise of control*. New York: W.H. Freeman and Company.

Basil, M. (1994). Secondary reaction-time measures. In A. Lang (Ed.), *Measuring Psychological Responses to the media*. Hillsdale, New Jersey: Lawrence Erlbaum Associates.

Basil, M. D., Brown, W. J., & Bocarnea, M. C. (2002). Differences in univariate values versus multivariate relationships: Findings from a study of Diana, Princess of Wales. *Human Communication Research, 28*(4), 501-514.

Becker, C. M., McMahan, S., Etnier, J., & Nelson, J. R. (2002). The potency of health promotion versus disease prevention messages in a college population. *American Journal of Health Studies, 18*(1), 26-30.

Beisecker, T. D., & Parson, D. W. (1972). *The process of social influence: Reading in persuasion*. London: Prentice Hall.

Benoit, W. L., & Harthcock, A. (1999). Attacking the tobacco industry: a rhetorical analysis of advertisements by the campaign for tobacco-free kids. *Southern Communication Journal., 65*(1).

Bohner, G., & Wanke, M. (2002). *Attitudes and attitude change*. New York: Taylor and Francis.

Bolls, P. D. (2002). I can hear you, but can I see you? The use of visual cognition during exposure to high-imagery radio advertisements. *Communication Research, 29*(5), 537-563.

Bolls, P. D., Lang, A., & Potter, R. F. (2001). The effects of message valence and listener arousal on attention, memory, and facial muscular responses to radio advertisements. *Communication Research, 28*(5), 627-651.

Bradley, M. M. (2000). Emotion and motivation. In J. T. Cacioppo, L. G. Tassinary & G. G. Bernston (Eds.), *Handbook of psychophysiology* (2nd ed., pp. 602-642). Cambridge: Cambridge University Press.

Bradley, M. M., and Lang, P.J. (2001). Measuring emotion: Behavior, feeling and physiology. In R.D. Lane & L. Nadel (Eds.), *Cognitive neuroscience of emotion* (pp. 242-276). New York: Oxford University Press.

Broadbent, D. E. (1954). The role of auditory localization in attention and memory span. *Journal of Experimental Psychology, 47*, 191-196.

Broadbent, D. E. (1958). *Perception and communication*. New York: Pergamon Press.

Brown, S. P., Homer, P. M., & Inman, J. (1998). A meta-analysis of relationships between ad-evoked feelings and advertising responses. *Journal of Marketing Research, 35*(1), 114-126.

Burke, M. C., & Edell, J. A. (1986). Ad reactions over time: Capturing changes in the real world. *Journal of Consumer Research, 13*(June), 114-118.

Burton, S., & Lichtenstein, D. R. (1988). The effect of ad claims and ad context on attitude toward the advertisement. *Journal of Advertising, 17*(1), 3-11.

Burton, S., & Zinkhan, G. M. (1989). An examination of three multidimensional profiles for assessing consumer reactions to advertisements. *Journal of Advertising, 18*.

Cacioppo, J. T., & Bernston, G. G. (1994). Relationship between attitudes and evaluative space: A critical review, with emphasis on the separability of positive and negative substrates. *Psychological Bulletin, 115*, 401-423.

Cacioppo, J. T., & Gardner, W. L. (1999). Emotion. *Annual Review of Psychology, 50*, 191-214.

Cacioppo, J. T., Gardner, W. L., & Bernston, G. G. (1997). Beyond bipolar conceptualizations and measures: The case of attitudes and evaluative space. *Personality and Social Psychology Review, 1*, 3-25.

Calfee, R. C. (1985). *Experimental methods in psychology*. Orlando:FL: Harcourt School Publishers.

Cameron, G. T., & Frieske, D. A. (1994). The time needed to answer: Measurement of memory response latency. In A. Lang (Ed.), *Measuring psychological responses to media messages*. Hillsdale, NJ: Lawrence Erlbaum Associates, Publishers.

Campaign for Tobacco Free Kids (2005a). Smoking and other drug use. Retrieved June 23, 2005 from www.tobaccofreekids.org.

Campaign for Tobacco Free Kids (2005b). Tobacco and socioeconomic status. Retrieved June 23, 2005 from www.tobaccofreekids.org.

Campbell, D. T., & Stanley, J. C. (1963). *Experimental and quasi-experimental designs for research*. Boston: Houghton Mifflin Company.

Cappella, J. N. (2006). Integrating message effect and behavior change theories: Organizing comments and unanswered questions. *Journal of Communication, 56*, S265-S279.

Carlson, P. (2001, August 10). Big Tobacco burned by cigarette spots; Funds from industry settlement used to create anti-smoking campaign. *The Washington Post*.

Carver, C. S., & Scheier, M. F. (1990). Origins and functions of positive and negative affect: A control-process view. *Psychological Review, 97*(1), 19-35.

Chaffee, S. H., & Schleuder, J. (1986). Measurement and effects of attention to news media. *Human Communication Research, 13*(76-107).

Chassin, L., Presson, C., Sherman, S. J., Corty, E., & Olshavsky, R. W. (1984). Predicting the onset of cigarette smoking in adolescents: A longitudinal study. *Journal of Applied Social Psychology, 14*, 224-243.

Choi, W. S., Gilpin, E., Farkas, A. J., & Pierce, J. P. (2001). Determining the probability of future smoking among adolescents. *Addiction, 96*, 313-323.

Clark, M. S., & Isen, A. M. (1982). Toward understanding of the relationship between feeling states an social behavior. In A. H. A. Isen (Ed.), *Cognitive social psychology*. New York: Elsevier-North Holland.

Conrad, K., Flay, B. R., & Hill, D. (1992). Why children start smoking cigarettes: Predictors of onset. *British Journal of Addiction, 102*, 689-701.

Craig, K. D. (1999). Emotions and psychobiology. In P. D. Wall & R. Melzack (Eds.), *Textbook of pain* (4th ed., pp. 331-343). Edinburgh, UK: Churchill Livingstone.

Craik, F. I., & Lockhart, R. S. (1972). Levels of processing: A framework for memory research. *Journal of Verbal Learning and Verbal Behavior, 11*, 671-684.

Crockett, W. H. (1988). Schemas, affect and communication. In L. Donohew, H. E. Sypher & E. T. Higgins (Eds.), *Communication, social cognition and affect* (pp. 33-52). Hillsdale, NJ: Lawrence Erlbaum.

DeFleur, M. L., Davenport, L., Cronin, M., & DeFleur, M. (1992). Audience recall of news stories presented by newspaper, computer, television and radio. *Journalism Quarterly, 69*(4), 1010-1022.

Deighton, J., Romer, D., & McQueen, J. (1989). Using drama to persuade. *Journal of Consumer Research, 16*, 335-343.

Deutsch, J. A., & Deutsch, D. (1963). Attention: Some theoretical considerations. *Psychological Review, 70*, 80-90.

Dillard, J. P., & Peck, E. (2000). Affect and persuasion: Emotional responses to public service announcements. *Communication Research, 27*(4), 461-495.

Dillard, J. P., Plotnik, C. A., Godbold, L. C., Freimuth, V. S., & Edgar, T. (1996). The multiple affective outcomes of AIDS PSAs: Fear appeals do more than scare people. *Communication Research, 23*, 44-72.

Donohew, L. (1990). Public health campaigns: Individual message strategies and a model. In E. B. Ray & L. Donohew (Eds.), *Communication and health: Systems and applications* (pp. 136-152). Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.

Donohew, L., Lorch, E. P., & Palmgreen, P. (1998). Applications of a theoretical model of information exposure to health interventions. *Human Communication Research, 24*, 454-468.

Donohew, L., Palmgreen, P., & Duncan, J. (1980). An activation model of information exposure. *Communication Monographs, 47*(4), 295-303.

Donohew, L., Zimmerman, R. S., Cupp, P. S., Novak, S., Colon, S., & Abell, R. (2000). Sensation Seeking, impulsive decision-making, and risky sex: Implications for risk-taking and design interventions. *Personality and Individual Differences, 28*, 1079-1091.

Donovan, J. E., & Jessor, R. (1985). Structure of problem behavior in adolescent and young adulthood. *Journal of Consulting and Clinical Psychology, 53*, 890-904.

Dorfman, L., & Wallack, L. M. (1993). Advertising health: The case for counter-ads. *Public Health Reports, 108*(6), 716-726.

Driscoll, M. P. (2000). *Psychology of learning for instruction* (2nd ed.). Boston: Allyn and Bacon.

Edell, J. A., & Burke, M. C. (1987). The power of feelings in understanding advertising effects. *Journal of Consumer Research, 14*, 421-433.

Elvin, J. (2001, March 5). Individual rights going up in smoke. *Insight on the News, 17,* 48.

Empirisoft.com. (2006a). DirectRT reaction time software for psychology experiments. Retrieved June 26, 2006, from http://www.empirisoft.com/DirectRT.aspx.

Empirisoft.com. (2006b). MediaLab research software for psychology experiments. Retrieved June 26, 2006, from http://www.empirisoft.com/medialab.aspx.

Empirisoft.com. (2006c). Reaction time hardware: DirectIN button boxes and keyboards for psychology responses. Retrieved June 26, 2006, from http://www.empirisoft.com/Hardware.aspx.

Engle, R. W., & Oransky, N. (1999). Multi-store versus dynamic models of temporary storage in memory. In R. J. Sternberg (Ed.), *The nature of cognition* (pp. 515-555). Cambridge, MA: MIT Press.

Eveland, W. P., & Dunwoody, S. (2001). User control and structural isomorphism or disorientation and cognitive load? Learning from the web versus print. *Communication Research, 28*(1), 48-78.

Everett, M. W., & Palmgreen, P. (1995). Influences of Sensation Seeking, message sensation value, and program context on effectiveness of anticocaine public service announcements. *Health Communication, 7*(3), 225-248.

Farrelly, M. C., Davis, K. C., Haviland, M. L., Messeri, P., & Healton, C. G. (2005). Evidence of a dose—response relationship between "truth" antismoking ads and youth smoking prevalence. *American Journal of Public Health, 95*(3), 425-431.

Farrelly, M. C., Healton, C. G., Davis, K. C., Messeri, P., Hersey, J. C., & Haviland, M. L. (2002). Getting to the truth: Evaluating national tobacco countermarketing campaigns. *American Journal of Public Health, 92*(6), 901-907.

Fazio, R. H. (1995). Attitudes as object-evaluation associations: Determinants, consequences, and correlates of attitude accessibility. In R. E. Petty & J. A. Krosnick (Eds.), *Attitude strength: Antecedents and consequences*. Mahwah, NJ: Lawrence Erlbaum.

Feigenbaum, E. A., & Feldman, J. (1995). *Computers and thought*. Cambridge, MA: MIT Press.

Flanagin, A. J., & Metzger, M. J. (2000). Perceptions of Internet information credibility. *Journalism and Mass Communication Quarterly, 77*(3), 515-540.

Flay, B. R. (1987). Mass media and smoking cessation: A critical review. *American Journal of Public Health, 77*(2), 153-160.

Flay, B. R., & Cook, T. D. (1981). Evaluation of mass media prevention campaigns. In R. E. Rice & W. J. Paisley (Eds.), *Public communication campaigns* (pp. 239-264). London: Sage Publications, Inc.

Flay, B. R., Miller, T. Q., Hedeker, D., Siddiqui, O., Britton, C. F., Brannon, B. R., et al. (1995). The television, school and family smoking prevention and cessation project, VIII: Student outcomes and mediating variables. *Preventive Medicine, 24*, 29-40.

Friestad, M., & Thorson, E. (1993). Remembering ads: The effects of encoding strategies, retrieval cues, and emotional response. *Journal of Consumer Psychology, 2*, 1-24.

Friestad, M., & Wright, P. (1994). The persuasion knowledge model: How people cope with persuasion attempts. *Journal of Consumer Research, 21*(1), 1-31.

Garner, W. R. (1974). Attention: The processing of multiple sources of information. In E. C. Carterette & M. P. Friedman (Eds.), *Handbook of perception II*. New York: Academic Press.

Geske, J., & Bellur, S. (2006). *Krugman revisited: Brain wave measures of media involvement for print and television*.Paper presented at the Association for Education in Journalism and Mass Communication Conference.

Gibson, J. J. (1941). A critical review of the concept of set in contemporary experimental psychology. *Psychological Bulletin, 38*, 781-817.

Goldman, L., & Glantz, S. A. (1998). Evaluation of anti-smoking advertising campaigns. *Journal of the American Medical Association, 279*(March), 772-777.

Gonzalez, J., Field, T., Yando, R., Gonzalez, K., Lasko, D., & Bendell, D. (1994). Adolescents' perceptions of their risk-taking behavior. *Adolescence, 29*(115), 701-709.

Gorsuch, R. L., & Butler, M. C. (1976). Initial drug use: A review of predisposing social psychological factors. *Psychological Bulletin, 83*, 120-137.

Greenberg, J., Solomon, S., & Pyszczynski, T. (1997). Terror Management Theory of self-esteem and cultural worldviews: Empirical assessments and conceptual refinements. *Advances in Experimental Social Psychology, 29*, 61-139.

Greene, K., Kremar, M., Rubin, D. L., Henley Walters, L., & Hale, J. L. (2002). Elaboration in processing adolescent health messages: The impact of egocentrism and Sensation Seeking on message processing. *Journal of Communication, 52*(4), 812-831.

Gunther, A. C., Bolt, D., Borzekowski, D. L. G., Liebhart, J. L., & Dillard, J. P. (2006). Presumed influence on peer norms: How mass media indirectly affect adolescent smoking. *Journal of Communication, 56*, 52-68.

Guttman, N., & Ressler, W. H. (2001). On being responsible: Ethical issues in appeals to personal responsibility in health campaigns. *Journal of Health Communication, 6*, 117-136.

Hancock, P. A., Masalonis, A. J., & Parasuraman, R. (2000). On the theory of fuzzy signal detection: Theoretical and practical considerations. *Theoretical Issues in Ergonomic Science, 1*(3), 207-230.

Hayes, A. F. (2005). *Statistical Methods for Communication Science*. Mahwah, New Jersey: Lawrence Erlbaum Associates.

Hazlett, R. L., & Hazlett, S. Y. (1999). Emotional response to television commercials: Facial EMG vs. self-report. *Journal of Advertising Research, 39*, 7-23.

Hersey, J. C., Niederdeppe, J., Evans, W. D., Nonnemaker, J., Blahut, S., Farrelly, M. C., et al. (2003). The effects of state counterindustry media campaigns on beliefs, attitudes, and smoking status among teens and young adults. *Preventive Medicine, 37*, 544-552.

Higgins, E. T. (1997). Beyond pleasure and pain. *American Psychologist, 52*, 1280-1300.

Hitchon, J. C., & Thorson, E. (1995). Effects of emotion and product involvement on the experience of repeated commercial viewing. *Journal of Broadcasting & Electronic Media, 39*, 379-389.

Hovland, C. I., Janis, I. L., & Kelley, J. J. (1953). *Communication and persuasion*. New Haven, CT: Yale University Press.

Huberty, C. J., & Morris, J. D. (1989). Multivariate analysis versus multiple univariate analysis. *Psychological Bulletin, 105*, 302-308.

Ingersoll, G. M., & Orr, D. P. (1989). Behavioral and emotional risk in early adolescents. *Journal of Early Adolescence, 9*(4), 396-407.

Isen, A. (1993). Some ways in which affect influences cognitive processes: Implications for advertising and consumer behavior. In P. Cafferata & A. M. Tybout (Eds.), *Cognitive and affective responses to advertising* (pp. 91-117). Lexington, MA: D.C. Health and Company.

Ito, T. A., Larsen, J. T., Smith, N. K., & Cacioppo, J. T. (1998). Negative information weighs more heavily on the brain: The negativity bias in evaluative categorizations. *Journal of Personality and Social Psychology, 75*, 887-900.

Jacoby, L. L., & Kelley, C. M. (1992). A process-dissociation framework for investigating unconscious influences: Freudian slips, projective tests, subliminal perception, and signal detection theory. *Current Directions in Psychological Science, 1*(6), 174-179.

Jessor, S. J., & Jessor, R. (1997). *Problem behavior and psychosocial development: A longitudinal study of youth*. New York: Academic Press.

Kahneman, D. (1999). Objective happiness. In D. Kahneman, E. Diener & N. Schwarz (Eds.), *Well-being: The foundations of hedonic psychology* (pp. 3-25). New York: Russell Sage Foundation.

Kahneman, D., & Treisman, A. (1984). Changing views of attention and automaticity. In R. Parasuraman & D. R. Davies (Eds.), *Varieties of attention* (pp. 29-61). New York: Academic Press.

Kamp, E., & MacInnis, D. J. (1995). Characteristics of portrayed emotions in commercials: When does what is shown in ads affect viewers? *Journal of Advertising Research, 35*(November/December), 19-28.

Kandel, E. R., Schwartz, J. H., & Jessell, T. M. (2000). *Principles of neural science* (2nd ed.). New York: McGraw-Hill.

Kaplan, R. M. (2000). Promoting wellness: Biomedical versus outcome models. In M. S. Jamner & D. Stokols (Eds.), *Promoting human wellness: New frontiers for research, practice, and policy* (pp. 44-77). Berkeley, CA: University of California Press.

Kazarian, S. S., & Evans, D. R. (2001). *Handbook of cultural health psychology*. New York: Academic Press.

Kiernan, J. A. (1998). *Barr's the human nervous system: An anatomical viewpoint* (7th ed.). Philadelphia, PA: Lipcott-Raven Publishers.

Kihlstrom, J. F. (1999). Conscious versus unconscious cognition. In R. J. Sternberg (Ed.), *The nature of cognition* (pp. 113-135). Cambridge, MA: MIT Press.

Klatzky, R. L. (1980). *Human memory: Structures and processes* (2nd ed.). New York: W.H. Freeman and Company.

Klitzner, M., Gruenewald, P. J., & Bamberger, E. (1991). Cigarette advertising and adolescent experimentation with smoking. *British Journal of Addiction, 86*, 287-298.

Kornbrot, D. E. (2006). Signal detection theory, the approach of free choice: model-based and distribution-free measures. *Perception & Psychophysics, 68*(3), 393-414.

Kotler, P., Roberto, N., & Lee, N. (2002). *Social marketing: Improving the quality of life* (2nd ed.). Thousand Oaks, CA: Sage Publications.

Krosnick, J. A., Chang, L., Sherman, S. J., Chassin, L., & Presson, C. (2006). The effects of beliefs about the health consequences of cigarette smoking on smoking onset. *Journal of Communication, 56*, S18-S37.

Krosnick, J. A., & Petty, R. E. (1995). Attitude strength: An overview. In R. E. Petty & J. A. Krosnick (Eds.), *Attitude strength: Antecedents and consequences* (pp. 247-282). Hillsdale, NJ: Lawrence Erlbaum.

Krugman, H. E. (1971). Brain wave measures of media involvement. *Journal of Advertising Research, 11*(1), 3-9.

Kymalaninen, J. A., & Weisman, A. (2004). Reactions toward mental, physical, and substance-abuse disorders. *Journal of Applied Social Psychology, 34*, 1883-1899.

Lang, A. (1995). Defining audio/video redundancy from a limited-capacity information processing perspective. *Communication Research, 22*(1), 86-115.

Lang, A. (2000). The limited capacity model of mediated message processing. *Journal of Communication, 50*, 46-70.

Lang, A. (2006a). Motivation, motivated cognition, and coactivation. Columbia, MO: Presentation at University of Missouri School of Journalism.

Lang, A. (2006b). Using the limited capacity model of motivated mediated message processing (LC4MP) to design effective cancer communication messages. *Journal of Communication 56*(Special Issue), S57-S80.

Lang, A., & Basil, M. (1998). Attention, resource allocation, and communication research: What do secondary task reaction times measure anyway? In M. E. Roloff & G. D. Paulson (Eds.), *Communication Yearbook* (Vol. 21, pp. 443-473). Thousand Oaks, CA: Sage Publications.

Lang, A., Bolls, P. D., & Kawahara, K. (1996). *The effects of arousing message content and structural complexity on television viewers' arousal and allocation of processing resources*.Unpublished manuscript, Paper presented to the Midwest Artificial Intelligence and Cognitive Science Conference.

Lang, A., Borse, J., Wise, K., & Prabu, D. (2002). Captured by the World Wide Web: Orienting to structural and content features of computer-presented information. *Communication Research, 29*(3), 215-245.

Lang, A., Bradley, S. D., Park, B., Shin, M., & Chung, Y. (2005). Parsing the resource pie: Using STRTs to measure attention to mediated messages. *Media Psychology 8*(4), 269-294.

Lang, A., Bradley, S.D., Sparks, J.V. Jr., & Lee, S. (2007). The Motivation Activation Measure (MAM): How well does MAM predict individual differences in physiological indicators of appetitive and aversive activation? *Communication Methods and Measures, 1*(2), 113-136.

Lang, A., Chung, Y., & Lee, S. (2005). It's the product: Do risky products compel attention and elicit arousal in media users? *Health Communication, 17*(3), 283-300.

Lang, A., Dhillon, K., & Dong, Q. (1995). The effects of emotional arousal and valence on television viewers' cognitive capacity and memory. *Journal of Broadcasting and Electronic Media, 39*(3), 313-327.

Lang, A., Geiger, S., Strickwerda, M., & Sumner, J. (1993). The effects of related and unrelated cuts on television viewers' attention, processing capactiy, and memory. *Communication Research, 20*(1), 4-29.

Lang, A., Schwartz, N., Chung, Y., & Lee, S. (2004). Processing substance abuse messages: Production pacing, arousing content, and age. *Journal of Broadcasting and Electronic Media, 48*(1), 61-88.

Lang, A., Shin, M., & Lee, S. (2005). Sensation Seeking, motivation, and substance use: A dual system approach. *Media Psychology, 7*, 1-29.

Lang, A., Wang, Z., & Bradley, S. D. (2004). *Motivational Activation Measurement (MAM): Technical manual and normative ratings*. Bloomington: Institute for Communication Research, Indiana University.

Lang, A., Zhou, S., Schwartz, N., Bolls, P. D., & Potter, R. F. (2000). The effects of edits on arousal, attention, and memory for television messages: When an edit is an edit can an edit be too much? *Journal of Broadcasting and Electronic Media, 44*(1), 94-109.

Lang, P. J. (1995). The emotion probe: Studies of motivation and attention. *American Psychologist, 50*(5), 372-385.

Lang, P. J., Bradley, M. M., & Cuthbert, B. N. (1990). Emotion, attention, and the startle reflex. *Psychological Review, 9*, 377-395.

Lang, P. J., Bradley, M. M., & Cuthbert, B. N. (1997). Motivated attention: Affect, activation, and action. In P. J. Lang, R. F. Simons & M. T. Balaban (Eds.), *Attention and orienting: Sensory and motivational processes*. Hillsdale, NJ: Erlbaum.

Lang, P. J., Bradley, M. M., & Cuthbert, B. N. (1999). *International Affective Picture System (IAPS): Instruction manual and affective ratings* (No. Technical Report No. A-4). Gainesville, FL: University of Florida, The Center for Research in Psycholophysiology.

Lang, P. J., Greenwald, A. G., Bradley, M. M., & Hamm, A. O. (1993). Looking at pictures: Evaluative, facial, visceral, and behavioral responses. *Psychophysiology, 16*, 495-512.

Lazarus, R. S., Coyne, J. C., & Folkman, S. (1984). Cognition, emotion and motivation: The doctoring of Humpty-Dumpty. In K. R. Scherer & P. Ekman (Eds.), *Approaches to emotion* (pp. 221-237). Hillsdale, NJ: Lawrence Erlbaum Associates.

Lee, M. J., & Ferguson, M. A. (2002). Effects of anti-tobacco advertisements based on risk-taking tendencies: Realistic fear vs. vulgar humor. *Journalism and Mass Communication Quarterly, 79*(4), 945-963.

Lindblom, E., & McMahon, K. (2005). Toll of tobacco in the United States of America. Retrieved June 23, 2005 from www.tobaccofreekids.org.

Lindsey, L. L. M. (2005). Anticipated guilt as behavioral motivation: An examination of appeals to help unknown others through bone marrow donation. *Human Communication Research, 31*(4), 453-481.

Lipsitt, L. P., & Mitnik, L. L. (1991). *Self-regulating behavior and risk taking: Causes and consequences*. Norwood, NJ: Ablex Publishing.

Lorch, E. P., Palmgreen, P., Donohew, L., Helm, D., Baer, S. A., & D'Silva, M. U. (1994). Program context, Sensation Seeking, and attention to televised anti-drug public service announcements. *Human Communication Research, 20*, 390-412.

Lutz, R. J. (1985). Affective and cognitive antecedents of attitude toward the ad: A conceptual framework. In L. F. Alwitt & A. A. Mitchell (Eds.), *Psychological processes and advertising effects* (pp. 45-64). Hillsdale, NJ: Lawrence Erlbaum Associates.

MacKenzie, S. B., Lutz, R. J., & Belch, G. E. (1986). The role of attitude toward the ad as a mediator of advertising effectiveness: A test of competing explanations. *Journal of Marketing Research, 28*(May), 130-143.

Macmillan, N. A., & Creelman, C. D. (2005). *Detection theory: A user's guide* (2nd ed.). Mahwah, New Jersey: Lawrence Erlbaum Associates, Publishers.

Maddux, J. E., & Rogers, R. W. (1983). Protection motivation and self-efficacy: A revised theory of fear appeals and attitude change. *Journal of Experimental Social Psychology, 19*(September), 469-479.

Marr, D. (1982). *Vision: A computational investigation into the human representation and processing of visual information*. New York: Freeman and Co.

Martin, C. A., Kelly, T. H., Rayens, M. K., Brogli, B., Himelreich, K., Brenzel, A., et al. (2004). Sensation Seeking and symptoms of disruptive disorder: Association with nicotine, alcohol, and marijuana use in early and mid-adolescents. *Psychological Reports, 94*, 1075-1082.

McGuire, W. J. (1978). An information-processing model of advertising effectiveness. In H. L. Davis & A. H. Silk (Eds.), *Behavioral and management sciences in marketing* (pp. 156-180). New York: Ronald Press.

McNeill, A. D., Jarvis, M. J., Stapleton, J. A., Russell, M. D., Eiser, J. R., Gammage, P., et al. (1988). Prospective study of factors predicting uptake of smoking in adolescents. *Journal of Epidemiology and Community Health, 43*, 72-78.

Melzack, O. R., & Wall, P. D. (1982). *The challenge of pain*. New York: Basic Books.

Millar, M. G., & Millar, K. U. (1996). Effects of message anxiety on disease detection and health promotion behaviors. *Basic and Applied Social Psychology, 18*(1), 61-74.

Minkler, M. (2000). Health promotion: At the dawn of the 21st century. In M. S. Jamner & D. Stokols (Eds.), *Promoting human wellness: New frontiers for research, practice, and policy* (pp. 349-377). Berkely, CA: University of California Press.

Mitchell, A. A., & Olson, J. C. (1981). Are product attribute beliefs the only mediator of advertising effects on brand attitude? *Journal of Marketing Research, 18*, 318-332.

Monahan, J. L. (1995). Thinking positively: Using positive affect when designing health messages. In E. Maibach & R. L. Parrott (Eds.), *Designing health messages* (pp. 81-98). Thousand Oaks, CA: Sage Publications.

Monohan, J. L. (1995). Thinking positively: Using positive affect when designing health messages. In E. Maibach & R. L. Parrott (Eds.), *Designing health messages* (pp. 81-98). Thousand Oaks, CA: Sage Publications.

Moore, J. (2007). *Veni, Vidi, Vici: How Truth fought Big Tobacco*. Paper presented at the American Academy of Advertising Conference.

Moore, J., & Greenwood, K. (2005). *Unselling the cigarette: A content analysis of persuasive elements of two types of national anti-tobacco advertisements*. Paper presented at the Association for Education in Journalism and Mass Communication Conference.

Moore, J., & Reinardy, S. (2005). *A rhetorical analysis of the message of the Target Market anti-tobacco campaign*. Paper presented at the International Communication Association Conference.

Morgan, S. E., Palmgreen, P., Stephenson, M. T., Hoyle, R. H., & Lorch, E. P. (2003). Associations between message features and subjective evaluations of the sensation value of antidrug public service announcements. *Journal of Communication, September*, 512-526.

Morris, J. D., Woo, C., Geason, J. A., & Kim, J. (2002). The power of affect: Prediction intention. *Journal of Advertising Research, May/June*, 7-17.

Multistate Settlement with the Tobacco Industry (1998). Accessed June 23, 2005 from http://www.library.ucsf.edu/tobacco/litigation/msa.pdf.

Murphy, K. R., & Myors, B. (2004). *Statistical power analysis: A simple and general model for traditional and modern hypothesis tests* (2nd Edition). Mahwah, NJ: Lawrence Erlbaum Associates.

Murray, J.P., Stam, A., & Lastovicka, J.L. (1996). Paid - versus donated - media strategies for public service announcement campaigns. *Public Opinion Quarterly, 60*(1), 1-29.

Neisser, U. (1967). *Cognitive psychology*. New York: Appleton-Century-Crofts.

Newcomb, M. D., & Felix-Ortiz, M. (1992). Multiple protective and risk factors for drug use and abuse: Cross sectional and prospective findings. *Journal of Personality and Social Psychology, 63*, 280-296.

Niederdeppe, J. (2005). Syntactic indeterminacy, perceived message sensation value-enhancing features, and message processing in the context of anti-tobacco advertisements. *Communication Monographs, 72*, 324-344.

Niederdeppe, J., Lindsey, D., Girlando, M., Ulasevich, A., & Farrelly, M. C. (2003). *Exposure to pro-tobacco messages among teens and young adults: Results from three national surveys.* San Francisco: American Legacy Foundation.

O'Keefe, D. J. (2000). Guilt and social influence. In M. E. Roloff (Ed.), *Communication yearbook* (pp. 67-101). Thousand Oaks, CA: Sage.

O'Keefe, D. J. (2002). Guilt as a mechanism of persuasion. In J. P. Dillard & M. Pfau (Eds.), *The persuasion handbook: Developments in theory and practice* (pp. 329-344). Thousand Oaks, CA: Sage.

O'Keefe, D. J. (2003). Message properties, mediating states, and manipulation checks: Claims, evidence, and data analysis in experimental persuasive message effects research. *Communication Theory, 13*(3), 251-274.

Ohbuchi, K.-I., Ohno, T., & Mukai, H. (2001). Empathy and agression: Effects of self-disclosure and fearful appeal. *The Journal of Social Psychology, 133*(2), 243-253.

Oskamp, S., & Schultz, P. W. (1998). *Applied social psychology* (2nd ed.). Upper Saddle River, NJ: Prentice Hall.

Palmgreen, P., Donohew, L., Lorch, E. P., Hoyle, R. H., & Stephenson, M. T. (2001). Television campaigns and adolescent marijuana use: Tests of Sensation Seeking targeting. *American Journal of Public Health, 91*(2), 292-296.

Palmgreen, P., Donohew, L., Lorch, E. P., Rogus, M., Helm, D., & Grant, N. (1991). Sensation Seeking, message sensation value, and drug use as mediators of PSA effectiveness. *Health Communication, 3*, 217-227.

Palmgreen, P., Stephenson, M. T., Everett, M. W., Baseheart, J. R., & Francies, R. (2002). Perceived message sensation value (PMSV) and the dimensions and validation of a PMSV scale. *Health Communication, 14*(4), 403-428.

Park, C., & Thorson, E. (1990). Influences on emotional response to commercials of different executional styles. In S. J. Agress, J. A. Edell & T. M. Dubitsky (Eds.), *Emotion in advertising* (pp. 161-174). Westport, CT: Quorum Books.

Pastore, R. E., Crawley, E. J., Berens, & M.S. & Skelly, M. A. (2003). "Nonparametric" A' and other modern misconceptions about signal detection theory. *Psychonomic Bulletin & Review, 10*(3), 556-569.

Pechmann, C., & Reibling, E. T. (2000). Planning an effective anti-smoking mass media campaign targeting adolescents. *Public Health Management Practice, 6*(3), 80-94.

Pechmann, C., & Stewart, D. W. (1993). The multidimensionality of persuasive communications: Theoretical and empirical foundations. In P. Cafferata & A. M. Tybout (Eds.), *Cognitive and affective responses to advertising* (pp. 31-65). Lexington, MA: D.C. Health and Company.

Pechmann, C., Zhao, G., Goldberg, M. E., & Reibling, E. T. (2003). What to convey in antismoking advertisements for adolescents? The use of protection motivation theory to identify effective message themes. *Journal of Marketing, 67*(April), 1-18.

Pedhazur, E. J. (1997). *Multiple regression in behavioral research: Explanation and prediction*. New York: Wadsworth Publishing.

Perloff, R. M. (1993). *The dynamics of persuasion*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Petty, R. E., & Cacioppo, J. T. (1981). *Attitudes and persuasion: Classic and contemporary approaches*. Boulder, CO: Westview Press.

Petty, R. E., & Cacioppo, J. T. (1986). *Communication and persuasion: Central and peripheral routes to attitude change*. New York: Springer-Verlag.

Petty, R. E., Wegener, D. T., & Fabrigar, L. R. (1997). Attitudes and attitude change. *Annual Review of Psychology, 48*, 609-648.

Pierce, J. P., Choi, W. S., Gilpin, E., Farkas, A. J., & Merritt, R. K. (1996). Validation of susceptibility as a predictor of which adolescents take up smoking in the United States. *Health Psychology, 15*(September), 355-361.

Pinker, S. (1997). *How the mind works*. New York: W.W. Norton & Company.

Popham, W. J., Potter, L. D., Bal, D. G., Johnson, M. D., Duerr, J. M., & Quinn, V. (1993). Do anti-smoking media campaigns help smokers quit? . *Public Health Reports, 108*(4), 510-514.

Putrevu, S., & Lord, K. R. (1994). Comparative and noncomparative advertising: attitudinal effects under cognitive and affective involvement conditions. *Journal of Advertising, 23*(2), 77-92.

Ray, M. L. (1977). When does consumer information processing research actually have anything to do with consumer information processing. In J. W.D. Perreault (Ed.), *Advances in consumer research* (pp. 372-375).

Reeves, B., & Geiger, S. (1994). Designing experiments that assess psychological responses to media messages. In A. Lang (Ed.), *Measuring psychological responses to media messages*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Reeves, B., & Thorson, E. (1986). Watching television: Experiments on the viewing process. *Communication Research, 13*(3), 343-361.

Reeves, B., Thorson, E., & Schleuder, J. (1986). Attention to television: Psychological theories and chronometric measures. In J. Bryant & D. Zillmann (Eds.), *Perspectives on media effects*. Hillsdale, NJ: Lawrence Erlbaum.

Rigotti, N. A. (2000). Use of tobacco products: Results of a national survey. *The Journal of the American Medical Association, 284*(August), 699-709.

Roberti, J. W. (2004). A review of behavioral and biological correlates of Sensation Seeking. *Journal of Research in Personality, 38*, 256-279.

Rogers, R. W., & Prentice-Dunn, S. (1997). Protection motivation theory. In D. Gochman (Ed.), *Handbook of health behavior research,* (pp. 113-132). New York: Plenum.

Roper, W. L. (1991). Making smoking prevention a reality. *The Journal of the American Medical Association, 266*(22), 3188-3190.

Rothman, A. J., Bartels, R. D., Wlaschin, J., & Salvoney, P. (2006). The strategic use of gain and loss framed messages to promote health behavior: How theory can inform practice. *Journal of Communication, 56*, S202-S220.

Ruiter, R. A. C., Verplanken, B., & van Eersel, G. (2003). Strengthening the persuasive impact of fear appeals: The role of action framing. *The Journal of Social Psychology, 143*(3), 397-400.

Salvoney, P., Schneider, T. R., & Apanovitch, A. M. (2002). Message framing in the prevention and early detection of illness. In J. P. Dillard & M. Pfau (Eds.), *The persuasion handbook: Theory and practice* (pp. 391-406). Thousand Oaks, CA: Sage.

Schwarz, N., & Clore, G. L. (2006). Feelings and phenomenal experiences. In E. T. Higgins & A. Kruglanski (Eds.), *Social psychology: A handbook of basic principles* (2nd ed.). New York: Guilford Press.

Shapiro, M. A. (1994). Signal detection measures of recognition memory. In A. Lang (Ed.) *Measuring psychological responses to media* (pp. 133-148). Hillsdale, NJ: Lawrence Erlbaum Associates.

Shapiro, M. A. (2002). Generalizability in communication research. *Human Communication Research, 28*(4), 491-500.

Sharples, M., Hogg, D., Hutchinson, C., Torrance, S., & Young, D. (1989). *Computers and thought: A practical guide to artificial intelligence*. Cambridge, MA: MIT Press.

Shehryar, O., & Hunt, D. M. (2005). A Terror Management perspective on the persuasiveness of fear appeals. *Journal of Consumer Psychology, 15*(4), 275-287.

Siegel, M. (1998). Mass media antismoking campaigns: A powerful tool for health promotion. *Annuals of Internal Medicine, 129*, 128-132.

Slater, M. D. (1995). Choosing audience segmentation strategies and methods for health communication. In E. Maibach & R. L. Parrott (Eds.), *Designing health messages: Approaches from communication theory and public health practice* (pp. 186-198). Thousand Oaks, CA: Sage Publications.

Sly, D. F., Arheart, K. L., Dietz, N., Trapido, E. J., Nelson, D., Rodriguez, R. D., et al. (2005). The outcome consequences of defunding the Minnesota youth tobacco-use prevention program. *Preventive Medicine, 41*, 503-510.

Sly, D. F., Hopkins, R. S., Trapido, E., & Ray, S. (2001). Influence of a counteradvertising media campaign on initiation of smoking: The Florida "truth" campaign. *American Journal of Public Health, 91*(2), 233-238.

Sly, D. F., Trapido, E., & Ray, S. (2002). Evidence of the dose effects of an antitobacco counteradvertising campaign. *Preventive Medicine, 35*, 511-518.

Solomon, D. S. (1981). A social marketing perspective on campaigns. In R. E. Rice & W. J. Paisley (Eds.), *Public communication campaigns* (pp. 281-292). London: Sage Publications, Inc.

Southwell, B. G. (2001). Health message relevance and disparagement among adolescents. *Communication Research Reports, 18*(4), 365-374.

Stein, J. A., Newcomb, M. D., & Bentler, P. M. (1994). Psychosocial correlates and predictors of AIDS risk behaviors, abortion, and drug use among a community sample of young adult women. *Health Psychology, 13*, 308-318.

Stephenson, M. T. (2003a). Examining adolescents' responses to antimarijuana PSAs. *Human Communication Research, 29*(3), 343-369.

Stephenson, M. T. (2003b). Mass media strategies targeting high sensation seekers: What works and why. *American Journal of Health Behavior, 27*(3), S233-S238.

Stephenson, M. T., Hoyle, R. H., Palmgreen, P., & Slater, M. D. (2003). Brief measures of Sensation Seeking for screening and large-scale surveys. *Drug and Alcohol Dependence, 72*, 279-286.

Stephenson, M. T., Morgan, S. E., Lorch, E. P., Palmgreen, P., Donohew, L., & Hoyle, R. H. (2001). Predictors of exposure from an antimarijuana media campaign: Outcome research assessing Sensation Seeking targeting. *Health Communication, 14*(1), 23-43.

Stephenson, M. T., & Palmgreen, P. (2001). Sensation Seeking, perceived message sensation value, personal involvement, and processing of anti-marijuana PSAs. *Communication Monographs, 68*(1), 49-71.

Stephenson, M. T., & Southwell, B. G. (2006). Sensation Seeking, the activation model, and mass media health campaigns: Current findings and future directions for cancer communication. *Journal of Communication, 56*, S38-S56.

Stevens, J. P. (2002). *Applied multivariate statistics for the social sciences* (4th ed.). Mahwah, NJ: Lawrence Erlbaum Associates, Publishers.

Straubhaar, J., & LaRose, R. (2002). *Media now: Communications media in the information age* (3rd ed.). Belmont, CA: Wadsworth, Thomson Learning.

Sturges, J. W., & Rogers, R. W. (1996). Preventive health psychology from a developmental perspective: An extension of protection motivation theory. *Health Psychology, 15*(May), 158-166.

Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics* (5th ed.). Boston: Pearson Education Inc.

Tate, C. (1999). *Cigarette wars: The triumph of "The little white slaver"*. New York: Oxford University Press.

Treisman, A. M. (1960). Contextual cues in selective listening. *Quarterly Journal of Experimental Psychology, 12*, 242-248.

United States Department of Health and Human Services (1986). *The health consequences of involuntary smoking: A report of the Surgeon General*. Washington, D.C.: United States Department of Health and Human Services.

United States Department of Health and Human Services (2000). *Reducing tobacco use: A report of the Surgeon General - Executive Summary*. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health.

United States Department of Health and Human Services (2001). *Women and smoking: A report of the Surgeon General*. Atlanta, GA: Department of Health and Human Services.

United States Department of Health and Human Services (2004). *The health consequences of smoking*. Atlanta, GA: United States Department of Health and Human Services.

United States Department of Health and Human Services (2006). *The health consequences of involuntary exposure to tobacco smoke*. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, Coordinating Center for Health Promotion, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health.

United States Public Health Service (1964). *Smoking and health: Report of the Advisory Committee to the Surgeon General of the Public Health Service* (No. PHS Publication 1103). Washington, D.C.: U.S. Government Printing Office.

United States Public Health Service (1967). *The health consequences of smoking: A Public Health Service review*. Washington, D.C.: U.S. Government Printing Office.

United States Public Health Service (1979). *Healthy people: The Surgeon General's report on health promotion and disease prevention*. Washington, D.C.: U.S. Government Printing Office.

Van Der Heijden, A. H. C. (1992). *Selective attention in vision*. London: Routledge.

Verde, M. F., Macmillan, N. A., & Rotello, C. M. (2006). Measures of sensitivity based on a single hit rate and false alarm rate: The accuracy, precision, and robustness of d', A_z, and A'. *Perception & Psychophysics, 68*(4), 643-654.

Verplanken, B., Hofstee, G., & Janssen, H. J. (1998). Accessibility of affective versus cognitive components of attitudes. *European Journal of Social Psychology, 28*, 22-35.

Viswanath, K., & Emmons, K. M. (2006). Message effects and social determinants of health: Its application to cancer disparities. *Journal of Communication, 56*, 238-264.

Wallack, L. M. (1986). Improving health promotion: Media advocacy and social marketing approaches. In C. Atkin & L. M. Wallack (Eds.), *Mass communication and public health: Complexities and conflicts* (pp. 147-163). Newbury Park, CA: Sage.

Wallack, L. M., & Corbett, K. (1987). Alcohol, tobacco and marijuana use among youth: An overview of epidemiological, program and policy trends. *Health Education Quarterly, 14*(2), 223-249.

Waugh, N. C., & Norman, D. A. (1965). Primary memory. *Psychological Review, 72*, 89-104.

Wixted, J. T., & Stretch, V. (2004). In defense of the signal detection interpretation of remember/know judgments. *Psychonomic Bulletin & Review, 11*(4), 616-641.

Wood, W. (2000). Attitude Change: Persuasion and Social Influence. *Annual Review of Psychology, 51*, 539-570.

Xiaoming, L., Stanton, B., Cottrell, L., Burns, J., Pack, R., & Kaljee, L. (2000). Patterns of initiation of sex and drug-related activities among urban low-income African American adolescents. *Journal of Adolescent Health, 28*, 46-54.

Yi, Y. (1990). Cognitive and affective priming effects of the context for print advertisements. *Journal of Advertising, 19*(2), 40-49.

Zaichkowsky, J. L. (1994). The personal involvement inventory: Reduction, revision, and application to advertising. *Journal of Advertising, 23*(4).

Zajonc, R. B. (1984). The interaction of affect and cognition. In K. R. Scherer & P. Ekman (Eds.), *Approaches to emotion* (pp. 239-245). Hillsdale, NJ: Lawrence Erlbaum Associates.

Zillmann, D., & Bryant, J. (1985). *Selective exposure to communication*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Zuckerman, M. (1971). Dimensions of Sensation Seeking. *Journal of Consulting and Clinical Psychology, 36*(February), 45-52.

Zuckerman, M. (1979). *Sensation Seeking: Beyond the optimal level of arousal*. Mahwah, NJ: Lawrence Erlbaum Associates.

Zuckerman, M. (1984). Sensation Seeking: A comparative approach to a human trait. *Behavioral and Brain Sciences, 7*, 413-471.

Zuckerman, M. (1988). Behavior and biology: Research on Sensation Seeking and reactions to the media. In L. Donohew, H. E. Sypher & T. Higgins (Eds.), *Communication, social cognition, and affect* (pp. 173-194). Mahwah, NJ: Lawrence Erlbaum Associates.

Zuckerman, M. (1994). *Behavioral expression and biosocial bases of Sensation Seeking*. New York: Cambridge University Press.

Zuckerman, M., Kolin, E. A., Price, L., & Zoob, I. (1964). Development of a Sensation Seeking scale. *Journal of Consulting Psychology, 28*, 477-482.

Zuckerman, M., & Kuhlman, S. (2000). Personality and risk-taking: Common biosocial factors. *Journal of Personality, 68*, 999-1029.

VITA

Jensen Joann Moore was born June 23, 1975 in Richland Center, WI. She graduated from Riverdale High School in Muscoda, WI in 1993 and from there went to Jamestown College in North Dakota on Track & Field and academic scholarships to study Business Administration and Marketing. It was at Jamestown that she got involved in her college newspaper, first as a photographer and columnist, and later as a staff writer and editor-in-chief. Since the college did not have a Journalism or Mass Communication program, she transferred to Black Hills State University in South Dakota. She continued taking classes in her original majors, Business Administration and Marketing, and added a major in Mass Communication. While at Black Hills State she continued working on the college newspaper and was a staff writer, sports writer, sports editor, page designer, and editor-in-chief. Jensen also lettered in BHSU's Track & Field and Cross Country programs. In May, 1999 she received three Bachelor's Degrees from Black Hills State; Business Administration with a minor in psychology, Marketing, and Mass Communication with dual emphases in Journalism and Public Relations.

Following graduation, Jensen was hired by Isaiah Thomas (then the new owner of the Continental Basketball Association) and placed in Grand Rapids, MI as the media and

public relations director of the Grand Rapids Hoops professional basketball team. When the league folded, she was hired by the St. Paul Saints professional baseball team (St. Paul, MN) as community relations director and an advertising executive. After two seasons with the Saints, she went back to school to get a graduate degree in Journalism and Mass Communication at the University of Minnesota. She graduated with her Master's from the program in May, 2003. In July, 2003 she married Matthew Duane Copple at the Como Conservatory in St. Paul. The two moved to Moberly, MO one month later to pursue graduate degrees - his in medicine at the Kirksville College of Osteopathic Medicine and hers at the prestigious University of Missouri School of Journalism. Both commuted an hour each day for classes (in separate directions) for two years.

At the end of her second year, Jensen discovered she was pregnant with their first child. In June, 2005 the couple moved to Jefferson City, MO where Matthew began his medical rotations at Capital Region Medical Center and Jensen commuted to Columbia to do research and teach. Jocelyn Angeline Copple was born in Jefferson City, MO on December 7, 2003.

Matthew completed his medical degree in June, 2007. The family moved to Detroit, MI as Matthew was hired as an orthopedic surgery resident at Henry-Ford hospital. Jensen completed her Ph.D. from the School of Journalism at the University of Missouri-Columbia in 2007. Upon completing her doctorate, she became a member of the Kappa Tau Alpha honor society. The couple's second child, Tristan Duane Copple, was born on September 5, 2007 – only 2 months prior to the dissertation defense. Jensen is currently looking for a teaching/research job in the Detroit area.