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Implicit theories of smoking and association with current smoking status

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Abstract

Implicit theories of smoking refer to people's beliefs about whether smoking behavior is something that is changeable (incremental belief) or fixed (entity belief). This study examines implicit theories of smoking and its association with smoking behavior in a nationally representative sample of US adults using data from the Health Information National Trends Survey. The current results show that implicit theories of smoking are associated with smoking. Among former smokers, 90 percent endorsed an incremental belief about smoking compared to 70 percent of current smokers. Our study provides initial evidence for the role of implicit theories of smoking as a psychological factor associated with smoking behavior.

Keywords

implicit theories; lay theories; smoking behavior

Smoking is the leading cause of preventable death and disease in the United States, accounting for a death rate among current smokers two to three times higher than never smokers (Carter et al., 2015). The Surgeon General reports that smoking causes 1300 deaths every day and 16 million Americans are living with a disease caused by smoking (USDHHS, 2014). Understanding psychological factors associated with smoking continues to be an important focus in public health efforts to reduce the impact of tobacco (Carter et al., 2015; USDHHS, 2014).

One promising psychological factor in understanding smoking behavior pertains to people's beliefs about their own personal attributes. Implicit theories (or lay theories) refer to the core assumptions people make about the extent to which human attributes (e.g. intelligence, morality) are dynamic and changeable or static and fixed (Dweck et al., 1995). Studies have demonstrated that peoples' beliefs about whether a personal characteristic is malleable versus fixed are associated with their reactions, intentions, and behaviors in a wide range of

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domains (Dweck, 2012; Dweck et al., 1995; Romero et al., 2014). People may hold different implicit theories for different characteristics.

Within the implicit theory framework, there are two types of beliefs people may hold: an incremental belief, that a given characteristic is malleable and can be changed, or an entity belief, that a given characteristic is stable and unchangeable despite efforts for change. Individuals who hold stronger incremental beliefs are more likely to think that they have greater control over personal outcomes and are likely to be more persistent at efforts to change a particular behavior because they believe that they can change traits through practice and learning (Dweck, 2012). Entity theorists, on the other hand, are less likely to initiate behavior to change a particular trait because they do not believe their efforts will be fruitful; they believe that they have to be flawless and failure means a lack of competence or potential (Dweck et al., 1995). Dweck et al. (1995) emphasize that there is no “correct” implicit theory to hold; the two types of implicit theories should be viewed as alternative ways of constructing reality, each with different potential costs and benefits (see Dweck, 2012 for a more thorough review of implicit theories).

Application of implicit theories to health-related domains is a burgeoning area of study. To date, there have only been a small number of studies exploring implicit theories in domains such as diet and weight loss, physical activity, willpower, and smoking. In the domain of weight loss, it was found that incremental beliefs were associated with less avoidant coping and the expectation to exert less effort to lose weight in response to a hypothetical dieting setback (Burnette, 2010). With regard to physical activity and athletic ability, incremental theorists have reported greater self-efficacy for behavior change, greater motivation, and more physical activity (Biddle et al., 2003; Kasimatis et al., 1996; Lyons et al., 2013). The implications of one’s beliefs about a given characteristic are particularly salient in the context of willpower, which is inherently related to diet and weight loss, physical activity, and smoking. Research on implicit theories about one’s will-power has found that entity theorists, who believe that they have a limited amount of will-power, have more difficulty regulating their behaviors and resisting temptation. Conversely, incremental theorists who believe that will-power is an unlimited resource tend to have better self-regulation and self-control (Job et al., 2010, 2015). Thus, whether someone holds an incremental or entity belief may have implications for modifying these health behaviors, including smoking.

Implicit theories of smoking (ITS) refer to people’s beliefs about whether smoking behavior is something that is changeable or fixed (Fitz et al., 2015). Smokers who hold a stronger incremental belief believe that they can start or stop smoking whenever they want (Viator, 2001) and may be more motivated, persistent, and likely to quit, while those who hold a stronger entity belief may not (Fitz et al., 2015). The relationship between ITS and expectations of smoking behavior among young adult nonsmokers and smokers has been demonstrated; stronger incremental beliefs were related to lower expectations of future smoking behavior (assessed by level of agreement with the statement, “I expect to try cigarette smoking in the future”) for current smokers (Fitz et al., 2015; Viator, 2001). For nonsmokers, stronger incremental beliefs were related to greater expectations to start smoking in the future (assessed by level of agreement with the statement, “I expect to

become a regular smoker in the future”), suggesting that non-smokers think they can presumably stop whenever they choose (Fitz et al., 2015).

There have only been two studies to date that explore implicit theories and smoking (Fitz et al., 2015; Vietor, 2001). While the results of these studies show promise in employing ITS to predict smoking *expectations*, it is not known whether ITS are associated with smoking *behavior*. The present study examines ITS and its association with smoking behavior. This study utilizes a nationally representative sample from the Health Information National Trends Survey (HINTS) to (1) characterize the US population’s ITS and (2) explore the association between ITS and smoking status, controlling for sociodemographic characteristics. Knowledge about the relationship between ITS and current smoking status may inform the future study of ITS and other cognitive constructs that contribute to smoking behavior. This work may also inform the strategic development of tailored smoking cessation communication campaigns and interventions.

Method

Data for this study come from the HINTS. HINTS is a nationally representative, cross-sectional mail survey of civilian, non-institutionalized adults aged 18 years or older in the United States. It tracks trends in the American public’s need for, access to, and use of health-related information and health behaviors, perceptions, and knowledge. The sample was drawn in two stages. In the first stage, addresses from the United States Postal Service file of residential addresses were randomly selected. In the second stage, an adult within the selected household was selected using the next birthday method. To maximize the response rate and the representativeness of the sample, the survey included multiple non-response follow-ups, a pre-paid incentive at the first mailing, and express delivery as one of the non-response follow-up mailings. For households that had a Hispanic surname, a Spanish version of the questionnaire was distributed along with the English version. Additional sampling, design, and weighting strategies for HINTS have been published elsewhere (Finney-Rutten et al., 2012; Westat, 2013).

Analyses were conducted using data from HINTS 4, Cycles 2 and 4 ($n= 7307$), collected from October 2012 through January 2013 ($N= 3630$) and July 2014 to November 2014 ($N= 3677$), respectively, by mailed questionnaire (Nelson et al., 2004; Westat, 2013). HINTS 4 was approved by the chair of the Westat Institutional Review Board (IRB) in an expedited review and was deemed exempt from IRB review by the National Institutes of Health (NIH) Office for Human Research Protections. The final response rates were 39.97 percent for Cycle 2 and 34.44 percent for Cycle 4. There were no significant differences between the two cycles on the key variables of interest and the data from the two cycles were merged to create a new data set for the present analyses.

One item assessed ITS: “Smoking behavior is something basic about a person that they can’t change very much” (*strongly agree, somewhat agree, somewhat disagree, strongly disagree*). Responses were dichotomized into Agree (*strongly agree* and *somewhat agree*) and Disagree (*somewhat disagree* and *strongly disagree*) due to lack of variability across the 4-point response categories. Two items assessed smoking status: (1) “Have you smoked at least 100

cigarettes in your entire life? (yes/no) and (2) How often do you now smoke cigarettes? (every day, some days, not at all).” Three smoking status categories were derived: current smoker (every day and some days), former smoker, and never smoker.

Standard measures assessed sample demographics, including age, education, income, and race/ethnicity. Age was categorized into 18–29, 30–49, 50–69, and >70 years. Race/ethnicity was categorized into non-Hispanic white, non-Hispanic black, Hispanic, and Non-Hispanic Other. Education was categorized into less than high school, high school graduate, and post high school training other than college, some college, and college graduate or higher. Income was categorized into less than US\$15K per year, US\$15K–US\$34K, US\$35K–US\$74K, and more than US\$75K per year.

Descriptive analyses and chi-square tests were conducted to examine associations among sociodemographics, smoking status, and ITS. Sociodemographic variables that had a significant association with ITS at the bivariate level were entered into a multinomial logistic regression to explore independent associations between ITS and current smoking status, controlling for sociodemographics. Data were analyzed in 2015 using SAS-callable SUDAAN, version 11.0.0, to estimate standard errors (SEs) of point estimates for the complex survey data and were weighted to adjust for oversampling, non-responsiveness, and to provide representative estimates of the adult US population.

Results

The majority (83%) of Americans hold incremental beliefs about smoking behavior, believing that smoking behavior is more changeable than fixed. In all, 60 percent of Americans have never smoked, 23 percent identify as former smokers, and 17 percent identify as current smokers. Of those who are current smokers, 31 percent hold an entity belief and 69 percent hold an incremental belief. For former smokers, 10 percent hold an entity belief and 90 percent hold an incremental belief. For never smokers, 16 percent hold an entity belief and 84 percent hold an incremental belief. The results from bivariate chi-square analyses examining relationships among ITS, smoking status, and sociodemographic characteristics (table not shown) show that entity and incremental theorists significantly differ in terms of smoking status, age, education level, income, and race/ethnicity ($p < 0.001$). Among those who hold an entity belief, these beliefs are most common among those who are current smokers (31%), of older age (70 years +; 23%), have less than a high school education (33%), make less than US\$15K annually (29%), and Hispanic (26%). Incremental beliefs are most common among middle-aged adults (30–49 years; 86%), post graduates (91%), those from higher income groups (US\$75K+; 91%), and non-Hispanic whites (97%).

A weighted multinomial logistic regression assessed the association between ITS and smoking status (controlling for sociodemographic variables; Table 1). Compared to those who hold an incremental belief about smoking, people who hold an entity belief are significantly less likely to be former than current smokers (odds ratio (OR) 0.33, 95% confidence interval (CI) 0.21–0.49). People who hold an entity belief about smoking are half as likely to be never than current smokers compared to those who hold incremental beliefs (OR 0.60, 95% CI 0.43–0.85). Higher educational level is associated with a greater

likelihood of being former or never smokers than current smokers. The results also show that as income increases, people are more likely to be former or never smokers than current smokers.

Discussion

This study examined associations between ITS and smoking status in a nationally representative sample. It builds on a substantial body of work in implicit theories (Dweck et al., 1995; Yeager et al., 2014) and extends a burgeoning literature investigating implicit theories and health behaviors (Burnette, 2010; Burnette and Finkel, 2012; Fitz et al., 2015; Lyons et al., 2013; Romero et al., 2014; Vietor, 2001). The current results show that ITS are associated with smoking status. The results indicate that people who hold entity beliefs about smoking are less likely to be former than current smokers compared to those who hold incremental beliefs. In addition, people who endorse entity beliefs about smoking are less likely to be never smokers than current smokers compared to those who endorse incremental beliefs. Although cross-sectional, these results suggest that entity beliefs are associated with greater risk for smoking. Although the majority of Americans, regardless of smoking status, hold an incremental belief, these results reveal that the types of beliefs people hold are significantly associated with their current smoking behavior. Among current smokers, 31 percent endorsed an entity belief about smoking compared to 16 percent of never smokers and 10 percent of former smokers. This is consistent with what has been found in previous research, where smokers were less likely to stop smoking because they believed there was nothing they could do to change their smoking behavior (Fitz et al., 2015; Vietor, 2001). Among former smokers, 90 percent endorsed an incremental belief about smoking compared to 69 percent of current smokers. This may indicate that former smokers have been successful at quitting because they believed that smoking behavior is modifiable, and thus, something they could achieve, even when quitting was challenging. Alternatively, successfully quitting smoking may have changed their beliefs about whether smoking behavior is modifiable. Further research is needed to tease out the temporal order of this relationship. Additional findings show that smoking status is associated with education and income; increasing educational attainment and income are associated with higher odds of being former versus current smokers, which suggests that as people are more educated or have more income, they are more likely to report having quit smoking.

There are some limitations that should be noted. ITS were assessed with a single item and may not account for the complexities related to peoples' beliefs about human characteristics. Implicit theories are typically measured by multiple items (Dweck et al., 1995; Yeager et al., 2014). HINTS is cross-sectional, thus temporality and causal inference cannot be established. Despite these limitations, this initial research may inform future studies on the relationship between ITS and smoking and the role of ITS compared to other social-cognitive factors of health behavior.

This study shows a significant association between ITS and current smoking status at the national level. Further exploring this relationship in subsequent studies may help to inform campaigns and interventions for smoking cessation. Interventions that have shown success in behavior change in other domains (e.g. weight, personality) have helped individuals develop

incremental beliefs by consistently delivering the message that the target characteristic is changeable (Burnette, 2010; Burnette and Finkel, 2012; Dweck, 2012; Job et al., 2010; Yeager et al., 2014). While smoking is a complex behavior and is influenced by many factors, our study provides initial evidence for the role of ITS as a psychological factor in smoking behavior using nationally representative data.

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Table 1

Weighted multinomial logistic regression: implicit theories of smoking and smoking status ($n = 5579$), conditional OR (95% CI).

	Smoking status	
	Former vs current	Never vs current
Implicit theory		
Entity	0.33 (0.21–0.49) ***	0.60 (0.43–0.85) **
Incremental (ref)	1.00	1.00
Age (years)		
18–29 (ref)	1.00	1.00
30–49	1.59 (0.80–3.15)	0.56 (0.32–0.96) *
50–69	3.30 (1.84–5.89) ***	0.90 (0.58–1.41)
70+	16.69 (8.44–32.97) ***	2.92 (1.62–5.28) ***
Race/ethnicity		
Non-Hispanic White (ref)	1.00	1.00
Non-Hispanic Black	0.84 (0.53–1.32)	1.88 (1.31–2.69) ***
Hispanic	1.70 (0.99–2.91)	3.19 (2.00–5.08) ***
Non-Hispanic Other	0.96 (0.47–1.93)	2.17 (1.15–4.08) *
Education		
Less than high school (ref)	1.00	1.00
High school graduate	1.52 (0.90–2.60)	1.47 (0.96–2.25)
Post high school training other than college	2.18 (1.42–3.36) ***	1.89 (1.16–3.07) **
Some college	2.75 (1.48–5.08) **	3.24 (1.63–6.45) **
College graduate or higher	3.15 (1.78–5.57) ***	4.39 (2.39–8.05) ***
Income		
<15K	1.00	1.00
15–34,999K	1.47 (0.80–2.71)	1.44 (0.92–2.26)
35–74,999K	2.16 (1.23–3.79) **	2.20 (1.28–3.78) **
75+K	2.76 (1.44–5.29) **	3.32 (1.89–5.84) ***

* Significant at the $p < 0.05$ level.

** Significant at the $p < 0.01$ level.

*** Significant at the $p < 0.001$ level.