

DEVELOPMENT AND EVALUATION OF A PERSONALIZED NORMATIVE
FEEDBACK INTERVENTION FOR HISPANIC YOUTH AT HIGH RISK OF SMOKING

HOLLY J. MATA

Interdisciplinary Health Sciences Doctoral Program

APPROVED:

Joe Tomaka, Ph.D., Co-Chair

Sharon Davis, Ph.D., Co-Chair

Gloria McKee, Ph.D.

Hector Balcazar, Ph.D.

Benjamin C. Flores, Ph.D.
Acting Dean of the Graduate School

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PREVIEW

DEDICATION

Dedicated to my student colleagues in public health: you make the world a better place!

PREVIEW

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DEVELOPMENT AND EVALUATION OF A PERSONALIZED NORMATIVE
FEEDBACK INTERVENTION FOR HISPANIC YOUTH AT HIGH RISK OF SMOKING

by

HOLLY J. MATA, M.S.

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ABSTRACT

Despite reductions in overall smoking rates, data show that adolescents continue to smoke at higher rates than adults and that adolescents living in the Texas–Mexico border area are more likely than their counterparts living elsewhere in Texas to smoke. While adult smoking in the Paso del Norte Region has decreased significantly over the past decade, area youth smoking rates exceed both state and national averages. Recent estimates report “any use” cigarette smoking among El Paso youth in the past month to be slightly more than 28% as compared with 21% among Texas youth participating in the 2009 statewide Youth Risk Behavior Survey and 19% among U.S. youth in the same survey. Sociodemographic factors such as income, low community educational attainment, ethnicity, and social context have been shown to contribute to smoking initiation and prevalence among adolescents. In addition to prioritizing groups that may be at high risk of smoking, the CDC’s *Best Practices for Tobacco Control Programs* (2007) suggests several strategies to help eliminate tobacco-related health disparities nationwide. These include identifying populations with disparities related to smoking, partnering to enhance intervention reach and resources, and developing and implementing culturally relevant approaches to smoking prevention and cessation. Accordingly, the purpose of this research project was to develop and evaluate an innovative intervention for youth who may be at high risk of smoking because of sociodemographic factors. Specifically, the research examined whether existing behavioral technology that has been used successfully to reduce alcohol consumption in youth and adults, Personalized Normative Feedback (PNF), can be adapted to similarly affect smoking behavior. PNF refers to a brief intervention process that

includes assessment of individual use patterns and direct comparisons of such behaviors to normative data. In the current project, PNF techniques were featured in a brief intervention program that prioritized smoking and non-smoking youth who may be at high risk for continued or future smoking. The primary hypotheses were that participants receiving the PNF intervention would report decreased susceptibility to smoking, lowered estimates of descriptive norms favoring smoking (social norms), and increased negative attitudes towards smoking relative to baseline and in comparison with participants exposed to a nutrition program similar in format and duration but that did not address smoking in any way. Results indicated that although intervention participants reported decreased susceptibility and lowered social norms relative to controls, these changes were not statistically reliable. Regarding changes in attitudes, participants in both groups reported increases in negative attitudes towards smoking which were statistically reliable, and were highest among youth who reported current smoking. Significant differences in smoking prevalence, norms, attitudes, and susceptibility were found by study site and by smoking status, suggesting the need for tailored prevention intervention approaches at the community level. Implications for future research and prevention intervention programs are discussed, as are limitations and strengths of the use of PNF to reduce smoking susceptibility among youth who may be at high risk of smoking because of contextual and sociodemographic factors.

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CHAPTER 1: INTRODUCTION

It is estimated that 20.6% of adults in the U.S. smoke cigarettes (CDC, 2009), and more people die from smoking each year than from murders, suicides, automobile accidents, alcohol and illegal drug use, and HIV/AIDS combined (U.S. Department of Health and Human Services [USDHHS], 2004). Extensive research has confirmed causal relationships between smoking and many forms of cancer, cardiovascular disease, respiratory disease, reproductive effects, decreased health status, and increased morbidity (USDHHS, 2004).

Despite reductions in overall smoking rates, data show that adolescents continue to smoke at higher rates than adults and that smoking rates are considerably higher among those with General Education Development (GED) certification (41.3%) and high school dropouts (35.7%), compared with those receiving traditional high school diplomas (25.5%; CDC, 2009). Other sociodemographic factors such as income, ethnicity, and social context also contribute to smoking initiation and prevalence among adolescents (O'Loughlin, Karp, Koulis, Paradis, & Di Franza, 2009). In addition to prioritizing groups that may be at high risk of smoking, the CDC's *Best Practices for Tobacco Control Programs* (2007) suggests several strategies to help eliminate tobacco-related health disparities nationwide. These include identifying populations with disparities related to smoking, partnering to enhance intervention reach and resources, and developing and implementing culturally relevant approaches to smoking prevention and cessation.

Adolescents living in the Texas–Mexico border area are more likely than their counterparts living elsewhere in Texas to smoke (TDSHS, 2007). Despite significant

decreases in adult smoking in the Paso del Norte Region, area youth smoking rates exceed both state and national averages. Recent estimates report “any use” cigarette smoking among El Paso youth in the past month to be slightly more than 28% (PDNHF, 2007a), as compared with 21% among Texas youth participating in the 2009 statewide Youth Risk Behavior Survey and 19% among U.S. youth in the same survey (CDC, 2011a).

Overview of Risk and Protective Factors Related to Youth Smoking

Sociodemographic factors. Socioeconomic factors such as poverty and low educational attainment contribute to increased risk and prevalence for a variety of health indicators regardless of ethnicity (Williams, Neighbors, & Jackson, 2003). In terms of smoking, studies have suggested that minority status, smoking by family and friends, low educational attainment, low socioeconomic status, and early experimentation are significantly associated with daily use and dependence (CDC, 2006; Hu, Davies, & Kandel, 2006; Kandel, Kiros, Schaffran, & Hu, 2004). Additionally, tobacco companies target lower income communities and neighborhoods known to have higher smoking rates through increased marketing and tailored advertising campaigns (Barbeau, Wolin, Naumova, & Balbach, 2005; CDC, 2010).

Risk factors that may contribute to increased tobacco and substance use *specifically on the US-Mexico border*—the site of the current project — include low socio-economic status, low educational attainment, illicit drug availability, and increased alcohol and tobacco marketing (Caetano, Ramisetty-Mikler, Wallisch, McGrath, & Spence, 2008; Power, 1998). As such, prioritizing youth who may be at high risk of smoking because of sociodemographic and contextual factors is a logical and cost-

effective response to the disparity in smoking rates. There is significant evidence supporting the role of comprehensive tobacco control policies in reducing adult smoking (CDC, 2007; Frieden et al., 2005) and some evidence suggesting that similar approaches can reduce youth smoking initiation (CDC, 2010). This is important, because with few exceptions, school-based prevention programs have not shown long-term success in reducing youth smoking (Müller-Reimenschneider, Bockelbrink, Reinhold, Rasch, Greiner, & Willich, 2011). However, community-based interventions that address youth smoking at a variety of contextual levels and supplement comprehensive tobacco control efforts have shown some evidence of success in reducing youth smoking rates (Carson, Brinn, Labiszewski, Esterman, Chang, & Smith, 2011; CDC, 2010; Müller-Reimenschneider et al., 2011).

Individual factors. Risk factors in addition to sociodemographic factors that have been investigated during the last 30 years include psychosocial factors such as attitudes, beliefs, and intention, social influences through family and friend networks, other substance use, academic success, individual traits such as rebelliousness, stress appraisal and response, and self-esteem and self-efficacy (Castro, Maddahian, Newcomb, & Bentler, 1987; Christakis & Fowler, 2008; Ford, Diamond, Kelder, Sterling, & McAlister, 2009; O'Loughlin et al., 2009).

Risk and protective factors related to youth smoking have been widely studied and yet have differed across several hundred longitudinal studies; smoking susceptibility, parental smoking, and peer smoking have emerged as common risk factors that have consistently predicted youth smoking (O'Loughlin et al., 2009). Effects of other individual risk factors have been less consistent when studied as single

predictor variables but are frequently part of multivariate models used to predict smoking uptake and continuance.

Researchers have also assessed the impact of individual factors such as biologic traits and genetic differences in nicotinic effect and dopaminergic response (Audrain-McGovern, Nigg, & Perkins, 2009; Montgomery, Lingford-Hughes, Egerton, Nutt, & Grasby, 2007), as well as contextual factors including movie portrayal of smoking (Charlesworth & Glanz, 2005), tobacco marketing (Hanewinkel, Isensee, Sargent, & Morganstern, 2011), anti-smoking media campaigns, and public policy efforts such as tax increases and indoor smoking bans (Carpenter & Cook, 2008; Gilpin, White, Messer, & Pierce, 2007; O'Loughlin et al., 2009).

Health Determinants, Health Disparities, and Tobacco-related Disparities

Disparities exist in terms of both smoking prevalence and access and response to program and policy efforts such that some groups may be more likely to initiate and continue smoking and less likely to quit (CDC, 2006; CDC, 2009; Christakis & Fowler, 2008; Hu et al., 2006). Accordingly, it is useful to understand tobacco prevention and control efforts from an overarching perspective of health determinants and health disparities, with additional theoretical contributions that impact specific constructs associated with smoking risk and prevalence.

Health determinants and health disparities. Health *determinants* are factors that impact individual and population health across a variety of social, environmental, and individual contexts (World Health Organization, 2011). Health *disparities* are differences in health determinants and health outcomes that can be attributed to social inequalities (CDC, 2011b). Because they encompass such a wide spectrum of factors,

determinants of health disparities in general are myriad, multifaceted, and complex. Determinants of tobacco-related health disparities in particular are similarly multifactorial and represent a significant public health challenge (Fagan et al., 2004; CDC, 2000).

Frameworks for understanding determinants of population health are useful in efforts to develop and implement strategies to address disparate health behaviors and outcomes such as those related to smoking. Two such frameworks, followed by research recommendations from a key group of tobacco researchers and stakeholders, will be addressed.

A framework based on levels of influence. Levels of influence on determinants of health have been described by Warnecke and colleagues (2008) as distal, intermediate, and proximal. Distal factors include public policy and social norms, and institutional contexts such as legal, political, and health care systems. Intermediate factors include social and physical contexts such as social capital and socioeconomic status, racial, ethnic, and cultural factors, and neighborhood characteristics including safety, access to services, and environmental health indicators. Proximal factors include individual characteristics such as age, ethnicity and health status, behaviors such as substance use, diet and fitness, and sexual behavior, and biological responses as well as genetic processes and pathways (Warnecke et al., 2008).

A framework based on pathways. Others have argued against the distal/proximal characterization of determinants of health and suggested instead that we conceptualize health determinants through multilevel pathways that are shaped by power, politics, and social contexts that then are embodied at the individual and biological levels. The consequences of this embodiment are then expressed in

population health, disease burden, and health disparities (Krieger, 2008). In this view, the pathways through which determinants affect the individual are not constrained by a hierarchy of levels but instead are manifest through multiple levels of influence simultaneously and continuously.

Regardless of whether determinants of disparities in health behaviors and outcomes are conceptualized through levels, pathways, or contexts, these determinants are especially challenging in the ongoing quest to eliminate tobacco-related health disparities. Researchers have called for empirical investigation into how best to intervene across multiple levels of influence and through various pathways of smoking initiation and continuance.

Tobacco-related Disparities

In 2002, the National Conference on Tobacco and Health Disparities (NCTHD) was convened to review the current research, outline an agenda for addressing gaps in the literature, and provide directions for future research. Collaborators representing multiple agencies and stakeholders in tobacco research defined tobacco-related health disparities as “differences in the patterns, prevention, and treatment of tobacco use; the risk, incidence, morbidity, mortality, and burden of tobacco-related illness that exist among specific population groups in the United States; and related differences in capacity and infrastructure, access to resources, and environmental tobacco smoke exposure” (Fagan et al., 2004, p. 211). In other words, some groups have higher smoking rates, are more vulnerable to tobacco-related exposure and disease, or have fewer prevention and cessation resources available. For example, smoking rates among members of the military, people who are gay, lesbian, bisexual, or transgender, people

living with mental illness and substance use disorders, and people living in rural as opposed to urban areas are significantly higher than among the general population (Tobacco Research Network on Disparities [TReND], 2011). Disparities by sociodemographic factors such as education, income, and ethnicity are well-documented, as is the vulnerability of youth to a variety of tobacco-related disparities (CDC, 2006, 2007, 2009; TReND, 2011).

Additionally, the NCTHD specifically called for the identification of the best mechanisms and venues through which research can be used to interrupt the pattern of tobacco-related health disparities among affected groups. Eleven key areas for scientific inquiry were outlined and included the domains of epidemiology, surveillance, psychosocial research, basic biology, harm reduction, marketing, policy, community and state, prevention of tobacco use, treatment of nicotine addiction, and research capacity and infrastructure (Fagan et al., 2004). As well, the NCTHD stressed the importance of innovative strategies and approaches that would examine the root causes of disparities, address needs at smaller and within-group levels, and translate findings into practice and policy. This project addresses several of the above suggested areas for inquiry, specifically psychosocial research, harm reduction, and prevention of tobacco use. This project also aimed to address needs at smaller group levels, a better understanding of which can help to impact practice and policy in the priority population.

Factors influencing youth smoking. As with determinants of health disparities, determinants of tobacco-related disparities can be conceptualized as occurring and interacting across multiple levels and pathways. Interventions among youth are crucial

to addressing tobacco-related disparities in light of research showing that virtually all adult smokers initiated smoking before the age of 18 (USDHHS, 1994).

Factors influencing youth smoking have also been characterized as belonging to distal, intermediate, and proximal realms and interacting to impact smoking behavior (Turner, Mermelstein, & Flay, 2004). In this model, the distal realm includes environmental and cultural influences such as media and marketing, public policy, and community characteristics; the intermediate realm includes contextual factors such as social norms, family and peer tobacco use and attitudes about use; and the proximal realm includes individual biological and genetic characteristics as well as ethnicity, gender, and age.

Respectively, these three realms – environmental/cultural, contextual, and individual - primarily influence attitudes, social norms, and responses to smoking experimentation (Turner et al., 2004). Research in each of these realms can contribute to increased understanding of youth smoking in general, and disparities in susceptibility to smoking across multiple levels and contexts in particular. Few smoking prevention programs have demonstrated long-term effects. In response, researchers have called for investigations into components of programs that may strengthen approaches to youth control through short-term or reinforcing effects, and for evaluation of strategies that may mediate or moderate program effectiveness (O’Laughlin et al., 2009). Researchers have also suggested that it is important to assess intervention effects both immediately and long-term (Flay, 2009), in order to capture both short-term effects as well as gain insight into how long intervention effects last.

Purpose and Rationale of the Current Project

Accordingly, the purpose of this research project was to develop and evaluate an innovative intervention for youth who may be at high risk of smoking because of sociodemographic factors including neighborhood characteristics such as low educational attainment and high poverty rates. Specifically, the research examined whether existing behavioral technology that has been used successfully to reduce alcohol consumption in youth and adults, PNF, can be adapted to similarly affect smoking behavior. PNF refers to a brief intervention process that includes assessment of individual use patterns and direct comparisons of such behaviors to normative data. Because substance users typically overestimate the proportion of peers who are users like themselves, the goal of PNF is to correct normative misperceptions by providing objective feedback regarding discrepancies between individual behavior and actual normative standards (Lewis, Neighbors, Lee, & Oster-Aaland, 2008). PNF interventions can be and typically are non-judgmental, non-evaluative, and non-labeling, making them ideal for use among young populations who may be defensive when talking about current substance use. Several reviews and meta-analyses have shown that PNF interventions have consistently reduced alcohol consumption and related risks (Carey, Scott-Sheldon, Carey, & DeMartini, 2007; Lewis & Neighbors, 2006; Walters & Neighbors, 2005).

In the current project, PNF techniques were featured in a brief intervention program that prioritized smoking and non-smoking youth who may be at high risk for continued or future smoking because of sociodemographic factors.

Primary hypotheses. The primary hypotheses were that participants receiving the PNF intervention would report decreased susceptibility to smoking, lowered estimates of descriptive norms favoring smoking (social norms), and increased negative attitudes towards smoking relative to baseline and in comparison with participants exposed to a nutrition program similar in format and duration but that did not address smoking in any way.

PREVIEW

CHAPTER 2: BACKGROUND AND SIGNIFICANCE

Sociodemographic Risk Factors and Theoretical Influences.

In this section, sociodemographic factors such as ethnicity, educational attainment, and income that may contribute to smoking risk among youth in the priority population are explored. The theoretical foundations of the current project are outlined, and relevant studies related to the outcomes of interest are described.

Hispanic ethnicity and smoking. Hispanic adults in the U.S. are less likely to smoke than are most other ethnic groups; only Asians have lower smoking rates. In 2008, 15.8% of Hispanics aged 18+ reported current smoking compared with 21.3% of non-Hispanic Blacks, 22% of non-Hispanic Whites (NHWs) and 32.4% of non-Hispanic American Indians/Alaska Natives. Within each ethnic group, men are almost twice as likely to smoke as women except among NHWs, where the gender difference is less pronounced. Relevant to the current project, ethnic variations in smoking among adolescents differ from adult trends. For example, a study of 5870 eighth graders in California found that Hispanic students reported higher susceptibility to smoking (71%) than did their White (61%), Black (58%), or Asian (47%) peers. Additionally, self-reported past 30-day smoking was highest for Hispanics (22%) compared with their White (18%), Black (12%), and Asian (12%) classmates (Unger, Rohrbach, Cruz et al., 2001).

In another study of 68,611 youth aged 12-17 that investigated smoking prevalence and susceptibility among six major racial/ethnic groups and nine Asian and Hispanic subpopulations in the U.S., Hispanic youth had relatively low past 30-day smoking rates of 9.3% (range of all groups 2.2%-23.1%) but high smoking susceptibility

rates of 27% (range 15.4%-28.8%) (CDC, 2006). In contrast with adult data, there was no difference in smoking rate by gender among Hispanic youth. Overall, these data suggest that although Hispanic adults are less likely to smoke than their non-Hispanic counterparts, Hispanic youth are much more susceptible to smoking than their non-Hispanic peers (27% compared with 21%). Moreover, the gender differences in adult smoking rates such that Hispanic women are less likely to smoke are not likely to continue, given the similar smoking rates and elevated rates of smoking susceptibility among male and female Hispanic youth.

Poverty and smoking. Income and poverty have been consistently associated with higher smoking rates. For example, one recent study found that prevalence of current smoking (in this study defined as having smoked at least 100 cigarettes and smoking on some days or every day) among 21,525 adults aged 18+ was much higher for those reporting incomes below the federal poverty level (31.5%) than for those reporting incomes at or above this level (19.6%) (CDC, 2009). This discrepancy in smoking rates is consistent with trends reported in earlier studies; in a 2000 study of 25,831 U.S. adults current smoking rates were 34.7% among those classified as poor with (income below the 1999 federal poverty level) compared with 20.7% among those classified as higher income (income \geq 300% of the federal poverty level) (Barbeau, Krieger, & Soobader, 2004).

Educational attainment and smoking. Significant differences exist in smoking prevalence by education level, such that U.S. adults aged 25+ with less or alternative educational attainment are much more likely to smoke. For example, as Figure 1 shows, the lower the educational level, the higher the smoking rate. Of particular concern are