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PRO-SMOKING INFORMATION SCANNING USING SOCIAL MEDIA AND

INCREASED SMOKING AMONG YOUNG ADULTS

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PRO-SMOKING INFORMATION SCANNING USING SOCIAL MEDIA AND

INCREASED SMOKING AMONG YOUNG ADULTS

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Dedication

This thesis is dedicated to my parents, Chunxiang and Wencheng Zhu

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Abstract

PRO-SMOKING INFORMATION SCANNING USING SOCIAL MEDIA AND

INCREASED SMOKING AMONG YOUNG ADULTS

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The amount of pro-smoking information appearing on social media has increased sharply in the past few years (Freeman & Chapman, 2007, 2010). This proliferation has expanded the potential for widespread exposure to information about smoking. Such potential highlights the need to understand how individuals acquire and use this information to make decisions about smoking initiation and cessation behaviors. Being in a critical age group (aged 18-25) for lifelong smoking behavior (Gilpin, White, & Pierce, 2005), young adults use social media ubiquitously. This study introduces information scanning (Niederdeppe, Hornik, Kelly, Frosch, Romantan, Stevens, Barg, Weiner, & Schwartz, 2007; Hornik & Niederdeppe, 2008) and the Integrative Model of Behavioral Prediction (Fishbein and Cappella, 2006; Fishbein, Hennessy, Yzer and Douglas, 2003; Fishbein and Yzer, 2003; Yzer, 2012) as useful constructs for understanding young adult smoking in the context of social media. Information scanning, understood in this research as

routine patterns of exposure to mediated and interpersonal sources, has been found to be useful in predicting cancer-related behaviors (e.g., Kelly, Hornik, & Niederdeppe, 2009; Shim, Kelly, & Hornik, 2006) but has never used to understand smoking behavior. This study builds on research that has found that only a small number of variables need to be considered to predict, change, or strengthen a particular behavior in certain population (Fishbein & Ajzen, 1975, 2010). To understand the extent to which a young adult's pro-smoking information scanning using social media affects the likelihood of being susceptible to smoking, being an experimental smoker, and being an established smoker. Specifically, this thesis hypothesizes (1) that pro-smoking information scanning using social media will influence smoking behavior, (2) that pro-smoking information scanning will interact with attitudes toward smoking, social norms regarding smoking, and smoking self-efficacy, interpersonal information scanning, and participation level on social media to impact smoking behavior, and (3) information scanning will contribute to the predictive validity of the Integrative Model of Behavioral Prediction to predict intentions to smoke. To test these hypotheses, a cross-sectional survey of 247 young adults (aged 18-25) was conducted. Results of this survey indicated that pro-smoking information scanning through social media significantly impacted attitudes toward smoking, social norms regarding smoking, and smoking self-efficacy. Pro-smoking information scanning using social media is independently related to smoking behavior after controlling for factors such as gender, ethnicity, academic achievement, interpersonal information scanning, attitudes toward smoking, social norms regarding smoking, and smoking self-efficacy. Only attitudes toward smoking and interpersonal

information scanning mediate the relationship between pro-smoking information scanning through social media and experimental and established smoking. Additionally, inclusion of information scanning variables increased the predictive ability of the Integrative Model of Behavioral Prediction. This study should be a wakeup call for more comprehensive and concerted efforts on the interaction between tobacco control and social media use. It concludes with a discussion of the theoretical and practical implications of these findings, especially the theory-based antismoking interventions using social media.

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CHAPTER ONE: THE PROBLEM OF YOUNG ADULTS SMOKING

Introduction

This thesis examines the problem of young adult smoking behavior in the context of social media use. Previous research has examined the psychological, interpersonal and environmental factors predicting adolescent smoking behavior, but there is lack of systematical research regarding young adult smoking behavior. This research introduces information scanning (Niederdeppe et al., 2007; Hornik & Niederdeppe, 2008), the idea that routine use of media and interactions with other people yield exposure to information that affects knowledge, attitudes, and behavior, to the study of young adult smoking behavior. This thesis expands information scanning (1) theoretically, by conceptually grounding this research in routine use of social media; (2) methodologically, by proposing a new, valid and more detailed measure of information scanning upon mediated sources; (3) practically, by testing the influence of social media content that uses pro-smoking appeals. Specially, this project uses a sample of 247 young adults (aged 18-25) to examine whether pro-smoking information scanning using social media influences their smoking behavior. The concept of information scanning using social media is then applied to the Integrative Model of Behavioral Prediction which is used to understand smoking behavior. Finally, opportunities to apply social media for advancing tobacco control are discussed and future research directions are proposed.

This thesis consists of five chapters. The current chapter focuses on defining the problem of young adult smoking behavior and what researchers and health practitioners have done to understand it. Individual and contextual influences on young adult smoking are examined. Then,

theories used to understand smoking behaviors are presented. Finally, this chapter contains an overview of how social media use influences antismoking campaigns targeting young adults.

Chapter two introduces the concept of information scanning and the Integrative Model of Behavioral Prediction as the framework through which to understand social media's influence on young adult smoking behavior. First, information scanning is described and evidence linking information scanning to behavior is presented. Next, information scanning is linked to young adult smoking behavior through an examination of the literature on the effects of social media on people's health related behaviors. Chapter two concludes with a presentation of research questions and hypotheses.

Chapter three contains the methodology used in this thesis. Data collection, recruitment of subjects, and survey measures are discussed. A sample survey can be found in Appendix A. This chapter concludes with an in-depth presentation on developing a measure of information scanning in mediated contexts.

Chapter four shows the results of the data analysis. Research questions and hypotheses are presented in turn. In this chapter, key findings are emphasized and are accompanied by tables presenting full parameter estimates.

Finally, Chapter five contains the discussion of the results presented in Chapter four. The theoretical and practical implications of the findings are explored. This chapter – and this thesis – concludes with recommendations for the future research and the design of effective antismoking campaigns directed toward young adults.

Young adulthood is a time when individuals are particularly susceptible to risky behaviors and is also a time when individuals have extraordinary capacities to rapidly adopt

emerging information and communication technologies (ICTs). Social media are especially interesting since young people spend a large amount of time using them. Because pro-smoking content can normalize tobacco use, encourage initiation, and thwart cessation attempts, the tobacco industry's penetration into social media may have serious smoking implications especially for young adults. The goal of this thesis is to understand how smoking is affected when young adults engage in pro-smoking information scanning behavior. If smoking is indeed mediated by social media use, then researchers, health practitioners, and campaign designers alike can begin to take appropriate steps to create interventions that effectively reduce smoking rates.

<div align="center">The Problem of Young Adult Smoking Behavior</div>

Despite antismoking legislation and widespread antismoking campaigns, smoking currently remains the leading cause of preventable illness and death in the United States. Each year, an estimated 443,000 people die prematurely from smoking or exposure to secondhand smoke, and another 8.6 million live with a serious illness caused by smoking, such as cardiovascular and lung cancer (Centers for Disease Control and Prevention, 2011). According to the most recent data, the percentage of young adults smoking generally increased over the 7-year period between 2004 and 2010 (National Survey on Drug Use and Health, 2012). Many of these young adults suffer from one or more of smoking-related diseases, while the top three diseases which can ultimately lead to death are lung cancer, cardiovascular and metabolic disease, and chronic obstructive pulmonary disease (U.S. Surgeon General's Office, 2014). The annual cost of smoking-related deaths and disease totals approximately $150 billion (U.S. Surgeon General's Office, 2014). As these statistics underline, addressing the issue of young adult smoking behavior is crucial to the health of the country.

As of 2012, the approximately 44 million smokers in the U.S., 88% reported smoking before the age of 18 (Substance Abuse and Mental Health Services Administration, 2012; U.S. Department of Health and Human Services, 2012; U.S. Surgeon General's Office, 2012); therefore tobacco control research and prevention programs typically target children and adolescents (Backinger, Fagan, Matthews, & Grana, 2003; Ellickson, McGuigan, & Klein, 2001; Hammond, 2005; Lantz, 2003). However, research on contemporary patterns of young adult's smoking have raised growing concerns about the increasing smoking initiation rates in young adults (Freedman, Nelson, & Feldman, 2012; Hammond, 2005; Lantz, 2003), especially the fact that this age group is often overlooked by tobacco prevention programs (O'Loughlin, Dugas, O'Loughlin, Karp, & Sylvestre, 2014; U.S. Department of Health and Human Services, 2012). Smoking behavior may not be as fixed or stable among young adults as is previously assumed. 18-25 appears to be the critical ages for lifelong smoking behavior (Gilpin, White, & Pierce, 2005). Even among smokers who first smoke in their adolescence, established smoking may not fully be ingrained until young adulthood (Lantz, 2003; Trinidad, Cilpin, Lee, & Pierce, 2004; Wchsler, Rigotti, Glehill-Hoyt, & Lee, 1998). Young adulthood represents a crucial time in the transition from adolescence to adulthood.

Young adults graduate from high school and leave home to attend college or university or join the job market. These changes may lead to higher susceptibility to smoking, which typically include dramatic changes in social networks, parental control, living arrangements, and learning and working settings (Backinger, Fagan, Matthews, & Grana, 2003; Hammond, 2005; O'Loughlin et al., 2014). By integrating smoking into activities and places where young adults' lives change, the tobacco industry disseminate pro-smoking information in order to encourage regular smoking and increased consumption. Maximizing the amount of smoking young adults

fits into the goals of the tobacco industry. "Getting young regular smokers who have not yet reached a stable level of cigarette consumption to smoke more would increase future sales. Such an emphasis might also encourage young adults who had never been regular smokers to progress to regular smoking. Those who had first smoked as adolescents but ceased after minimal experimentation might be particularly vulnerable to renewed smoking, as they had already surmounted the barrier of having a first cigarette. Also, because young adults are role models for adolescents, such tactics might help maintain adolescent interest in smoking. Finally, some young adults who have smoked regularly have quit or are trying to quit, and tempting them to relapse or keeping them from successfully quitting would be an important industry goal" (Gilplin et al., 2005, p. 748).

The tobacco industry approaches young adults through a variety of promotional strategies (Biener & Albers, 2004; Carter, 2003; Freeman & Chapman, 2007, 2010; Ling & Glantz, 2002; Rigotti, Moran, & Wechsler, 2005; Sepe, Ling, & Glantz, 2002; USDHHS, 2012). In the offline context, the tobacco industry studies "young adults' attitudes, lifestyles, values, aspirations, and social patterns with a view toward making smoking a socially acceptable part of young adults' new activities" (Ling & Glantz, 2002, p.913). For example, the tobacco industry increases young adults' involvement by creating a smoke-friendly promotional environment, particularly in "adult-only" activities such as bars and nightclubs (Ling & Glantz, 2002; Sepe, Ling, & Glantz, 2002). These offline (on-site) promotions help the industry manipulate peer influence to encourage tobacco use among young adults. In terms of online promotion, social media offer the tobacco industry a powerful and efficient channel for rapidly countering the policies of tobacco control (Freeman, 2012). In a 2010 study, Freeman and Chapman found that employees of British American Tobacco (BAT) energetically promoted the company and its brands through

Facebook, a dominant social media site. They uncovered that BAT's employees actively created

Facebook groups, joined pages as fans, and posted photos of tobacco products, promotional

items, and events. Freeman (2012) also found that a large amount of pro-tobacco information has

been featured on YouTube, a video-sharing social media sites. As Ribisl and Jo (2012) noted,

Facebook and YouTube represent only a small portion of social media in use. The list of social

media is long and rapidly expanding, ranging from Twitter to Tumblr, Google+ to Instagram. It

is uncertain to what extent these social media are being leveraged to promote pro-tobacco

information. This uncertainty underscores the importance of this research.

<div align="center">Predictors of Young Adult Smoking Behavior</div>

This research analyzed accessible literature regarding young adult smoking. It found that

research examining the predictors of young adult smoking behavior loosely fall into three areas:

research which examines interpersonal factors, research which examines intrapersonal factors,

and research which examines factors that exist at the environmental level. The following section

will present the key findings in these areas.

Intrapersonal Influences

Socio-demographic traits. Factors such as age, gender, race/ethnicity, and achieved status

differences (e.g., education, employment/occupation, and income) have been reported to

influence young adult smoking (Chassin et al., 1990; Ellis et al., 2008; Juon et al., 2002;

Lawrence et al., 2007; Newcomb, et al., 1989). For example, Green and his colleagues (2007)

found that non-college-educated young adults smoke at more than twice the rate of their college-

educated counterparts, partly because non-college-educated young adults were less likely to have

a job. As a group, non-college-educated young adults found it hard to adapt and maintain a

personal life change. In terms of age, the documented decrease in overall smoking prevalence from young adulthood into slightly older young adulthood may be explained, in part, by fewer transitions in employment, housing, location that increase the possibility of smoking during earlier years (Green et al., 2007; Lawrence et al., 2007).

Sensation seeking. Sensation seeking is a major correlate of smoking (Zuckerman, 1979, 1983). It refers to being willing to takes risks for the sake of novel, varied, and extreme experiences which lead to stimulation and arousal (Burt, Dinh, Peterson, &, Sarason, 2000; Jessor, 1991; Santi, Cargo, Brown, Best, & Cameron, 1994; Zuckerman, 1979). People who seek sensations are more likely to be involved in risky behaviors such as smoking (Audrain-McGovern, et al., 2003; Palmgreen, Donohew, Lorch, Hoyle & Stephenson, 2001; Stephenson & Palmgreen, 2001).

Depression/Depressive symptoms. Studies have found that depression and depressive symptoms had a direct effect on young adult smoking behavior (Breslau, Peterson, Schultz, Chilcote, & Andreski, 1998; Choi, Patten, Gillin, Kaplan, & Pierce, 1997). Moreover, Ritt-Olson, et al. (2005) found that peer influence mediated the relationship between depression and smoking. They found that depression is linked to having peers who have pro-smoking attitudes. Association with these peer groups, in turn, increase the possibility of experimental smoking (Ritt-Olson et al., 2005).

Interpersonal Influences

Young adult smoking is most often a social behavior, influenced by friends, peers, and family members. The following section reviews how these interpersonal factors influence young adult smoking behavior.

Peer influences. A widely held assumption is that young adults engage in smoking because their peers influence them to do so (Taylor, Conard, O'Byrne, Haddock, & Poston, 2004). Andrews, Tildesley, Hope, and Li (2002) found that the substance use of by peers has an impact on young adult smoking behavior. Through an experimental study, Harakeh et al. (2007) found that young adults are more likely to smoke in the company of a heavy-smoking peer than a non-smoking peer. Peer influence has often been attributed to modeling peer behavior, as postulated by social learning theory (Bandura & Walters, 1963). Bandura (1977, 1986) developed social learning theory, suggesting that individuals observe and model other's behavior since that may intentionally lead to positive rewards such as belonging to the group or being liked. The behavior of valued individuals tends to be modeled by others. In terms of smoking, these valued individuals may play a protective role and help to decrease young adult smoking or, alternatively, may be a risk factor for encouraging young adults smoking (Andrew, et al., 2002). For example, if a young adult has some smoking peers who always post pro-smoking photos on social media, they may believe that smoking is more socially acceptable than young adults who barely experience these situations.

Family influences. While peers have well-documented effects on young adult smoking behavior, family and home environment are also factors that greatly influence the likelihood of young adult smoking behavior (Bauman, Foshee, Linzer, & Koch, 1990; Chassin, Presson, Sherman, & Edwards, 1991; Chassin, Presson, Sherman, & Mulvenon, 1994; Oygard, Klepp, Tell, & Vellar, 1995). For example, Chassin et al. (1994) found that smokers with a family history of smoking tend to be more committed smokers and view smoking as having more positive psychological consequences than their peers without such family histories. Alternatively,

Briker, Rajan, Andersen, & Peterson (2005) found that early parental smoking cessation is associated with increased odds of their young adult children's smoking cessation.

Environmental influences

Extending the scope of review even further, the environment in which a young adult lives can also exert substantial influence on young adult smoking behavior.

Tobacco advertising. Tobacco advertising, which includes promotional items and paid advertising in print media, radio, television, and movies, clearly has a substantial influence on individual smoking (Turner, Mermelstein, & Flay, 2004). The tobacco industry has a long history of using bars and nightclubs to encourage young adult smoking via promotional items (Biener, Nyman, Kline, & Albers, 2004; Gilpin et al., 2005; Hendlin, Anderson, & Glantz, 2010; Katz & Lavack, 2002; Ling & Glantz, 2002; Rigotti, Moran, & Wechsler, 2005; Sepe & Glantz, 2002). Besides bars and nightclubs, promotional items were also distributed by college social events sponsored by organizations such as fraternities and sororities (Cheney, Harris, Gowin, & Huber, 2014). Research demonstrated that having or being willing to use these tobacco promotional items is associated with young adult smoking (Sepe, Ling, & Glantz, 2002).

Policy Interventions. Antismoking policies limit young adult smoking behavior. "Tobacco-policy interventions are designed to change the environment with the ultimate goal of preventing young people from beginning to smoke or reducing the likelihood that they will accelerate and solidify their smoking patterns" (Forster, Widome, & Bernat, 2007, p.335). For example, the Clean Air Acts places restriction on the areas where a smoker of any age may smoke. Smoke-free environments may reduce young adult smoking behavior by decreasing the visibility of smokers (Farkas, Gilpin, Distefan, & Pierce, 1999; Forster, Widome, & Bernat, 2007;

Gilpin, White, Farkas, & Pierce, 1999; Gower et al., 2000). However, bars and nightclubs are among the few places where smoking is not generally restricted by Clean Air Acts, so bars and nightclub venues are still out of policy interventions. These places represent an opportunity to reach young adults at highest risk for long-term smoking morbidity and mortality (Jiang & Ling, 2011).

Social Networking Sites Use and Smoking

Social media sites are part of the new wave of Internet use, featuring applications that allow users to create and distribute their information and network with others online (Forsyth & Malone, 2010). Social media sites move toward a fully interactive medium driven by user-generated information. A prevalent representative of social media sites, social networking sites (SNSs) spearhead this movement. According to the Pew Research Center's Internet Project (2013), 73% of online adult use a SNS of some kind, while about 90% young adults reported that they had used SNSs. This age group (18-25) are the most likely to report they use SNSs.

SNSs, which are web-based services that allow individuals to construct public or semi-public profiles, connect with other users, create and distribute information, and view and traverse their list of connections and those made by others within the system, have become common online destinations for youth and young adults (Boyd & Ellison, 2008; Lenhart & Madden, 2007). SNSs deeply penetrate young adults' everyday life, and tend to become invisible once they are widely adopted and taken for granted (Debatin, Lovejoy, Horn, & Hughes, 2009). While there have been noted benefits associated with social media use, such as new chances for sociability and self-expression (Boyd & Ellison, 2008), Freeman and Chapman (2010) found that the tobacco industry use SNSs to glamorize smoking.

Social media has amplified tobacco industry's opportunities to market and sell products (Freeman & Chapman, 2008; Malone & Bero, 2000). Studies have shown that the tobacco industry exerts extensive efforts in using social media to promote tobacco product and create consumption around their brands (Freeman & Chapman, 2009, 2010; Wackowski, Lewis, & Delnevo, 2011). Freeman and Chapman (2010) found more than 500 Facebook pages that were related to British American Tobacco brands or products. Employees of the tobacco company actively promoted tobacco products through joining and administrating groups, participating fan discussions, and posting contents of events, products, and promotional items. In 2013, an interview about "how a startup tobacco company uses social media" showed how tobacco products "go viral" on social media (Stone, 2013). The founder of Hestia Tobacco shared the experiences of adjusting its promotional strategy after Facebook blocked advertising for Hestia. He said, "I have the Instagram… When folks hashtag #cigarette, or #americanspirits, or anything else that suits my fancy, I'll thumb over to their squarely artistic endeavor, and recommend that they give Hestia Tobacco a try". Hestia Tobacco takes advantage of multiple social media outlets: "I will do those same hashtag searches on Twitter. I've had a few 'Hestia Tobacco Marketing' accounts suspended. I've also made some fabulous friends by tweeting about this crazy journey. I now have a great relationship with the guy who does social media at New Belgium Brewing, and quite a few other spots. I've recently found fertile soil at Reddit as well" (Stone, 2013, p.1).

Pro-smoking information may not be merely created and distributed by the tobacco industry. Forsyth and Malone (2010) found that smoking imagery is prolific and easily accessed on YouTube (Freeman & Chapman, 2007; Forsyth & Malone, 2010; Seidenberg, Rogers, Rees, & Connolly, 2012). Most-viewed videos such as music videos or trending videos may serve to

portray smoking as normal, glamorous, and desirable rather than addictive and deadly (Dalton et al., 2003, 2009; Song et al., 2007). For example, one YouTube video, having almost 50,000 views, shows a Marlboro packet of cigarettes being turned into a Transformer robot similar to those featured in a blockbuster film.

CHAPTER TWO: REVIEW OF THERORETICAL FOUNDATIONS

The current chapter will first discuss the two theories adapted and tested in this thesis: Information Scanning (Hornik & Niederdeppe, 2008; Niederdeppe et al., 2007) and the Integrative Mode of Behavioral Prediction (Fishbein, 2008; Fishbein & Cappella, 2006; Fishbein, Hennessy, Yzer, & Douglas, 2003; Fishbein & Yzer, 2003). Next, the two theories are linked to previous research findings in order to lay the foundation for this study's research questions and hypotheses which are presented at the end of this chapter.

Information Scanning

Various concepts are directly related to information scanning, including incidental or mere exposure (Bornstein, Leone, Galley, 1987; Obermiller, 1985; Shapiro, MacInnis, & Heckler, 1997; Shapiro, 1999; Tewksbury, Weaver, & Maddex, 2001), casual seeking (Johnson, 1997), passive learning (Zukin & Snyder, 1984), non-strategic information acquisition (Berger, 2002), passive information seeking (Brashers et al., 2002), and routine information acquisition (Griffin, Dunwoody & Newirth, 1999). The term "information scanning" was first developed by Niederdeppe and his colleagues in 2007. They assert that information scanning refers exclusively to "information acquisition that occurs within routine patterns of exposure to mediated and interpersonal sources that can be recalled with a minimal prompt" (Niederdeppe et al., 2007, p. 5).

Hornik et al. (2013) identify three mechanisms of information scanning: (1) new information acquisition; (2) normative reinforcement; or (3) reminding. First, information scanning may increase the possibility of exposure and memory encodings that can be recalled later. Information that people scanned may include the risks and benefits of certain behavior, the

social support available for performing certain behavior, or even guidelines for successfully

executing the behavior. Second, routine scanning may reinforce social norms (descriptive or

subjective norms) by offering important cues about how people as individual should behave (i.e.

how an individual behavior is expected and/or how most others engage in the behavior; (Bandura,

1986)). Finally, scanning may remind people of the reasons for engaging in a behavior. For

example, smoking cessation demands a higher level of commitment, which may require

recurring reminders of why quitting smoking is important. Previous studies concerning

information scanning stand in juxtaposition to two related issues: information seeking and media

effects.

Information seeking. In the past decade, scholars have already tapped into the process and

dynamics of information acquisition (Case, 2002). Two models of information acquisition were

identified: information seeking models and less purposeful models of information acquisition

(information scanning, noted by Niederdeppe et al., 2007). Several studies conceptualize

information acquisition with a continuum from information seeking to purely incidental exposure

(Griffin et al., 1999; Ramirez et al., 2002; Wilson, 1999). Other conceptualizations, such as

Atkin (1973), place less purpose models of information acquisition in the middle of a spectrum,

with information seeking and active information avoidance at opposite ends of the spectrum

(Brashers, Goldsmith, & Hsieh, 2002; Case, Andrews, Johnson, & Allard, 2005). These

conceptualizations were tested empirically; however, information seeking has drawn the most

research attention (Bright et al., 2005; Muha, et al., 1998; Niederdeppe et al., 2007; Niederdeppe,

Frosch & Hornik, 2008).

Johnson (1997) defines information seeking as "the purposive acquisition of information from selected information carriers" (Johnson, 1997, p. 4). Focusing on the purpose of information seeking, more scholars view information seeking as active efforts to resolve uncertainty (Case, 2002; Johnson, 1997) and obtain specific information as a consequence of a relevant event or experience, like smoking cessation (Phua, 2013) and cancer diagnosis and treatment (Czaja, Manfredi, & Price, 2003; Echlin & Rees, 2002; Freimuth et al., 1989; Leydon, Boulton, Moynihan, Jones, Mossman, Boudioni, & McPherson, 2000; Mayer, Terrin, Kreps, Menon, McCance, Parson, & Mooney, 2007). Johnson (1997) posited that people who seek information about a particular health issue are typically in the process of making a health-related decision, such as starting a low-fat diet or taking certain precautions before getting vaccinated. Deliberative information seeking can function to release anxiety or reinforce confidence in a decision that already has been made (Carlson, 2000; Czaja, et al., 2003; Feltwell & Rees, 2004). In recent years, scholars asserted that information seeking includes non-routine media use or interpersonal conversation about a particular topic (Hornik, et al., 2013). For example, people watch a TV program about smoking cessation; people use online search engine to find information about quitting and staying quit; and/or people purposely ask friends, family members, or medical practitioner about smoking-related questions.

Information scanning. Scholars increasingly recognized the importance and frequency of information gained in a less purposeful way (Case, 2002). Niederdeppe et al. (2007) and Shim et al. (2006) noted that while a single episode of exposure due to deliberate seeking about a topic may be more influential than a single episode of information scanning, the process of information scanning about most topics is much more frequent. Hornik and Niederdeppe (2008) built on this standpoint by arguing that "even when individuals are not actively seeking

information on a specific topic, routine use of media and interactions with other people yield

exposures to information that affect knowledge, beliefs, and behavior" (Hornik & Niederdeppe,

2008, p.2257). Information scanning can involve information accessed by using social media

(mediated), paying attention to particular information in regular television viewing/ radio

listening/ newspaper reading (mediated), or hearing certain information in the routine talk with

friends or family (interpersonal). This definition excludes information scanning that was not

encoded in memory (Hornik & Niederdeppe, 2008; Niederdeppe et al., 2007). It is nearly

impossible to assess individual scanning behavior in a survey or interview context employed by

communication studies (Southwell, Barmada, Hornik, & Maklan, 2002).

Information scanning and media effects. Information scanning is also closely linked with

media effects studies. Media effects studies are focused on the influence of specific information,

such as idealistic body images and violent portrayals. Contrary to media effects research,

information scanning research often starts with a behavior like smoking and examines whether

routine exposure to information sources affects it. Additionally, information scanning research

includes both mediated (e.g., television and Internet) and interpersonal sources (e.g., families and

friends) as opposed to solely media effects. However, there is clearly overlap between the media

element of scanning and other areas of media effects, so information scanning studies and media

effects studies often address the same basic research questions and use similar research methods

(Hornik & Niederdeppe, 2008).

<div align="center">The Integrative Model of Behavioral Prediction</div>

The Integrative Model of Behavioral Prediction (IM) is the most recent formulation of

reasoned action approach (Ajzen & Fishbein, 1977, 1980; Fishbein, 1980; Fishbein & Ajzen,

<div align="center">16</div>

1975, 2010). The development of the reasoned action approach is sequential (Yzer, 2012). The early work of Ajzen and Fishbein (1975) informed the theory of reasoned action (TRA) which suggests that behavioral intention is determined by attitudes (beliefs about particular behavior and its outcomes) and subjective norms (whether or not referents approve if the behavior and motivation to comply with those referents). In the 1980s, Ajzen (1985, 1988) proposed the theory of planned behavior (TPB), which adds the construct of perceived behavioral control as an additional behavioral determinant next to attitude and subjective norm (Madden, Ellen, & Ajzen, 1992). TPB refers to people's perceptions of their ability to perform a given behavior. Such perceptions/beliefs also include the resources and opportunities one has to perform a behavior directly and indirectly through behavioral intentions, thus TPB can predict behaviors which are not under volitional control (Madden, Ellen, & Ajzen, 1992). In early 2000, both TRA and TPB were subsumed into the Integrative Model of Behavioral Prediction (IM), the focus of this research (Fishbein & Cappella, 2006; Fishbein, Hennessy, Yzer & Douglas, 2003; Fishbein & Yzer, 2003; See figure 1). The IM also combines key constructs from social cognitive theory (Bandura, 1986) and the health belief model (Becker, 1974). The IM postulates that the proximal determinant of an individual's behavior includes behavioral intentions (i.e., the intentions to engage in particular behavior), environmental factors (presence or absence; constraints or facilitator), and the possession of the required skills to perform the behavior. Behavioral intention, in turn, is determined by attitudes, social norms, and self-efficacy. Notably, self-efficacy (i.e., perception of one's own ability to perform the behavior) is added as a third determinant next to attitudes and subjective norms in the IM.

Determinants of Intention. The IM is based on the argument that intention is a function of three types of perceptions: attitude, perceived norm, and self-efficacy (Yzer, 2012). Attitude is

the sum of a person's beliefs and evaluations about how favorable or unfavorable his or her performing a particular behavior will be. Perceived norms (i.e., perceived normative pressure) refers to the social pressure one expects regarding performing a particular behavior. It consists of two aspects, injunctive norms (i.e., what others think one should do) and descriptive norm (i.e., what others are doing). Self-efficacy is based upon beliefs that a person feels capable of effectively performing the behavior under various situations and contexts. Taking smoking as an example, people's attitudes are their evaluation of how positive or negative their smoking behavior would be. The injunctive norm pertains to how much they feel people who are important to them (e.g., significant others) will support or disagree with their smoking behavior, while the descriptive norm is their perceptions of how many of those people are smokers. Self-efficacy is the extent to which they feel they can smoke if they want to.

The determinants of intention have successfully predicted health behaviors such as cancer scanning behaviors (Montano & Taplin, 1991), testicular self-examination (Brubaker & Wickersham, 1990), exercise (Gobin, Valois, & Lepage, 1993; Kimiecik, 1992), weight control (Schiffter & Ajzen, 1985), condom use (Kashima, Gallois & McCamish, 1993; Noar, Crosby, Benac, Snow, & Troutman, 2009), alcohol use (Marcoux & Shope, 1997), smoking initiation (Harakeh et al., 2004; Hill, et. al., 1997; Godin, et. al., 1993; McMillan & Conner, 2003; McMillan, Higgins, & Conner, 2005; Pallonen, Prochaska, Velicer, Prokhorov, & Smith, 1998), and smoking cessation (Babrow, Black & Tiffany, 1990; Norman, Conner, & Bell, 1999; Pearlman, Wernicke, Thordike, & Haaga, 2004).

Other Proximal Variables. The IM suggests that skills and environmental factors are moderators of the intention-behavior relationship. As shown in Figure 1, the IM predicts that people act on their intentions when they have the necessary skills and when environmental

factors either facilitate or impede behavioral performance (Yzer, 2012). For example, those who suffered smoking-related diseases may be highly motivated and thus intend to start quitting smoking. Nevertheless, in the reality of a first attempt to quit they may find themselves less likely to successfully quit smoking because they have limited access to effective smoking cessation programs and are less likely to use such resources (Honjo, Tsutsumi, Kawachi, & Kawakami, 2006; Vidrine, Reitzel, & Wetter, 2009). Health literacy is one factor that may prevent those who are lack of health literacy from using social support for smoking cessation, referring to "the ability to obtain, understand, and use health information to make important decisions regarding health and medical care" (Stewart, Gabriele, & Fisher, 2012, p.43). Deficient health literacy may shed lights on the reason why those people cannot connect themselves with social support and resources for smoking cessation.

In addition to necessary skills, a wide range of contextual factors can also either facilitate behavioral performance or impede behavioral performance. For example, young adults who regularly go to bars and nightclubs without the limit of the Clean Air Acts may have higher likelihood to smoke (Ling et al., 2014). Contrarily, young adults who regularly go to places restricted with the Clean Air Acts may perceive smoking as less normative and consequently are less likely to smoke.

Background/Distal variables. The IM also draws attention to distal variables such as socio-demographics and personality traits. While these variables can be related to intention and behavior, they cannot directly affect intention or behavior. The IM therefore positions these variables as background/distal variables.
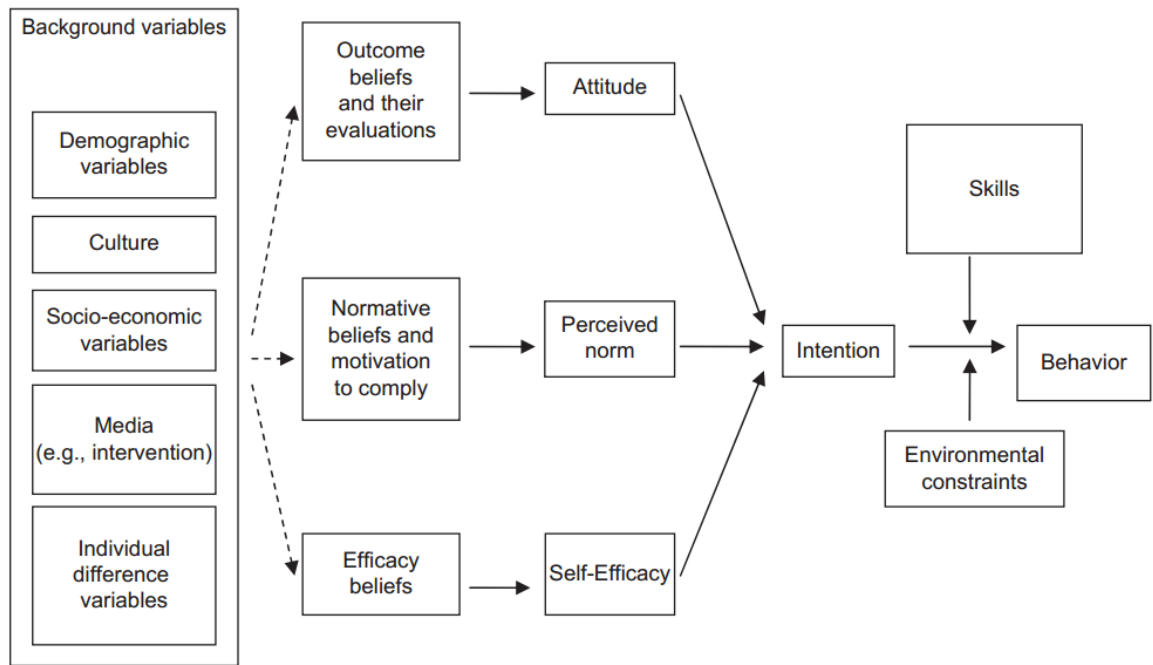
Figure 1. The Integrate Model of Behavioral Prediction (Adapted from Yzer, 2013)

Research Question and Hypotheses

This research argues that pro-smoking information scanning using social media will add predictive power to the ability of the Integrative Model of Behavioral Prediction to predict young adult (a) smoking susceptibility, (b) experimental smoking, and (c) established smoking. It examines whether the relationship between attitudes, social norms, and self-efficacy and smoking behavior is stronger among young adults who encounter more pro-smoking information scanning using social media. Based on the theoretical reasons found in Information Scanning and the Integrated Model of Behavioral Prediction, the following two research questions and eight hypotheses were proposed to guide the research.

RQ1: What is the contribution of pro-smoking information scanning using social media to the Integrative Model of Behavioral Prediction?

H1: Pro-smoking information scanning using social media can significantly predict non-smokers' smoking susceptibility.

H2: Pro-smoking information scanning using social media can significantly predict experimental smoking.

H3: Pro-smoking information scanning using social media can significantly predict established smoking.

RQ2: What are the mediators between pro-smoking information scanning using social media and experimental/established smoking?

H4: Attitudes toward smoking will mediate the relationship between pro-smoking information scanning using social media and experimental/established smoking.

H5: Conforming to social norms regarding smoking will mediate the relationship between pro-smoking information scanning using social media and experimental/established smoking.

H6: Smoking self-efficacy will mediate the relationship between pro-smoking information scanning using social media and experimental/established smoking.

H7: Participation level on social media will mediate the relationship between pro-smoking information scanning using social media and experimental/established smoking.

H8: Interpersonal information scanning will mediate the relationship between pro-smoking information scanning using social media and experimental/established smoking.

CHAPTER THREE: RESEARCH METHODS

Data Collection

Data for the current research were collected using an online questionnaire created on surveymonkey.com. The first page of the questionnaire contained an Information Sheet, which described the purpose of the study, procedures, potential risks and benefits to subjects and/or society, confidentiality of data, participation and withdrawal, rights of research participants, and identity and contact address and email of the primary investigator, as well as approval of the study by the Institutional Review Board at the University of Texas at Austin. Potential subjects were informed that their participation was strictly voluntary, and that they may choose not to answer any questions, and withdraw from the questionnaire at any time. All data collected was strictly anonymous. Participants had to be 18 years or older, and they had to be registered as UT students. After participants read the Information sheet, and clicked on a URL link to the questionnaire, they have indicated their agreement to participate, instead of providing a signed consent form.

Recruitment of Subjects

The sample is a non-random, convenience sample. Subjects for this research were recruited from three UT-registered student organizations. A recruitment message was sent to members of student organizations through their email list provided by the moderators of each student organizations. The message that was sent out in all cases contained a description of the primary investigator's qualifications as a M.A. candidate at University of Texas at Austin, as well as the objectives of the study, which was to learn more about social media use and young adult smoking behavior. Additionally, it stated that subjects' participation in the study was

voluntary, and that if they participate, they could choose not to answer any questions they did not wish to answer, could also opt out of the survey at any time, and that the questionnaires would take approximately ten to fifteen minutes to complete. Additionally, they had to be 18 years of age and above, and be currently enrolled in UT. Also, they were informed that the survey is totally anonymous. They were also told specifically that they would not receive any incentives for participation.

The entire study period for the survey lasted for a period of one and a half months, from March 2014 to April 2014. A total of 252 subjects completed the questionnaire. After subtracting ineligible subjects and incomplete questionnaires, 247 completed questionnaires remained.

Research Reliability and Validity

Reliability refers to external and internal consistency found in repeated measurements (Carmines & Zeller, 1979; Williams & Monge, 2001). It concerns the extent to which each instrument yields the same results on repeated trials (Carmines & Zeller, 1979). Validity, meanwhile, refers to the degree to which a test measures what it is supposed to measure, or the accuracy of the measurements (Carmines & Zeller, 1979). Consequently, it permits appropriate interpretation of scores. There are three measures that can be used to assess the validity of data collection tools: content validity, criterion validity, and construct validity, (Carter & Poter, 1998; Kerlinger & Lee, 2000; Knapp, 1998). Content validity refers to the extent to which the instruments appear to others to be measuring what it says it does (i.e., the representativeness or sampling adequacy of the instruments). Face validity is a simple form of content validity – the researcher asks people (e.g., recognized experts in the area) to check the tool. Criterion validity can be represented by concurrent validity (i.e., the new measure is related to an already existing

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and well-accepted measure) and predictive validity (i.e., the new measure can predict a future event or interest). Criterion validity is usually measured using a correlation coefficient – the higher the correlation is, the more valid the measure is considered. Construct validity is the degree to which a test measures an intended hypothetical validity (Gay, 1996). Construct validity is usually measured by using a correlation coefficient – when the correlation is high, the tool can be considered valid. In the present study, research reliability and validity were measured by exploratory factor analysis and Harman's single factor test.

Measures

To access the impact of pro-smoking information scanning using social media and young adult smoking, the following predictors, outcomes, and control variables are measured. Unless otherwise indicated, variables were assessed on a seven-point Likert-type scale ranging from strongly disagree (1) to strongly disagree (7).

Attitudes toward smoking. Attitude items were adapted from Haddad and Malak's (2002) attitudes (positive and negative) toward smoking subscales, including fourteen items and sixteen items respectively. Haddad and Malak (2002) tested the instruments on a group of university students, and found high reliability and internal consistency, with $\alpha=0.83$. In this study, the positive attitude questions were reverse coded. Higher scores on this scale indicate more negative attitude toward smoking. A principle components factor analysis with a Varimax rotation revealed that the 31 items were primarily loading on one factor. The factor was related to the health aspects of smoking, and included examples like "All forms of smoking are dangerous," "Smoking during pregnancy is harmful," "Smoking should be avoided," and "Smoking seriously

damages health". Reliability for this scale was α=0.84 (M=4.32, SD=1.49). The eigenvalue is 5.11, demonstrating high construct validity.

Injunctive norms. To assess the participants' injunctive norms (i.e., acceptance of smoking), a two item measure was created. Participants were asked to indicate the extent to which they agreed or disagreed with statements that their friends would approve of them smoking and that their family would approve of their smoking. In the exploratory factor analysis, injunctive norms had a Cronbach's α=0.89 (M=4.78, SD= 0.69) and eigenvalue=2.95.

Descriptive Norms. To assess the participants' descriptive norms, a two item measure was created by adapting from existing descriptive norms scales (Reed et al., 2007). Participants were asked to indicate the extent to which they agreed or disagreed with statements that smoking is common and that smoking is socially acceptable. In the exploratory factor analysis, descriptive norms had a Cronbach's α=0.85 (M=5.16, SD=1.13) and eigenvalue=2.90.

Smoking Self-efficacy. To assess participants' smoking self-efficacy, a fourteen-item measure for smoking self-efficacy was modified from Etter, Bergman, Humair, and Perenger's research (2000). The 7-piont scale, ranging from "Not at all sure" (=1) to "Absolutely" (=7), was originally used to measure whether or not "refusal self-efficacy" is associated with individual's smoking (De Vries, Dijkstra, & Kuhlman, 1988; Lawrance & Rubinson, 1986). Two subscales were further identified (Etter, Bergman, Humair, & Perneger, 2000), including internal stimuli (e.g., feeling depressed) and external stimuli (e.g., facing peer influence to smoke). In the present study, the scale was modified to test participants' perception of their ability to accept a cigarette or to stay a smoker, which refers to "acceptance self-efficacy" (author coined). The modified scale had a Cronbach's α=0.86 (M=4.96, SD=1.77) and eigenvalue=6.71.

Pro-smoking information scanning using social media. To assess participants' pro-smoking information scanning using social media, fifteen items were created. The exact items were measured using the stem, "I saw pro-smoking contents on" and they were measured with a 6-point scale (M=3.82, SD=1.18), ranging from "Never" (=1) to "Always" (=6). The fifteen items were: Facebook, Twitter, Instagram, Pinterest, YouTube, Tumblr, Google+, LinkedIn, MySpace, Reddit, Foursquare, myYearbook, Meetup, Fliker, Tagged. These items showed high reliability with a Cronbach's α=0.90 and eigenvalue=6.29.

Interpersonal information scanning. Participants were asked to report whether (1) family members and friends around them smoked and (2) they heard pro-smoking information in the course of routine interactions with families and friends. Items include "I heard pro-smoking information during my interactions with my family members," "I heard pro-smoking information during my interactions with my friends," "My family members smoked around me," and "My friends smoked around me." Participants to each of the four items were coded on a 6-point scale (M=3.6, SD=1.41), ranging from "Never" (=1) to "Always" (=6). This scale had a α=0.76 and eigenvalue=5.12.

Smoking status. A five-level variable measuring smoking status was modified from the 2014 National Health Interview Survey (NHIS). Smoking was coded into a 4-point smoking status score (1 = never tried, not susceptible, 2 = never tried, susceptible, 3 = ever tried, experimental, 4 = ever tired, established). Participants who reported they had never smoked and that they would not smoke a cigarette at any time in the next year were coded as "Not susceptible". Those who indicated they had never smoked but might try smoking in the next year were coded as "Susceptible." Those who reported they had tried smoking, even one or two puffs, but had not smoked more than 100 cigarettes in their life were coded as "Experimental smoker."

Those who reported they had tried smoking and had smoked more than 100 cigarettes in their life were coded as "Established Smokers." Table 2 provides frequencies for each category.

Participation level on social media. Participation level on social media was measured by a series of fifteen questions, adapted from Brandtzaeg and Heim's (2011) user-generated content participation scale and Ellison et al.'s (2007) Facebook intensity scale. These fifteen items were summed to yield a single participation scale. Examples include "I regularly answer questions on social media," "I regularly update my profile and status on social media," and "I regularly feel out of touch if I not logged in". The adapted scale indicated high reliability with a Cronbach's $\alpha=0.87$ (M=5.15, SD=1.62). Based on the exploratory factor analysis, the scale also established construct validity with an eigenvalue=5.89.

Demographics. Participants were asked about demographic factors previously found to have an impact on smoking behavior (e.g., Ling et al., 2009). These variables were gender, age (in order to ensure participants met the sampling criterion of being 18-25 years old), and ethnicity/race. The survey participants (N=247) were predominantly male (59.9%), Caucasian American (58.3%), and the largest age group was 24 (20.6%). All the questions used in the measures are included in Appendix A.

Academic achievement. An adolescent's academic achievement has well-documented effects on that adolescent's smoking behavior (Bryant, Schulenberg, Bachman, O'Malley and Johnston, 2000, 2003; Ellickson, Perlman and Klein, 2003). However, there is lack of evidence concerning the association between college student's academic achievement and their smoking behavior. To bridge this gap, participants were asked to report the grades (M=7.64, SD=1.32) they got from their recently finished semester, ranging from mostly A to Mostly F or below.

Therefore, there were 9 levels of grades one could report receiving, with "mostly A" scored highest at 9 and "F or below" scored lowest at 1.

Data analysis plan

Data analysis was conducted with SPSS version 19.0 and Mplus 7.11. SPSS was used for descriptive statistics, factor analyses, correlation analyses, and multivariate regression analyses. Mplus 7.11 was used to test mediated relationships among variables using weighted least square probit regression.

CHAPTER FOUR: RESULTS

Descriptive Statistics

Table 1 presents the descriptive statistics for the participants (N=247). The mean age of participants was 22 years old and they ranged from 18-25.

Table 1. Demographic Characteristics of Questionnaire Participants (N=247)

Variable	Category	Number	Percentage
Gender	Female	99	40.1%
	Male	148	59.9%
Age	18	32	13.0%
	19	11	4.5%
	20	38	15.4%
	21	29	11.7%
	22	25	10.1%
	23	34	13.8%
	24	51	20.6%
	25	27	10.9%
Ethnicity	Asian American	41	17.0%
	African American	18	7.3%
	Hispanic American	34	13.8%
	Native American	2	0.8%
	Caucasian American	144	58.3%
	Other/Mixed	8	3.23%

Smoking Status

The smoking status of participants is summarized in Table 2. In this research, the data categories of "Not susceptible" and "Susceptible" respondents (N=158) were used to test hypotheses associated with smoking susceptibility (i.e., non-smokers' behavioral intention toward smoking), while the data categories of "experimental smoker" (N=68) and "established smoker" (N=21) respondents were used to test hypotheses associated with "experimental and established smoking".

Table 2. Smoking Status of Participants (N=247)

Smoking Status	Number	Percentage
Not susceptible	53.4%	132
Susceptible	10.5%	26
Experimental smoker (not established)	27.5%	68
Established smoker	8.5%	21

Test of the Contribution of Pro-smoking Information Scanning using Social Media on the

Integrative Model of Behavioral Prediction

The hypothesis of this study is that pro-smoking information scanning using social media will contribute predictive validity to the Integrative Model of Behavioral Prediction. Multiple regression analyses were applied to test this hypothesis. The size and significance of standardized coefficients and R^2 change were evaluated to determine the extent to which pro-smoking information scanning using social media contributed to the model. Before the multiple regression analyses, bivariate correlation analyses were conducted to examine the association of the independent and dependent variables in the study.

Behavioral intention to smoke in the next year (smoking susceptibility) was used as the dependent variable. Because this item was asked only to those who were categorized as "Not susceptible" (N=132) and "Susceptible" (N=26), "Experimental smokers" (N=68) and "Established smokers" (N=21) were not included in this analysis. Therefore, 158 individuals were included in this data analysis. Table 3 provides bivariate correlations illustrating the relationship between attitudes toward smoking, injunctive norms, subjective norms, smoking self-efficacy, pro-smoking information scanning using social media, interpersonal information scanning, participation level on social media, and behavioral intention to smoke.

Table 3. Bivariate Correlations of Independent Variables on Behavioral Intention (N=158)

Factor	1	2	3	4	5	6	7	8
1. Behavioral intention to smoke	1							
2. Attitudes toward smoking	.26**	1						
3. Injunctive norms	.23*	.25*	1					
4. Descriptive norms	.19*	.21*	.24*	1				
5. Smoking Self-efficacy	.37**	.22*	.28*	.26**	1			
6. Pro-smoking Information scanning using social media	.36**	.26**	19*	.30**	.21**	1		
7. Interpersonal information scanning	.28**	.24**	27*	.21*	.41**	.26**	1	
8. Participation level on social media	.25	.29	.12	.37	.28	.29**	.25	1

p<.05*, p<.01**, p<.001***

The bivariate correlation analyses found that pro-smoking information scanning using social media was positively associated with behavioral intention to smoke (β=.36, p<.01), attitudes toward smoking (β=.26, p<.01), injunctive norms (β=.19, p<.05), descriptive norms (β=.30, p<.01), and smoking self-efficacy (β=.21, p<.01). Attitudes toward smoking (β=.26, p<.01), injunctive norms (β=.23, p<.05), descriptive norms (β=.19, p<.05), and smoking self-efficacy (β=.37, p<.01) were positively associated with behavioral intention to smoke. Participation level on social media was positively associated with pro-smoking information scanning using social media (β=.29, p<.01).

Following the correlation analyses, multivariate regression was performed using the variables tested. Behavioral intention to smoke in the next year was entered as the dependent variable, with demographic items (Model 1), attitude items (Model 2), injunctive norms (Model 3), subjective norms (Model 4), self-efficacy items (Model 5), interpersonal information scanning items (Model 6), and pro-smoking information scanning using social media items (Model 7) entered as independent variables. A base model was tested at first, including Model 1, Model 2, Model 3, Model 4, and Model 5. Then, Model 6 was added as the second step. Finally, Model 7 was entered. No multicollinearity problem was detected on the basis of the collinearity statistics which showed that tolerance for all variables were not close to 0, and VIF did not approach 10.

Overall, the base model accounted for 32% of the variance in behavioral intention to smoke ($R^2= .317$, $F(23,154) = 3.84$, $p < .001$. In the second step, the addition of interpersonal information scanning items increased the R^2 by 0.027 ($R^2=.344$, $F(25,152) = 3.91$, $p < .01$). The R^2 changed significantly. In the final step, inclusion of pro-smoking information scanning using social media increased the R^2 by 0.034 ($R^2=.378$, $F(25,153) = 3.97$, $p < .001$). The R^2 changed significantly. Therefore, H1 was supported. Table 4 presents the results of standardized regression coefficients selected independent variables on behavioral intention toward smoking.

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Table 4. Standardized Regression Coefficients (OLS Regression) Selected Independent Variables on Behavioral Intention toward Smoking (N=158)

Independent Variables	β_1	β_2	β_3	β_4	β_5	β_6	β_7	R^2	F	DF
Model 1								0.155	1.95	11
Ethnicity										
Asian American	0.12									
African American	0.13									
Hispanic American	0.09									
Native American	0.03									
Caucasian American	0.18									
Other/Mixed	0.03									
Age	0.18									
Male (Gender)	0.27									
Model 2										
Attitudes toward smoking		0.22**						0.216	2.43	12
Model 3										
Injunctive norms			0.15*					0.234	2.72	13
Model 4										
Descriptive norms				0.07*				0.265	3.76	15
Model 5										
Smoking Self-efficacy					0.29*			0.317	3.84	16
Model 6										
Interpersonal information scanning						0.14*		0.344	3.91	20
Model 7										
Pro-smoking information scanning using social media							0.21**	0.378	3.97	20

Note: $p<.05$*, $p<.01$**, $p<.001$***

Test of the Relationship between Pro-smoking Information Scanning using Social Media and

Experimental and Established Smoking

Multivariate logistic regression was carried out to find out the relationship between experimental smoking and established smoking as dependent variables and pro-smoking information scanning using social media, interpersonal information scanning, participation level on social media, attitudes toward smoking, social norms about smoking, smoking self-efficacy, gender, ethnicity, and academic performance as independent variables. Each variable was assigned with a Logit plot to test for a linear relationship between these scores and the logit of smoking status (experimental smoking and established smoking). Pro-smoking information scanning using social media, interpersonal information scanning, participation level on social media, attitudes toward smoking, social norms about smoking, smoking self-efficacy, gender, ethnicity, and academic performance were entered as continuous variables (Table 5 and Table 6). Odds ratios (ORs) indicated increases in odds of being an experimental smoker or established smoker for each increase in the variable's coded category.

Pro-smoking information scanning using social media does not predict whether a participant was an "experimental smoker"(i.e., People had tried smoking, even one or two puffs, but had not smoked more than 100 cigarettes in their life). The unadjusted odds ratios (ORs) of experimental smoking significantly increased by 4.24 for information scanning using social media (p<.001). This effect became nonsignificant with the adjusted odds ratio (AORs) increased by 4.19 for information scanning using social media (p=0.79). The comparison between ORs and AORs indicated that most of the effects of information scanning do not have direct influence on experimental smoking. Thus, H2 was not supported. The other variables linked with significant odds of experimental smoking were interpersonal information scanning, attitude toward smoking,

and smoking self-efficacy. The overall model was statistically significant with $\chi^2=692.43$, p<.001, and $R^2=0.67$.

Information scanning using social media doesn't predict whether a participant was an "Established smoker" (i.e., People had tried smoking and had smoked more than 100 cigarettes in their life). The unadjusted odds ratios of established smoking significantly increased by 3.82 for information scanning using social media (p<.001). This effect became nonsignificant with the AORs increased by 3.71 for information scanning using social media. The comparison between ORs and AORs indicated that most of the effects of information scanning don't have direct influence on established smoking. Thus, H3 was not supported. The other variables linked with significant odds of established smoking were interpersonal information scanning, attitudes toward smoking, social norms, smoking self-efficacy, and academic performance. The overall model was statistically significant with $\chi^2=726.54$, p<.001, and $R^2=0.74$.

Table 5. Predictors of Experimental Smoking (N=68)

	Unadjusted OR (95% CI) N=68	Adjusted OR (95% CI) N=68
Information scanning using social media (a)	4.24 (3.38-4.55)	4.19 (3.65-4.42)
Interpersonal information scanning (a)	**3.54 (3.11-3.84)**	**3.48 (3.05-3.66)**
Participation level on social media (b)	3.82 (3.70-3.96)	3.60 (3.48-3.74)
Attitudes toward smoking (b)	**4.97 (4.24-5.14)**	**4.85 (4.12-5.01)**
Social norms (injunctive norms and descriptive norms) (b)	3.72 (3.58-3.88)	3.52 (3.37-3.68)
Smoking Self-efficacy (b)	**2.24 (1.98-2.55)**	**2.09 (1.83-2.40)**
Male (Gender) (c)	0.74 (0.62-0.85)	0.62 (0.50-0.79)
Academic performance (d)	5.67 (4.79-6.82)	5.52 (4.67-6.60)
Ethnicity		
Asian American	0.67 (0.41-0.92)	0.89 (0.30-1.79)
African American	0.42 (0.32-0.57)	0.67 (0.24-1.21)
Hispanic American	0.84 (0.66-0.92)	0.60 (0.53-0.94)
Native American	0.72 (0.64-1.26)	0.73 (0.38-1.56)

Caucasian American	0.57 (0.44-0.94)	0.92 (0.85-1.61)
Other/Mixed	0.86 (0.61-0.91)	0.67 (0.43-1.09)

For continuous variables, odds ratios indicate increases in the odds of being an experimental smoker for each coded category of the variable. Adjusted for all other listed variables. Significant (p<0.05) Odds ratios are bolded. (a) Coded categories range from 0=Never to 6=Always; entered as a continuous variables; (b) Coded categories range from 0=Disagree strongly to 6=Agree strongly; entered as a continuous variables; (c) Coded categories are: 0=Male; 1=Female; (d) Coded categories range from 0= F to 9=mostly A; entered as a continuous variables.

Table 6. Predictors of Established Smoking (N=21)

	Unadjusted OR (95% CI) N=21	Adjusted OR (95% CI) N=21
Information scanning using social media (a)	3.82 (3.68-4.51)	3.71 (3.55-4.32)
Interpersonal information scanning (a)	**3.68 (3.51-4.14)**	**3.34 (3.15-3.96)**
Participation level on social media (b)	3.17 (2.74-3.96)	2.94 (2.48-3.31)
Attitudes toward smoking (b)	**4.23 (4.14-5.10)**	**4.01 (3.72-4.76)**
Social norms (injunctive norms and descriptive norms) (b)	**3.94 (3.58-4.18)**	**3.81 (3.37-3.62)**
Smoking Self-efficacy (b)	**2.53 (1.89-2.75)**	**2.09 (1.80-2.47)**
Male (Gender) (c)	0.43 (0.35-0.86)	0.89 (0.52-0.75)
Academic performance (d)	**5.22 (5.09-6.12)**	**5.09 (4.77-6.69)**
Ethnicity		
Asian American	0.82 (0.49-0.92)	0.61 (0.36-0.68)
African American	0.94 (0.72-0.58)	0.85 (0.42-1.25)
Hispanic American	0.84 (0.56-0.96)	0.72 (0.63-0.94)
Native American	0.57 (0.34-1.24)	0.47 (0.32-1.86)
Caucasian American	0.86 (0.43-0.94)	0.94 (0.51-1.61)
Other/Mixed	0.13 (0.07-0.21)	0.21 (0.13-0.69)

For continuous variables, odds ratios indicate increases in the odds of being an experimental smoker for each coded category of the variable. Adjusted for all other listed variables. Significant (p<0.05) Odds ratios are bolded. (a) Coded categories range from 0=Never to 6=Always; entered as a continuous variables; (b) Coded categories range from 0=Disagree strongly to 6=Agree strongly; entered as a continuous variables; (c) Coded categories are: 0=Male; 1=Female; (d) Coded categories range from 0= F to 9=mostly A entered as a continuous variables.

Test of Mediation between Pro-smoking Information Scanning using Social Media and

Experimental and Established Smoking

According to the results of multivariate logistic regression, the direct effect of

information scanning using social media is not significant for experimental and established

smoking once attitudes toward smoking (H4), social norms regarding smoking (H5), smoking

self-efficacy (H6), participation level on social media (H7), and interpersonal information scanning (H8) were included in the model. Analyses (Baron & Kenny, 1986) were conducted to identify the variables that mediate this relationship by highlighting variables that (1) were associated with both pro-smoking information scanning using social media and experimental and established smoking, and (2) when added in the logistic regression, decreased the relationship between pro-smoking information scanning using social media and experimental and established smoking. Each variable tested in the multivariate logistic regression was entered into a new two-step logistic regression: (1) pro-smoking information scanning using social media was entered on the first step, and (2) on the second step, one other independent variable (IV) was entered to test whether adding that IV decreased the estimated relationship between information scanning using social media and experimental and established smoking. IVs that caused a significant decrease in pro-smoking information scanning using social media's estimated association with experimental and established smoking were identified as potential mediators. IVs that couldn't mediate the relationship were excluded for further consideration. Overall, the process highlighted two potential IVs: interpersonal information scanning and attitudes toward smoking. Therefore, H4 and H8 were supported, whereas H5, H6, and H7 were not supported by this dataset.

If interpersonal information scanning was included in a logistic regression, pro-smoking information scanning using social media decreased the odds of experimental and established smoking from 3.86 (p<.001) to 3.72 (p=0.024). By the same token, including attitudes toward smoking in a logistic regression decreased the odds ratio from 3.86 (p<.001) to 3.65 (p=0.031). Only when the two IVs were included in the same time, the odds ratio for pro-smoking information scanning using social media decreased to a non-significant level of 3.14 (p=0.43). The processes presented above suggest that only interpersonal information scanning (H4) and

attitudes toward smoking (H8) can mediate the relationship between information scanning using social media and experimental and established smoking. Table 8 includes the results of mediation analyses.

Table 8. Test of Mediation between Information scanning using social media and

Established Smoking

Independent Variable	Dependent Variable	Mediator	Odd Ratios (OR)	p-value
Pro-smoking Information scanning using social media	Experimental and established smoking	None	3.86	p=0.0007***
Pro-smoking Information scanning using social media	Experimental and established smoking	Interpersonal information scanning	3.72	p=0.024*
Pro-smoking Information scanning using social media	Experimental and established smoking	Attitudes toward smoking	3.65	p=0.031*
Pro-smoking Information scanning using social media	Experimental and established smoking	Combination of Interpersonal information scanning and attitudes toward smoking	3.14	p=0.43
Pro-smoking Information scanning using social media	Experimental and established smoking	Social Norms (including injunctive norms and subjective norms)	3.91	p=0.071
Pro-smoking Information scanning using social media	Experimental and established smoking	Smoking self-efficacy	4.12	p=0.098
Pro-smoking Information scanning using social media	Experimental and established smoking	Participation level on social media	4.09	p=0.064

p<.05*, p<.01**, p<.001***

The results of the probit regression suggested a formal path analysis (Figure 2). This model allowed pro-smoking information scanning using social media to increase attitudes toward smoking (H4) and interpersonal information scanning (H8), with the two IVs increasing the probability of experimental and established smoking. This model was a good fit to the data (χ^2=12.09, p=.58; RMSEA<0.005; WRMR=.28).
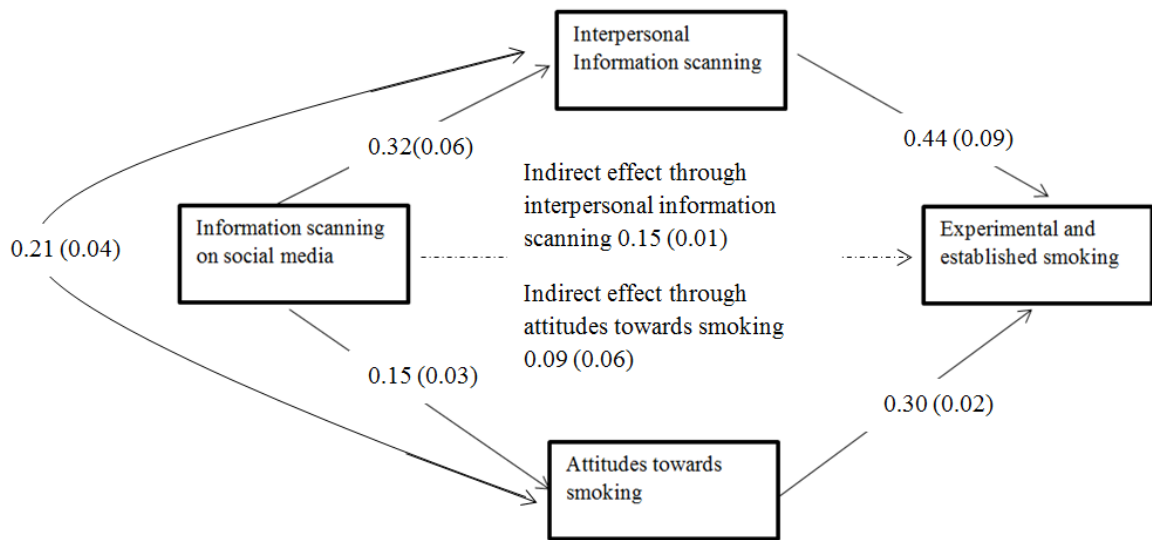

Figure 2. Path Analysis. All path coefficients are unstandardized probit coefficients with the standard errors in parenthesis. Dashed lines indicate indirect relationships. p<.05*, p<.01**, p<.001***

CHAPTER FIVE: DISCUSSION AND CONCLUSION

This study hypothesizes that pro-smoking information scanning using social media plays a role in predicting young adult smoking behavior. A sample of young adults (N=247) was surveyed to examine this hypothesis. Results of the data analysis indicate that pro-smoking information scanning using social media can predict nonsmoker's smoking susceptibility (behavioral intention to smoke), while it cannot predict experimental and established smoking. Only interpersonal information scanning and attitudes toward smoking can mediate the relationship between pro-smoking information scanning using social media and experimental and established smoking. This chapter discusses these findings and evaluates the practical and theoretical contributions and implications of these findings.

Pro-smoking Information Scanning using Social Media and Nonsmoker's Smoking

Susceptibility

The results indicate that attitudes, social norms, and self-efficacy conform to normal predictions for nonsmokers' smoking susceptibility, and the inclusion of pro-smoking information scanning using social media added power to the predictive ability of these variables. For smokers, pro-smoking information scanning using social media can influence experimental smoking and established smoking via its effect on the intermediate variables of attitudes, social norms, and self-efficacy. While pro-smoking information scanning using social media may be related to the three variables, there is still an independent influence of pro-smoking information scanning using social media on smoking susceptibility. That means pro-smoking information scanning using social media impacts smoking behavior above and beyond the relationship between the three variables and smoking susceptibility. This suggests that pro-smoking

information scanning using social media affects smoking susceptibility independently of any effect on attitudes, social norms, or self-efficacy and that inclusion of these variables significantly improves the predictive ability of the IM.

In order to examine how much pro-smoking information scanning using social media improve the predictive ability of the IM, independent variables including gender, ethnicity, academic performance, attitudes toward smoking, social norms regarding smoking, and smoking self-efficacy were entered into a multivariate logistic regression model which served as a base model with which to compare models containing the variable measuring pro-smoking information scanning using social media. The likelihood of being a susceptible smoker (people who have never smoked but might try smoking in the next year) was examined as the dependent variable in the present research. The current analysis found that pro-smoking information scanning using social media accounts for 3.4% of the variance, while interpersonal information scanning accounts for 2.7% of the variance. The overall model accounts for 37.8% of the variance.

Mediating Pro-smoking Information Scanning Using Social Media in Experimental and Established Smoking Groups

This study is the first to hypothesize that pro-smoking information scanning using social media is associated with young adult smoking in a dose-dependent manner: the more pro-smoking information scanning a young adult experienced on social media, the more likely he/she will try smoking (experimental smoking) or become an established smoker (established smoking). The findings indicate that pro-smoking information scanning using social media cannot alone predict whether a participant was an experimental smoker or established smoker, and that the effect of information scanning is more direct with experimental smoking than

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established smoking. It shows that pro-smoking information scanning may primarily influence young adult smoking by recruiting new smokers/new triers. Rather than directly encouraging young adults to smoke regularly, pro-smoking information scanning using social media instead encourages young adults to experiment with smoking. Once experimentation occurs repeatedly, other factors become influential in promoting smoking. As Figure 2 suggests, when pro-smoking information scanning grows by using social media, both interpersonal information scanning and attitudes toward smoking increase the probability of experimental and established smoking.

Theoretical Contributions

First, this study supports the idea that information scanning is a useful concept (Kelly, Niederdeppe, & Hornik, 2009), offers guidance about its measures in the social media context, and provides evidence that these measures are valid indicators of the construct. As other researchers found previously, this study confirms information scanning is much more prevalent and frequent than information seeking (Niederdeppe et al., 2007; Shim, Kelly, & Hornik, 2006). Additionally, this study highlights the importance of establishing valid measures of information scanning, in both mediated and interpersonal contexts.

Second, this study contributes to the literature on pro-smoking information scanning by incorporating the Integrative Model of Behavioral Prediction. The findings discussed above indicate that both pro-smoking information scanning using social media and interpersonal information scanning have significant impact on young adult smoking by influencing the intermediate variables of attitudes, social norms, and self-efficacy. In other words, these intermediate variables can be used to explain why pro-smoking information scanning did or did not predict young adult's smoking behavior.

Practical Contributions

Antismoking campaigns on social media. Antismoking campaigns could use social media more effectively to counter pro-smoking promotions (Graham, Milner, Saul, & Pfaff, 2008; Lin & Hullman, 2005). In terms of the YouTube example, it appears that there is much more pro-smoking imagery than antismoking imagery (Forsyth & Malone, 2010). In order to tackle with pro-smoking imagery, antismoking videos should be generated, improved, and disseminated by the tobacco control community and antismoking campaigns. This study hints that strong anti-smoking campaigns on social media that denormalize smoking may be useful interventions to decrease young adult smoking. Therefore, health practitioners should develop action plans about targeting young adult via effective social media campaigns. Such campaigns "will not only be able to help combat pro-smoking content by active and witty participation in the feedback mechanisms, but will also be able to reach audiences that would never visit typically earnest and formal tobacco-control websites" (Freeman & Chapman, 2007, p.974).

Antismoking Policies. Everybody can see tobacco advertising at retail outlets, for example, but communication on social media is an attractive marketing tool because it can reach targeted audiences without being seen by others. While tobacco advertising is strictly regulated in traditional media outlets, no related policies exist for user-generated content posted on social media sites. More regulation of social media and a greater use of social media for antismoking campaigns are needed. Due to social media's complexity and widespread nature, progress on reducing international tobacco marketing needs a comprehensive commitment and an integrated approach. The guidelines for implementing Article 13 of the WHO Framework Convention on Tobacco Control provide an approach for regulating social media. For instance, Article 13 views social media as "content hosts" and underscores that social media "should have an obligation to

remove or disable access to tobacco advertising, promotion and sponsorship once they have been made aware of the content" (WHO FCTC, 2008, p.163). That means social media could better regulate themselves by regularly identifying and removing pro-smoking information, so the role of social media administrators in regulating public access to pro-smoking information should be examined in the future research. In practice, antismoking policies such as restrictions on pro-smoking information should take into account the recruitment of new smokers through social media to young adults. These online efforts need also collaborate with offline interventions, such as taking advantage of bars and clubs which are important venues for public health efforts to address young adult smoking (Ling, Neilands, & Glantz, 2009). Meanwhile,

Social network approaches. Whether the goal is to restrain smoking at a local school or to promote antismoking campaigns within a community, it is important to understand the social structure of the group and the dynamics of information distribution. Because social networks exert a great amount of impact on the ways in which people think and act, in order to understand how to promote antismoking campaign, it is often very useful to examine the behavior of other people within one's social network, in both offline and online contexts. This viewpoint is consistent with previous studies which suggest both intervention and prevention programs should target not only young adults but also the online group in which they are involved (Freeman, 2012). Social network data can be used for future research to analyze the dynamics of young adult's social media use and benefit for the design of "network interventions". However, as Valente noted, "researchers have many intervention choices at their disposal. Selecting the appropriate network intervention depends on the availability and character of network data, perceived characteristics of the behavior, its existing prevalence, and the social context of the program" (Valente, 2012, p.49). Therefore, the social network approach should build on the basis

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of identifying young adult's online social network and how such networks are embedded in young adults' routine online activities.

Message design. Research on antismoking messages design is insufficient. Future research may focus on how messages can be tailored and targeted to young adults to stop the recent upward trends in smoking behavior. It will be useful to examine such message design by assessing young adults' receptivity to using social media for smoking cessation.

Limitations

Although this study had several significant results that could lead to potentially successful antismoking interventions, it still has limitations. To begin with, self-report data may be subject to recall bias. Information scanning would need to be minimally encoded in memory and made accessible for recall in the future. Since the assessment of individual scanning behavior relies on self-report, the results may vary with individual ability to recall and articulate encoded information (i.e. memory).

Next, the sample posed several issues. Use of a convenience sample may lower the generalizability of findings. Additionally, the sample size of the study was relatively small (N=247). The small sample also influences the representativeness of certain subgroup (for example, only 18 African Americans). In terms of smoking status, there are 89 respondents are smokers, while 158 respondents are non-smokers. Moreover, socioeconomic data was not collected, so the relationship of class differences and young adult smoking could not be examined. Thus, two recommendations for future research are made. First, a larger nationwide sampling should be used to frame a sample that was demographically similar to the population of young adults in U.S. Doing so will ensure detection of significant effects by using a larger

sample size. Second, socioeconomic data should be collected in order to determine the extent to which young adult's smoking behavior vary as a function of social class.

Data from the survey are cross-sectional. Results for young adults aged 18-25 years do not represent trends over time for the particular cohort. Longitudinal studies examining how young adults respond to pro-smoking information scanning using social media over time will be useful in understanding young adults smoking behavior.

Most antismoking interventions targeting young adults take place in colleges or health centers rather than social environments, such as bars and nightclubs (Berg, Lust, Sanem, et al., 2009; Hughes, Cohen, & Callas, 2009; Riley, Obermayer, & Jean-Mary, 2008). Therefore, future studies targeting young adult smoking behavior should involve those who are not in college.

In terms of survey questions, studies on adolescents' smoking initiation often ask the question "Have you ever tried smoking a cigarette, even just a puff?" However, since 80% smokers began smoking before the age of 18 (SAMHSA, 2006), young adults will have smoked a few puffs of a cigarette during adolescence. Thus, the question regarding ever smoking a single puff (smoking initiation) is probably not an appropriate measurement to study young adult smoking behavior.

This study is also limited by the number of mediated sources. Social media was the only mediated source examined in this study. Future analyses might explore differences between information scanning from television, radio, movie, and print media versus social media. By the same token, family and friends were the only interpersonal sources. Future analyses might examine the differences between scanning from family members versus friends, best friends

versus distant friends, as well as other reference groups who may be weak ties within young adult's social networks, such as coworkers or acquaintances.

Finally, considering the large number of analyses conducted, there is a possibility that certain statistically significant results were obtained by chance. However, this study was mainly focused on explorative research, and it was the first time pro-smoking information scanning using social media was measured. Future research in this area can apply a more focused series of analyses using fewer variables and statistical tests.

Conclusion

This study found that pro-smoking information scanning using social media has significant impacts on young adult (1) smoking susceptibility, (2) experimental smoking, and (3) established smoking. This scanning process is significantly associated with attitudes toward smoking, social norms, smoking self-efficacy, participation level on social media and interpersonal information scanning. However, only attitudes toward smoking and interpersonal information scanning mediate the relationship between pro-smoking information scanning through social media and experimental and established smoking. The findings underscore the importance of understanding the influence of information scanning using social media. Therefore, health professionals and public health practitioners need come together to understand how social media is used to disseminate pro-smoking information and the mechanisms how information scanning influence young adult smoking behavior. They should have the complete picture of eliminating pro-smoking information and promoting antismoking campaigns on social media. This process should include sources that are encountered in a more incidental and frequent

fashion when young adults use social media. Doing so will increase the success of antismoking

campaigns by targeting young adults more efficiently with social media.

ONLINE QUESTIONNAIRE FOR YOUNG ADULT SMOKING AND SOCIAL MEDIA USE

Section 1: Social Media Use

1. On which social media site or sites do you have a profile or account? (You can CHOOSE ONE ANSWER or MORE THAN ONE ANSWER)

A. Facebook

B. Twitter

C. Instagram

D. MySpace

E. YouTube

F. Tumblr

G. Google Plus

H. Pinterest

I. Meet me

J. My Yearbook

K. Reddit

L. Foursquare

M. Spotify

N. Skype

O. Flickr

P. Tagged

Q. Other (SPECIFY) _____

R. Don't know

S. None

2. How long do you own a social media site?

A. Less than 6 months

B. 1 year

C. 2 years

D. 3 years

E. Greater than 3 years

3. How often the account was checked?

A. Less than a few times per month

B. A few times per month

C. Daily

D. More than 3 times per day

E. More than 5 times per day

4. What is the average amount of time spent on social media sites?

A. Up to 5 minutes

B. 15 minutes

C. 30 minutes

D. 1 hour

E. Or more than an hour

5. Based on question 5, what is the profile you use or update most often?_____

6. How many friends do you have on your primary social media sites?

A. 0-25

B. 26-50

C. 51-100

D. 101-150

E. 151-200

F. 201-300

G. 301-400

H. More than 401

7. Why do you use social media sites? Select all answers that apply.

A. To keep in touch with friends and family.

B. To meet new people.

C. To share photos, videos, and music.

D. To play games.

E. To discover new music, books, films, and other entertainment

F. Others (SPECIFY)_____

8. What other social media sites do you use? Please check all that apply.

A. Social bookmarking (Digg, Delicious, StumbleUpon, etc.)

B. Livecasting (Stickam, Justin.tv, etc.)

C. Social aggregators (FriendFeed, Posterous, etc.)

D. Wikis

E. Virtual Worlds (SecondLife, WOW, The Sims Online, etc.)

F. Online gaming (FullTilt Poker, PS3 Multiplayer, Kongregate, etc.)

G. Other

Section 2: Tobacco Use

1. Have you ever tried cigarette smoking, even one or two puffs?

A. Yes

B. No

2. How old were you when you first tried cigarette smoking, even one or two puffs?

A. I have never smoked cigarettes, not even one or two puffs

B. 6 years old or younger

C. 7-10 years old

D. 11-13 years old

E. 14-17 years old

F. 18-22 years old

G. 22 years old or older

3. Do you think it is okay for someone your age to smoke cigarettes?

A. Yes

B. No

C. Don't know/no response

4. What do you think is the main reason kids your age smoke cigarette? Is it (Please check all application statements):

A. To relieve stress

B. Because they feel depressed, sad or lonely

C. Just to have fun

D. To fit in

E. To lose weight

F. Don't know/no response

5. If one of your best friends were to offer you a cigarette, would you smoke it?

A. Definitely yes

B. Probably yes

C. Probably not

D. Definitely not

6. How many of your four closest friends smoke cigarettes?

A. None

B. One

C. Two

D. Three

E. Four

F. Not sure

7. When you use social media, how often do you see ads for cigarettes and other tobacco products?

A. I do not have a social media account

B. Never

C. Rarely

D. Sometimes

E. Most of the time

F. Always

8. What brand of cigarettes have you ever seen on social media sites, such as advertisings, posters, photos, and videos?

A. American Spirit

B. Camel

C. GPC, Basic, or Doral

D. Kool

E. Lucky Strike

F. Marlboro

G. Newport

H. Parliament

I. Virginia Slims

J. Some other brand not listed here

Section 3: Participation level on social media

Note: Strongly disagree (=1), Disagree (=2), Somewhat disagree (=3), Neither agree or disagree (=4), Somewhat agree (=5), Agree (=6), Strongly agree (=7).

1. I regularly contribute information I find about smoking on this site.

2. I regularly receive information from other posters about smoking on this site.

3. I regularly post questions about smoking on this site.

4. I regularly answer questions about smoking on this site.

5. I regularly give advice to other members of this site.

6. I regularly receive advice from other members on this site.

7. I regularly give encouragement to other members of this site.

8. I regularly receive encouragement from other members on this site.

9. I regularly correspond with other members of this site.

10. I regularly start new threads or topics on this site.

11. I regularly post links, images, video clips, etc. that I find useful to other members on this site.

12. This social networking site is part of my daily activity.

13. I am proud to tell other people that I am using this social networking site.

14. I feel out of touch if I have not logged onto this social networking site for a while.

15. I feel I am part of the community on this social networking site.

16. I would be sorry if this social networking site shut down.

17. I visit this site only to read the posts, as I do not participate.

18. I get encouragement from the posts that I read, even though I do not participate.

19. I get information from the posts I read, even though I do not participate.

20. I get advice from the posts I read, even though I do not participate.

Section 4: Pro-smoking information on social media

Note: Strongly disagree (=1), Disagree (=2), Somewhat disagree (=3), Neither agree or disagree (=4), Somewhat agree (=5), Agree (=6), Strongly agree (=7).

1. I saw pro-smoking information on Facebook.

2. I saw pro-smoking information on Twitter.

3. I saw pro-smoking information on Instagram.

4. I saw pro-smoking information on Pinterest.

5. I saw pro-smoking information on YouTube.

6. I saw pro-smoking information on Tumblr.

7. I saw pro-smoking information on Google+.

8. I saw pro-smoking information on Linkedin.

9. I saw pro-smoking information on MySpace.

10. I saw pro-smoking information on Reddit.

11. I saw pro-smoking information on Foursquare.

12. I saw pro-smoking information on MyYearbook.

13. I saw pro-smoking information on Meetup.

14. I saw pro-smoking information on Fickr.

15. I saw pro-smoking information on Tagged.

Section 5: Pro-smoking information you receive

Note: Never (=1), Very Rarely (=2), Rarely (=3), Occasionally (=4), Very Frequently (=5), Always (=6).

1. Posts/status about smoking

2. Images about smoking in parties, vehicles, parties, streets, campus, and so forth

3. Videos about smoking in in parties, vehicles, parties, campus, streets and so forth

4. Brands of tobacco products

5. Advertising of tobacco products

Section 6: Pro-smoking information during interpersonal communication

Note: Never (=1), Very Rarely (=2), Rarely (=3), Occasionally (=4), Very Frequently (=5), Always (=6)

1. I heard pro-smoking information during my interactions with my family members.

2. I heard pro-smoking information during my interactions with my friends.

3. My family members smoked around me.

4. My friends smoked around me.

Section 7: Attitudes toward Smoking

Note: Strongly disagree (=1), Disagree (=2), Somewhat disagree (=3), Neither agree or disagree (=4), Somewhat agree (=5), Agree (=6), Strongly agree (=7).

1. All forms of smoking are dangerous as opposed to only heavy smoking.

2. Smoking during pregnancy is harmful to the unborn baby.

3. Smoking should be avoided.

4. Smoking seriously damages health.

5. Smoking shortens a person's life.

6. Smoking is a purposeless activity.

7. Smokers can totally reverse damage to their health by giving up smoking.

8. Smoking kills.

9. Second-hand smoke is harmful to the health of non-smokers.

10. Smokers die younger than non-smokers.

11. Smoking is a revolting habit.

12. No one should be allowed to smoke.

13. The risk of developing lung cancer as a direct result of smoking is very high.

14. The damage done through the inhalation of tobacco smoke is irreversible.

15. The lung cancer rate is significantly higher for smokers than non-smokers.

16. One does not have to smoke for a long time to be in danger of developing tobacco-related disorders.

17. Smokers are more exposed to heart and arteriosclerosis diseases than non-smokers.

18. Smoking is one of life's basic pleasures (REVERSED)

19. There is nothing like a good smoke (REVERSED)

20. Only heavy smoking is dangerous (REVERSED)

21. Smoking is not as harmful as taking drugs or drinking alcohol (REVERSED)

22. Smoking is less of a danger than other risks, such as the risk of a car accident (REVERSED)

23 Statistics that show a relationship between smoking and health hazards are generally misleading (REVERSED)

24. Anti-smoking advertisements exaggerate the dangers of smoking (REVERSED)

25. Smoking is relatively harmless (REVERSED)

26 The health of non-smokers is not affected by breathing cigarette smoke (REVERSED)

27. Life is too short to worry about the harmful effects of smoking (REVERSED)

28. One has to smoke for a long period of time to be in danger of developing serious disease (REVERSED)

39. There is no significant differences regarding mortality rate between smokers and non-smokers (REVERSED)

30. Many old people who have smoked for years and have not developed lung cancer is clear evidence that lung cancer is not caused by smoking (REVESED)

Section 8: Social Norms regarding Smoking

Note: Strongly disagree (=1), Disagree (=2), Somewhat disagree (=3), Neither agree or disagree (=4), Somewhat agree (=5), Agree (=6), Strongly agree (=7).

1. Smoking is common among friends.

2. Smoking is common among family members.

3. My friends would approve of my smoking behavior.

4. My family would approve of my smoking behavior.

5. Smoking is socially acceptable offline

4. Smoking is socially acceptable online

Section 9: Smoking Self-Efficacy

The following are some situations in which certain people might be tempted to smoke. Please indicate whether you are sure you tend to smoke in each situation.

Note: Not at all sure (=1), Very little sure (=2), Little sure (=3), Somewhat sure (=4), Almost sure (=5) To a great extent sure (=6), Absolutely sure (=7).

1. When I feel nervous

2. When I feel depressed

3. When I feel angry

4. When I feel very anxious

5. When I think about a difficult problem

6. When I feel the urge to smoke

7. When having a drink with friends

8. When celebrating something

9. When drinking beer, wine or other spirits

10. When I am with smokers

11. After a meal

12. When having coffee or tea

13. When cigarette offered by a friend

14. When cigarette offered by a family member

Section 10: Demographic Information

1. How old are you? _____
   A. 18 years old
   B. 19 years old
   C. 20 years old
   D. 21 years old
   E. 22 years old
   F. 23 years old
   G. 24 years old
   H. 25 years old or older

2. What is your sex?
   A. Female
   B. Male

3. Which year in college are you in?
   A. Freshman

B. Sophomore

C. Junior

D. Senior

E. Master

F. Ph.D.

4. What race or races do you consider yourself to be? (You can CHOOSE ONE ANSWER or MORE THAN ONE ANSWER)

A. Asian American

B. African American

C. Hispanic American

D. Native American

E. Caucasian American

F. Other/Mixed (Please specify)_____

5. During the past 12 months, how would you describe your grades in school?

A. Mostly A

B. Mostly A's and B's

C. Mostly B's

D. Mostly B's and C's

E. Mostly C's

F. Mostly C's and D's

G. Mostly D's

H. Mostly D's and F's

I. Mostly F's or below

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