Exploring the cultural context of tobacco use: A transdisciplinary framework


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Understanding culture is an essential key to reducing tobacco use. Conceptualizations of culture vary across scientific disciplines and theoretical orientations. Because of the complexity of the causes and effects of tobacco use, no single discipline has sufficient capacity to undertake a comprehensive approach to studying culture and tobacco. Transdisciplinary research offers a means of bridging disciplinary perspectives. This paper reviews epidemiological data on observed variation in smoking patterns across national groups, ethnicities and genders, and presents reasons for studying culture in tobacco control research. We discuss and contrast conceptualizations and specific definitions of culture and identify aspects of each conceptualization that are relevant to research on tobacco. We present a multilevel, multidimensional conceptual framework for transdisciplinary research teams to use to think together about the influence of culture on tobacco and of tobacco on culture. The framework challenges researchers to think about how the sociocultural context influences tobacco use at micro, meso, and macro levels. Finally, we offer suggestions for improving transdisciplinary research on culture and tobacco.

Tobacco control research, like most fields, has been hampered by boundaries between scientific disciplines. In no case is this problem more evident than in research on culture and tobacco use. Fortunately, in recent years, researchers from many scientific disciplines have begun to come together to consider how people’s culture shapes their tobacco-related attitudes, ideas, beliefs, and behaviors. The variation across cultures and ethnic groups in the prevalence and habits of tobacco use makes clear the importance of understanding cultural influences on smoking.

However, the approach to take to understand culture and tobacco use is far from clear. Scientific disciplines vary in how they conceptualize and apply notions of culture to tobacco research. A definition or theory of culture that is useful in one discipline might not be meaningful when applied within another discipline. This article describes the need for researchers from different scientific disciplines and perspectives to cooperate to create a shared language and shared models about the role of culture in tobacco use. We identify conceptual issues that have arisen through this endeavor, offer a basic framework to stimulate transdisciplinary thinking about culture and tobacco use, and identify directions for translating research into practice and action to reduce tobacco use.

Why study the cultural context of tobacco use?

Tobacco is used throughout the world, but culture shapes the specific methods and patterns of its use. For example, in Cuba tobacco is smoked in hand-rolled cigars, whereas in India it is smoked in bidis.
(small flavored cigarettes), and in Indonesia it is blended with clove. Smokers in Syria smoke tobacco together in a narghile (large standing water pipe), whereas smokers in Southeast Asia smoke it in a suipa (clay pipe) individually. Beyond smoking, tobacco also is inhaled through the nose as snuff and ingested orally as chewing tobacco and betel quids (Mackay & Eriksen, 2002).

Smoking prevalence varies substantially across nations, ethnic groups, genders, and other demographically defined groups (U.S. Department of Health and Human Services, 1998). A comparison of smoking prevalence rates across national populations and across ethnic groups in the United States reveals the extent of this variation (Centers for Disease Control and Prevention, 2002; Corrao, Guindon, Sharma, & Shokoohi, 2000). Figure 1 shows that among some of the world’s most populous nations, the prevalence of current smoking varies from 17% to 64% among adult men and from 1% to 42% among women (Corrao et al., 2000).

Smoking prevalence rates vary substantially between the genders in some nations but not in others. In China, there is a large gender discrepancy in smoking (63% of men and 4% of women), whereas in Brazil the discrepancy is much smaller (38% of men and 29% of women). Among Native Americans in the United States, the prevalence of smoking is higher among women (43%) than among men (29%). Given that there is no known genetic or biological basis for the variation in gender patterns of smoking across populations, we are left only with environmental conditions as possible causes. If one interprets national and ethnic groups as cultural groups—an approach that has limitations discussed below—these data suggest that the gender ideologies within these cultural groups likely have an important influence on smoking prevalence patterns across genders. Within every society, gender ideology and gender roles are deeply rooted in culture. Therefore, the influence of culture on gender patterns of tobacco use becomes a prime focus for investigation.

The approaches that researchers take to examine the influence of culture on gender differences in

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**Figure 1.** Sources: Centers for Disease Control and Prevention (2002); Corrao, Guindon, Sharma, & Shokoohi (2000). Note. U.S. data are from 2000; data from other countries are the most recent data available, ranging from 1996 to 2000.
tobacco use are influenced by the researchers’ disciplinary or theoretical orientations. Some researchers view gender-related smoking prevalence patterns as a target for public health interventions (U.S. Department of Health and Human Services, 2001), as a product of industrialization or Westernization (Hippert, 2002), as an expression of women’s relative equality and power in society (West & Zimmerman, 1987; Connell, 1987; Lorber, 1994), as a response to changing body image ideals (Amos, Gray, Currie, & Elton, 1997; Voorhees, Schreiber, Schumann, Biro, & Crawford, 2002), or as an outcome of targeted marketing strategies (Amos & Haglund, 2000). A complete explanation is likely to include multiple interpretations.

The description above, while instructive, contains one important flaw: It uses race, ethnicity, and national origin as proxy measures of culture. In the United States, most research on variations in tobacco use has used bureaucratic categories of race, ethnicity, or national origin to delineate cultural groups (e.g., Centers for Disease Control and Prevention, 2000, 2001, 2002; U.S. Department of Health and Human Services, 1994, 2008). However, because race is a socially constructed category rather than a biological category, these categorizations are not meaningful when applied to biologically based scientific disciplines such as genetics. In many health studies, racial or ethnic variables are used as proxy measures of cultural groups under the assumption that racial or ethnic groups share cultural practices, belief systems, and customs (Chin & Humikowski, 2002; Murry, Smith, & Hill, 2001). When applied to biological research on tobacco use, the assumption is often made that self-identified racial or ethnic categories are indicators of groups that share similar genetic makeup and/or are exposed to similar environments. Self-identified racial or ethnic categories actually might be proxies for the impact of institutional structures, policy decisions, or localized environmental factors such as poor access to health care, fewer educational or employment opportunities, or proximity to environmental toxins (Senior & Bhopal, 1994; Williams, Lavizzo-Mourey, & Warren, 1994). In addition, because race and ethnicity are social constructs rather than biological categories, definitions of race and ethnicity differ across cultural contexts (Okazaki & Sue, 1995). In conducting transdisciplinary research on culture and tobacco, it is important to match the operationalization of constructs with the goals of the research.

Within broad groups, whether racial, ethnic, or national, substantial variation in tobacco use can be attributed to other demographic factors, such as gender, socioeconomic status, age, and migration history (Perez-Stable et al., 2001). It is incorrect to assume that all people who share a common racial identity, ethnic identity, or nation of ancestry will also share values or health beliefs. Moreover, it is incorrect to assume that people who share the same nation of ancestry share the same culture. Individuals vary in the degree to which they identify with, and follow the norms of, the cultures with which they interact. Many individuals identify with some aspects of one culture and some aspects of other cultures (Berry, 1980, 1998; Marin, 1996; Marin, Perez-Stable, Marin, & Hauck, 1994; Cuellar, Arnold, & Maldonado, 1995; LaFramboise, Coleman, & Gerton, 1998; Oetting & Beaupvais, 1991; Padilla, 1980; Phinney, 1998; Phinney & Devich-Navarro, 1997). When people move to a new cultural context or interact with others from different cultural contexts, they might alter their notions of leisure, style of speech, social behavior, attitudes, beliefs, and customs, including those relevant to tobacco use. Multicultural attitudes and behaviors also can develop when aspects of one culture are exported to another culture through the print or electronic media. Movies, television programs, music, books, and computer games can convey cultural norms and beliefs, including those relevant to tobacco, to people nearly anywhere in the world. However, within any cultural group there will be a great deal of variation in how people interpret the information they receive.

Clearly, tobacco control research needs a more careful approach to understanding the role of culture in shaping smoking patterns. The variation in overall prevalence of tobacco use and in gender patterns of tobacco use suggests that culture plays an important role in influencing tobacco use, along with socioeconomic, psychosocial, and biological factors. The variation across nations and ethnic groups in the prevalence and habits of tobacco use makes clear the importance of understanding cultural influences on smoking. However, the approach to take to understand culture and tobacco use is far from clear. Conceptualizing the influence of culture on tobacco has proven to be a difficult task for any single scientific discipline to undertake.

Why take a transdisciplinary approach to research on culture and tobacco?

Research on tobacco control lacks a common language through which to communicate about culture. Researchers from different disciplines who study tobacco control use the terms culture, cultural beliefs, or cultural values. In tobacco control research, these terms are often used without precision and are often used interchangeably without adequate consideration of their significance and distinctions. Moreover, because researchers conceptualize culture differently and often work in disciplinary isolation, the same terms have different meanings and implications across disciplines. From some perspectives, culture is something in a person’s immediate existence to be measured as one of many risk or protective
factors for smoking. For example, in genetic epidemiology, social psychology, and other disciplines that use the deductive approach from the natural sciences (i.e., hypothesis testing with experimental or quasi-experimental designs), researchers typically frame culture as a variable to be measured and included in a causal model. From other perspectives, culture is something all-encompassing that permeates every aspect and level of human existence. In anthropology, and in some approaches in sociology that use the inductive approach (i.e., hypothesis generation through multiple iterations of investigation), researchers typically conceptualize culture as the context in which all habits occur and take a holistic approach to understanding people’s ideas and practices.

These varying approaches to culture, both in conceptualization and in measurement strategy, create a gap in understanding across disciplinary boundaries. Because researchers from different disciplines are using different assumptions about the practice of science, they frequently have difficulty communicating about cultural issues that are studied by multiple disciplines.

Transdisciplinary research seeks to bridge traditional boundaries between scientific disciplines, bringing together experts from multiple fields to create new conceptual models and paradigms to address a common problem (Klein, 1996). Rosenfield (1992) distinguishes transdisciplinary research from multidisciplinary and interdisciplinary research. In *multidisciplinary* research, researchers in various fields work independently or sequentially to address aspects of a research question that are relevant to their specific fields of expertise, without integrating the results across disciplines. In *interdisciplinary* research, researchers from two or more disciplines work together on a particular problem, with each researcher using theoretical models and methods from his or her area of expertise. Although the researchers are collaborating to solve a problem, each researcher is addressing a different part of the problem.

In *transdisciplinary* research, researchers work jointly from a shared conceptual framework that draws together experts from multiple fields to create new conceptual models and paradigms to address a common problem. The collaboration of researchers from diverse fields facilitates the examination of a problem from multiple levels of investigation. Because many factors influence tobacco use, transdisciplinary research is particularly well suited to achieve a more comprehensive understanding of culture in the study of tobacco use, while also offering unique opportunities for the translation of that research into practice.

Because universities and research institutes typically are organized into isolated, discipline-specific departments, mechanisms and incentives are necessary to encourage researchers from various disciplines to meet one another and create transdisciplinary research strategies (Klein, 1996). One way to create incentives for transdisciplinary research is to allocate funding to transdisciplinary research groups. In 1999, the National Cancer Institute and the National Institute on Drug Abuse funded seven Transdisciplinary Tobacco Use Research Centers (TTURCs). Although each TTURC has a unique research focus, many of the TTURC research projects address issues of culture and tobacco use. The following section describes some conceptual issues that arise in transdisciplinary research on tobacco and presents some ways in which research on culture and tobacco could be integrated across disciplines. When applicable, examples of research conducted by the TTURCs are presented.

**Conceptual issues in transdisciplinary research on culture and tobacco**

Can researchers from different disciplinary perspectives agree on a useful definition of culture? A central feature of transdisciplinary research is the development of shared conceptual models that integrate discipline-specific theories, concepts, assumptions, and approaches to improve the understanding of an issue (Rosenfield, 1992). However, because of the complexity of habits such as tobacco use, no single conceptualization or definition of culture will be meaningful for all research on culture and tobacco, especially across disciplines. A transdisciplinary team of researchers can, instead, suggest which aspects of specific conceptualizations and definitions of culture are germane to the task of studying culture and tobacco use, thereby creating a mutual understanding. In the following section, we present several important conceptualizations and definitions of culture that could be applicable to the study of tobacco. Undoubtedly, there are others that may be useful. Thus, we present the discussion below as a summary of important considerations that have arisen during the debates about the culture concept, rather than as an exhaustive treatment.

Culture has been defined from many disciplinary perspectives, ranging from sociocultural anthropology (e.g., Kroeber & Kluckhohn, 1952) to evolutionary biology (e.g., Dawkins, 1976). Although culture has been a central focus of the social sciences, more than a century of vigorous debate has expanded the concept of culture, yielding new permutations rather than a single grand theory of culture. Scholars in anthropology and sociology have proposed overarching theories of culture (e.g., Tylor, 1871; Durkheim, 1926; Benedict, 1934; Levi-Strauss, 1963). Tylor's conceptualization of culture as "that complex whole which includes knowledge, belief, art, morals, law, custom, and any other capabilities and habits acquired by man as a member of society" is a good starting
point for research on tobacco by specifying the breadth across which culture spans. The search for a unifying theory of culture gained popularity among logical positivists in the mid-twentieth century (Ayer, 1959; Cohen & Nagel, 1934; Kroeber & Kluckhohn, 1952). For example, Kroeber and Kluckhohn attempted to synthesize the many definitions of culture into a grand theory, stating that culture comprised everything that humans thought, felt, imagined, or created that was not directly attributable to a biologically rooted impulse. Such an expansive definition of culture is difficult to operationalize in research on tobacco use, because it subsumes nearly all nonbiological phenomena related to tobacco.

As consensus about the culture concept became more elusive, social scientists abandoned the quest for a grand theory in favor of the study of culture in local people’s context-bound, socially and historically shaped ideas, feelings, and habits. The shift from a unifying theory toward grounded case studies does not indicate a lessened interest in, or importance of, culture, but rather a different strategy for studying it. The culture concept was not abandoned; instead, it was redefined continuously within disciplines such as anthropology, sociology, social psychology, and public health, according to their particular disciplinary objectives. Today, even within specific disciplines, one can find substantial variations in the conceptualization, uses, and application of the culture concept.

For the purposes of thinking about tobacco’s functional, normative, and symbolic place in societies, cultures can be seen to “comprise systems of shared ideas, systems of concepts and rules and meanings that underlie and are expressed in the ways that humans live” (Keesing, 1985). One anthropological perspective (Goodeenough, 1961, 1963) might focus on understanding how social norms about tobacco use are culturally constructed, how a society determines where and when it is appropriate to use tobacco, how a particular society negotiates what should or should not be changed about tobacco use, and how some people mobilize to control tobacco use while others resist tobacco control measures. This process-oriented conceptualization of culture offers one pathway for operationalizing the study of culture in tobacco control research.

Geertz (1973) advocated analyzing and interpreting symbols, particularly symbols of language, to understand the processes that generate and regenerate cultural knowledge. This holistic approach to culture seeks to reveal the underlying symbolic cultural logic that guides most human behavior, and is simultaneously the human behavior. People make meaning out of cultural objects such as tobacco within highly symbolic, ritualized activities. Using this conceptualization of culture, one might view the concept of the smoker as inseparable from the concept of smoking, as the dancer can be viewed as inseparable from the dance.

In contrast to Geertz, Triandis approached culture from a social psychology perspective, dividing culture into “material” and “subjective” culture (Triandis, 1972). Material culture constitutes things made by humans (e.g., cigarettes and cigars) and subjective culture constitutes ways a society perceives of its social environment (e.g., perceptions about which groups of people typically chew tobacco). Triandis’s approach to the study of culture is literal and behaviorally oriented. Triandis recommended that an investigator focus on subdividing subjective culture into specific elements, such as categories, associations between categories, beliefs, attitudes, norms, roles, and values. This approach lends itself to studying the constituent components of culture rather than framing it as “a complex whole.”

Although scientific disciplines do not share a single definition of culture, many disciplines share the notion that cultural elements shape the behavior of individuals, groups, and societies. Rather than try to impose a grand theory of culture on researchers working in a transdisciplinary effort, the approach in this article is to illustrate some potential opportunities to broaden our understanding of the role of culture in tobacco use by examining it from multiple perspectives, to indicate ways in which the study of culture might be further operationalized, and to suggest how scientific discoveries might be translated from scientific discovery into practical application. This approach generates more questions than answers, indicating the magnitude of this challenge as well as the potential advancement of knowledge that could result from attempting to address the challenge.

A transdisciplinary framework for studying cultural influences on tobacco use

Transdisciplinary research strives to develop shared conceptual models that integrate discipline-specific theories, concepts, assumptions, and approaches to improve the understanding of an issue (Rosenfield, 1992). No single, overarching definition or conceptualization of culture is adequate or meaningful for all researchers because each approaches tobacco control research from a different perspective.

Traditionally, most researchers interested in preventing tobacco use or facilitating tobacco cessation have concentrated on studying tobacco use and nicotine dependence at a single level of investigation. Examining the influence of culture on tobacco use at a single level can be informative, but to produce a more complete picture of the total cultural context in which tobacco use occurs, we propose a framework that challenges researchers to explore multiple contextual
levels while examining multiple dimensions of life that are associated with tobacco use (shown in Figure 2, adapted from Mock, 2001). This multilevel, multidimensional framework for research on culture and tobacco allows us to view tobacco use from three nested levels of investigation: the micro level (intrapersonal- and interpersonal-level influences), the meso level (community-level influences), and the macro level (society- and global-level influences).

Culture exists at all of these levels because the sociocultural context surrounds and is infused into each level. Phenomena that occur at the micro, meso, and macro levels are interrelated. A change in culture at one level is invariably associated with changes at other levels.

The dimensions of life associated with tobacco use can be grouped into five general categories, each of which cuts across the micro, meso, and macro levels of investigation. These dimensions are tobacco agriculture and processing, genetic predisposition, social norms of tobacco use, tobacco distribution and regulation, and tobacco advertising and promotion. These five dimensions are not exhaustive, and they may apply to varying degrees depending on the specific cultural group of interest. However, the dimensions span a range of important factors found in many tobacco control studies.

Within this multilevel, multidimensional framework, a transdisciplinary group of researchers can think about how a Cambodian family’s dependence on tobacco as a cash crop may make children in that family more susceptible to using tobacco on a daily basis. Similarly, where the macro level intersects with tobacco advertising and promotion, we can consider how Cambodian culture is being transformed by transnational tobacco company advertisements on billboards and television designed to saturate the society with images associating smoking with wealth and modernity. The framework allows researchers to identify important zones of cultural influence and cultural transformation.

This multilevel, multidimensional framework also allows a group of researchers to think across boundaries. The cultural dimensions of the Cambodian family’s tobacco farming are, in fact, intertwined with the cultural transformation sought by tobacco companies. The marketing image of wealth and modernity is likely to reinforce the farmers’ interest in tobacco as a cash crop and as a source of symbolic and material wealth.

Micro-level approaches to culture focus on individuals’ interpretations of cultural information and the ways in which cultural influences affect individuals’ behavior. Micro-level definitions of culture (e.g., Dawkins, 1976; Homans, 1961; Cook, 1987) search for the specific components of culture that influence behavior at the individual level. Micro-level analyses regard each discrete piece of cultural information (e.g., each specific practice, idea, habit, skill, invention, belief, or story) as a separate unit and evaluate whether each cultural element influences the tobacco use behavior of individuals. For example, a
psychologist might assess individuals’ agreement with specific traditional values from Hispanic culture such as fatalism, familism, or machismo (Cuellar, Arnold, & Gonzales, 1995), to determine whether people who agree with those values have a higher or lower risk of smoking.

Meso-level approaches to culture focus on change and variation within institutions or groups of people at a localized social level. These approaches emphasize cultural variation among members of a group and changes in culture over time (McElroy & Jezewski, 2000). Approaches at the meso level might examine the structures of families, peer groups, or communities in relation to other groups or social institutions, and how tobacco becomes socially acceptable or unacceptable in those groups.

Macro-level approaches to culture conceptualize culture at the societal level as the collection of information learned and referenced by a group of people, including knowledge, expectations, behaviors, practices, symbols, beliefs, arts, and institutions (Berry, Poortinga, Segall, & Dasen, 1992; Gardiner, Mutter, & Kosmitzki, 1998; Hofstede, 1980). At this level, one might study “tobacco culture” itself, and how it is shaped by macro-level influences of international trade and global tobacco marketing.

The micro-, meso-, and macro-level framework is not the only way to delineate levels of investigation; each of these broad levels could be subdivided into smaller levels. We propose this framework (similar to that of Pettigrew, 1996) because it provides a useful, unifying heuristic that makes sense to researchers who measure correlates and predictors of behaviors, as well as researchers who study human habits in multiple nested contexts. We are not suggesting that culture is stratified by these levels. Rather, these domains serve as vantage points or lenses that can be used to view a research question. For example, if we find that tobacco use varies with the presence or absence of certain genetic characteristics, it is useful to ask whether this micro-level phenomenon would be altered in some way if placed in varied cultural contexts at the meso (e.g., varied community norms) or macro (e.g., varied national marketing environments) levels.

We use the term levels of investigation in this article to avoid confusion with the term levels of analysis, which also is used to describe hierarchically nested data structures that are analyzed by using multilevel statistical models (e.g., individuals nested within small groups, nested within larger groups; Bryk & Raudenbush, 1992). In this article, we use the term levels of investigation to describe levels of scientific inquiry and organizational structure, rather than specific data structures. The following section presents examples of research on tobacco from micro-, meso-, and macro-level perspectives, along with the possible roles that cultural factors might play in the research.

The challenge remains to understand variations at one level that are embedded in and influenced by variations at different levels of cultural context.

Tobacco use at the micro, meso, and macro levels of investigation, and possible interactions with culture

Influences on tobacco use, at all levels of investigation, occur within a cultural context. The cultural context could alter the extent to which various factors influence tobacco use. For example, an allele of a certain gene might predispose a person to nicotine dependence, but cultural factors might prevent a person with the allele from ever trying tobacco. Laws might be passed to deny youth access to tobacco, but the cultural context might determine whether or not those laws are followed and enforced. Thus, the cultural context could be construed as a moderator of other influences on tobacco use at the micro, meso, and macro levels of investigation. Specific micro-, meso-, and macro-level influences are described below, along with ways in which they might vary according to the cultural context in which they occur.

The cultural context in micro-level analyses

Genetic influences. Research on the genetics of tobacco use is a relatively new field (Kidd, 1993; Welch & Burke, 1998). Such research has focused on understanding mechanisms through which particular genetic polymorphisms influence smoking behavior or responses to treatment (Hall, Madden, & Lynsky, 2002). Genes could affect several tobacco-related factors: personality characteristics such as risk-taking or sensation-seeking, which affect individuals’ propensity to experiment with tobacco; the subjective experience of the pleasant or aversive effects of tobacco, which influence whether an individual progresses from experimentation to habitual tobacco use; the ability to metabolize nicotine, which affects the frequency and intensity with which an individual uses tobacco and experiences nicotine withdrawal symptoms; the likelihood of having comorbid conditions such as affective disorders; and the response to pharmacological interventions for smoking cessation (Hughes, 1999).

Analyses from several twin studies indicate that inherited factors may explain at least 50% of the variance in smoking initiation and nicotine dependence (Heath & Martin, 1993; Sullivan & Kendler, 1999; True et al., 1999). According to the 14 published twin studies of smoking behavior from 1988 to 2002 reviewed by Swan (2002), monozygotic (genetically identical) twin pairs are consistently more similar in smoking behavior than are dizygotic (fraternal) twin pairs, suggesting a genetic basis for smoking. Significant genetic influences also have been documented...
for age at smoking onset (Heath, Kirk, Meyer, & Martin, 1999) and for smoking persistence (Madden et al., 1999).

Implicit in the twin studies analyses is the finding that a substantial proportion of the variance in smoking initiation and nicotine dependence is non-genetic, that is, attributable to environmental factors. Nearly all of the environmental factors known to be associated with tobacco use are directly or indirectly influenced by the cultural context. Even twin studies are subject to the influences of sociocultural factors. Twin studies depend on the “equal environments assumption”—that the environments experienced by pairs of dizygotic twins are as similar as those experienced by monozygotic twin pairs. Research indicates that this assumption is not always supported because in some cultures many monozygotic twins share more similar social environments and experiences than do dizygotic twins. Twins’ experiences are heavily influenced by the sociocultural context in which they grow up. In cultures where identical appearance is noteworthy and attracts attention, monozygotic twins may be more likely to be treated more similarly by others, to be dressed alike, to share friends, and to participate in activities together during childhood (Morris-Yates, Andrews, Howie, & Henderson, 1990). However, the differential patterns of socialization experienced by monozygotic and dizygotic twins have only a very small effect on estimates of the heritability of psychopathology, behaviors, and health in adulthood (Cronk et al., 2002).

Recent genetics research has focused on identifying the specific genes responsible for the heritability of smoking. Multiple alleles of numerous genes have been associated with smoking behavior, including genes that regulate the production, transport, and reuptake of neurotransmitters such as dopamine (McKinney et al., 2000; Shields et al., 1998) and serotonin (Lerman et al., 2001; Sullivan, Jiang, Neale, Kendler, & Straub, 2001), and genes that regulate the rate of nicotine metabolism. Genetic variants associated with the production and transport of serotonin and dopamine also are associated with poor impulse control (Lerman et al., 2001). Adolescents with a genetic tendency toward poor impulse control, depending on the cultural context in which they live, might be more likely to become involved in culturally proscribed activities deemed to be rebellious or high risk. If, in an adolescent’s ethnic culture or youth culture, tobacco use is seen symbolically to be a rebellious or high-risk activity, then adolescents living in that culture who have genetic tendencies toward poor impulse control may be more likely to use tobacco. Conversely, if the adolescent’s culture does not place this symbolic value on tobacco use, poor impulse control might lead to other rebellious behaviors rather than tobacco use.

Researchers also have identified genes that regulate the rate of nicotine metabolism (Tyndale & Sellers, 2002; Xu et al., 2002). Some alleles of those genes impair the ability to metabolize nicotine into cotinine; individuals with those genotypes are more likely to experience aversive reactions to large or frequent doses of nicotine, and the effects of nicotine will be longer lived (Benowitz, Perez-Stable, Herrera, & Jacob, 2002). People who metabolize nicotine slowly might smoke less frequently because the nicotine remains pharmacologically active for a longer time. To avoid taking in more nicotine than they can metabolize, slow nicotine metabolizers might smoke fewer cigarettes per day or inhale less nicotine per cigarette (Ahijevych, 1999). Recent TTURC research (Lerman et al., 2002) has identified alleles of the CYP2B6 gene that are associated with stronger nicotine cravings and a higher rate of relapse among smokers who are attempting to quit.

Many genetic findings have not been replicated successfully across studies, suggesting that some of the associations that have been reported were chance statistical findings resulting from the large number of statistical tests performed, or that they were heavily influenced by the cultural context. The problem of replicating genetic findings across studies is not unique to tobacco research. As discussed in detail below, finding an association between a gene and a behavior in one population but not in another population might indicate that cultural factors influence whether or not the gene is expressed.

Social-environmental influences. At the intersection of the micro level and the dimension of social norms of tobacco use, smoking behavior can be facilitated or constrained by influences from the social network, including peers and family members. Peer influences are especially strong during adolescence, the period of highest risk for smoking initiation (Conrad, Flay, & Hill, 1992; Tyas & Pederson, 1998). Peers can influence an adolescent’s smoking by providing cigarettes, by teaching the adolescent how to smoke, by bringing the adolescent into situations where other adolescents are smoking, or by providing positive social reinforcement for the adolescent’s early attempts at smoking.

The nature and strength of peer influences on tobacco use might vary according to the cultural context in which they occur. Many studies of so-called “cultural” differences in peer influences actually have compared ethnic groups in the United States. Several studies have found that peer influences on smoking behavior are stronger among white adolescents than among Asian, African American, Hispanic, and Pacific Islander adolescents (Flay, Hu, Siddiqui, & Day, 1994; Landrine, Richardson, Klonoff, & Flay, 1994; Siddiqui, Mott, Anderson, & Flay, 1999; Unger...
et al., 2001). Other studies (Gritz et al., in press) have concluded that although there might be slight differences across ethnic groups in the strength of peer influences, peers are among the strongest influences on adolescent smoking across ethnic groups in the United States. Recent cross-cultural research suggests that peer influences on adolescent smoking are strong in non-U.S. cultural contexts, as well. In surveys of adolescents in California and Wuhan, China, peer influences on smoking behavior were equally strong in both samples; having a close friend who smoked increased the respondent’s risk of smoking approximately fourfold (Unger et al., 2002). The between-group differences in peer influence appear to be small relative to the strong peer influences on tobacco use that exist across groups. More research is needed to understand variations in peer influence across cultural groups, rather than across ethnic groups in the United States.

In some cultures, parents influence their children’s smoking behavior by modeling smoking behaviors, by influencing the children’s motivation to engage in rebellious behaviors, by influencing the children’s choice of friends, or by giving the children unsupervised free time to experiment with smoking. Parenting characteristics such as warmth, demands, control, and communication also can affect adolescents’ tendency to experiment with risky behaviors such as smoking (Jackson & Henricksen, 1997). Tobacco-related parenting norms and behaviors are associated with broader societal norms (meso-level) and may be influenced by other dimensions, such as tobacco advertising and promotion. Because the norms for parenting styles vary across cultures (Stewart & Bond, 2002), it is likely that the effects of parenting styles on adolescents’ smoking behavior also vary across cultures. Similar to the literature on cultural variation in peer influences on smoking, most studies of cultural variation in parental influences have compared ethnic groups within the U.S. context. Some studies have found differences across ethnic groups in the United States in the strength of parents’ influence on their children’s smoking behavior (Gritz et al., in press; Mermelstein, 1999). TTURC research (Shakib et al., in press) suggests that the strategies that parents use to prevent their children from experimenting with risk behaviors such as smoking might depend on the parents’ integration into the culture in which they live. Parents who are familiar with the culture in which they live are likely to be more aware of the culture-specific situations, locations, and activities that might place their children at risk for experimenting with smoking. Strategies such as monitoring the children’s whereabouts and activities are likely to be effective for those parents, because the parents are adept at identifying the high-risk social contexts that their children might encounter. Parents who are unfamiliar with the culture in which they live, however, might have more difficulty identifying the high-risk situations that their children encounter in everyday life. Those parents, therefore, might need to rely more on social support from the extended family and community to help prevent smoking among their children.

Children also can influence their parents’ knowledge and attitudes about tobacco, especially if the parents are not fully acculturated into the culture in which the family resides. When a family immigrates to a new country, the acculturation process is not uniform across generations of the family (Szapocznik, Scopetta, Kurtines, & Arandel, 1978; Portes & Rumbaut, 2001). Children typically learn the U.S. culture more rapidly than their foreign-born parents do (Portes & Rumbaut, 1998, 2001). When children are more familiar with the language and institutional systems of the community than their parents are, the children sometimes serve as information brokers for the parents—locating, translating, and interpreting information for their parents (Buriel, Perez, DeMent, Chavez, & Moran, 1998). Therefore, the acculturation status of the family members might influence the transmission of health information, including that relevant to tobacco, between children and parents.

**Interactions between micro-level variables and cultural factors.** It might be possible to gain an improved understanding of micro-level influences on tobacco use by examining the ways in which they are expressed within diverse cultural contexts. For example, in a culture where tobacco is normative and is used in social situations to establish friendships, some people might smoke for social reasons even if they lack specific alleles that predispose them to nicotine dependence. In those cultures, it might be difficult to detect an association between a specific gene and smoking, because some of the smokers in the culture will have the gene and some will not. In a culture where smoking is unacceptable in most social contexts or in a culture where smoking is unacceptable for a subgroup such as women, even people who have genes that predispose them to nicotine dependence might not smoke because smoking is socially constrained. If one genetic study finds an association between a specific allele and tobacco use and another study in another population fails to replicate the results, an examination of the cultural contexts in which both study populations live might yield an increased understanding of gene-culture interactions. Cultural context could be one explanation for the failure of some genetic studies to replicate the results of previous studies; a gene that confers risk or protection from nicotine dependence might be expressed only within particular cultural contexts.
The cultural context in meso-level analyses

At the meso level, one can examine tobacco distribution and regulation, and how these cultural processes influence social norms within a society. Culture defines the climate of anti-tobacco policies, and social norms influence tobacco use patterns. Strict enforcement of policies banning retail sales of cigarettes to minors can limit youth access to tobacco (Rigotti et al., 1997). No-smoking policies in specific areas such as elevators, hospitals, airplanes, schools, and restaurants can limit smokers’ opportunities to smoke and isolate smokers by forcing them to smoke outdoors or in segregated areas. The California Tobacco Control Program, for example, has successfully established some of the most restrictive anti-smoking policies in the world, restricting smoking in all indoor workplaces and many outdoor areas (Gilpin et al., 2001; Rohrbach et al., 2002). Smoking can take on the attributes of social stigma (Goffman, 1963) and can even create momentary and transient subculture membership boundaries (e.g., a smokers’ lounge at an airport or an outdoor patio area at a bar).

Religious doctrines can create social norms that constrain smoking behavior. The texts of most of the world’s major religions were written before tobacco use became prevalent worldwide, but religious scholars later interpreted ancient texts and issued official statements about whether or not tobacco use was consistent with religious doctrines. Christianity, Judaism, Buddhism, Hinduism, and Bahá’í do not specifically forbid smoking but do state that it is inconsistent with the religious ideals of not deliberately harming one’s body and avoiding intoxicating and addictive substances that can impair judgment (World Health Organization, 1999). The Church of Jesus Christ of Latter-Day Saints (also known as the Mormon Church) advises church members to avoid tobacco. Although tobacco users are welcome to attend church meetings, abstinence from tobacco is one of several conditions necessary for participating in church ordinances. Religious doctrines also can change as a result of changes in secular norms; Islamic leaders in several countries recently have issued official decrees that smoking is now forbidden, in response to increasing evidence about the physical, social, and cultural effects of tobacco use (World Health Organization Eastern Mediterranean Regional Office, 2001). Traditional Native American religions have used tobacco in culturally restricted ways for healing and ceremonies but do not condone habitual, everyday smoking outside of spiritual contexts (Pego, 1995). A challenge for tobacco control in Native American communities is to acknowledge the cultural importance of sacred tobacco use, while preventing frequent recreational use and nicotine dependence. Tobacco control organizations recently have partnered with American Indian tribes to develop health education messages that distinguish sacred tobacco use from habitual use of commercial tobacco products (American Indian Tobacco Education Network, 2000). Religious beliefs and practices also can create opportunities for smoking cessation for specific occasions such as Ramadan or Lent (Afifi, 1997).

Interactions between meso-level variables and cultural factors. Meso-level environmental variables such as anti-tobacco policies or religious doctrines can interact with cultural factors. For example, in a culture without policies restricting youth tobacco purchases (or in a culture where such policies exist but are not enforced), children might become familiar with the process of purchasing tobacco at an early age by buying tobacco for their parents or other adults. In a culture where prohibitions on youth access to tobacco are strictly enforced, many adolescents might be unable to obtain tobacco, and therefore unable to try tobacco, until they or their friends have reached the legal purchase age. However, this framing of tobacco use as a prohibited or “adult” activity might actually increase its allure among adolescents.

Similarly, variation in cultural norms and values might influence the degree to which people feel compelled to follow social norms and the extent of the consequences of not following social norms. For example, in a culture that emphasizes a person’s identity as a member of a group rather than emphasizing the person’s individual identity (e.g., a collectivist culture), an adolescent’s decision to smoke in the schoolyard might be viewed as a deviant act that brings shame to the adolescent’s entire family (Triandis, 1995). In a culture that emphasizes individuals’ unique attributes that differentiate them from larger social groups (e.g., an individualistic culture), the same act of smoking probably would bring individual consequences to the child in the form of punishment, but the consequences probably would not extend to the entire family. Therefore, from a social psychology perspective, the societal norm that youth should not smoke might carry a stronger connotation in collectivist cultures, because the consequences of the child’s smoking affect the reputation of the larger group.

The cultural context in macro-level analyses

At the intersection of the macro level and the dimensions of tobacco distribution and regulation, the cultural space that tobacco occupies can be altered by changes in international trade regulations and tariffs (U.S. Federal Trade Commission, 2002). The imposition of taxes can cause the price of tobacco to rise out of range for those with less discretionary income, such as youth and the poor (Biener, Aseltine,
Cohen, & Anderka, 1998), thus transforming tobacco symbolically into a luxury good. Conversely, the opening of national economies to global trade and investment can create new, lucrative markets for tobacco companies. For example, China was closed to foreign trade from 1949 to 1979. When China legalized foreign trade in 1979, Philip Morris began negotiations with Chinese companies to establish joint ventures and to provide technical assistance in exchange for the opportunity to sell its product in China (O’Sullivan & Chapman, 2000). During the 1980s and 1990s, Philip Morris executives lobbied China to reduce its taxes on foreign cigarettes to make them similar in price to Chinese cigarettes. That change again increased its market share and established some preference for U.S. brands among Chinese smokers. Later, the entry of China into the World Trade Organization in 2001 resulted in loosened trade restrictions between China and the United States and created new opportunities for U.S.-based tobacco companies to sell their product in Asia.

At the macro level, the dimension of tobacco agriculture and processing can drive cultural changes that alter perceptions about tobacco. In most societies, tobacco is cultivated as a cash crop. Large-scale corporate involvement in tobacco purchasing and processing creates, recreates, and perpetuates a “tobacco culture.” Corporate agricultural activities are closely connected to the broader enterprise of building commercial markets for consumption. Activities in the dimension of tobacco agriculture are often linked to activities in the dimension of tobacco advertising and promotion. To foster an all-encompassing tobacco culture, companies that purchase tobacco also promote sales of tobacco by associating desirable images and lifestyles with tobacco use. Culturally significant images are portrayed in advertisements in magazines, newspapers, storefronts, and other venues (Cruz et al., 2003; Harper & Martin, 2002). Tobacco companies pay incentives to stores, sponsored events, bars, filmmakers, and celebrities to display their products and logos. Companies use sophisticated marketing techniques to address as well as alter social norms and to create pro-tobacco attitudes by creating associations between tobacco and activities or attributes that the culture values. By linking tobacco products with values embraced positively within a culture, tobacco marketing contributes to the production and transformation of culture. In this regard, effective marketing produces two outcomes: tobacco and the cultural disposition to use it.

Tobacco industry documents have provided evidence that tobacco companies have marketed to specific demographic groups, such as women, ethnic minority groups, and the gay/lesbian/bisexual/transgender community (Muggli, Pollay, Lew, & Joseph, 2002; Washington, 2002). For example, the recent Virginia Slims “find your voice” campaign, aimed at young ethnic women, portrayed women dressed in traditional attire with the “find your voice” message, implying that smoking could help women to become more liberated and free (Baezconde-Garbanati, 2001). Marketing, therefore, creates new cultural elements in addition to simply selling to a cultural group. The intent of such marketing is to reshape the cultural process of identity formation such that tobacco use is seen by members of that group as acceptable or desirable (Pollay, Jung, & Carter-Whitney, 1992).

Cultural factors interact with macro-level conditions that influence tobacco use and control. For example, people who identify with a cultural group that is targeted by tobacco industry marketing campaigns could be influenced more strongly by those campaigns, relative to people who do not identify with that targeted group (Chen, Cruz, Schuster, Unger, & Johnson, 2002). Marketing is designed to shape the cultural context in which tobacco is used. For example, in the United States, advertisements for menthol cigarettes are more prevalent in neighborhoods with primarily African-American residents and in magazines with primarily African-American readership (Basil, Schooler, Altman, & Slater, 1991). It is likely that such a marketing strategy propagates the cultural image of an African-American smoker being a menthol smoker.

**Implications and applications: Translating research into practice**

The ultimate goal of most research on tobacco is to reduce tobacco-related morbidity and mortality, by preventing people from initiating tobacco use and by helping those who use tobacco to quit. Therefore, it is important to focus on translating research into practice. The following are examples of ways in which improvements in research on culture and tobacco could advance tobacco prevention and cessation programs.

**Smoking prevention programs for adolescents**

Many large-scale trials of smoking prevention programs for adolescents have not specifically addressed issues of culture (e.g., Botvin, Baker, Dusenbury, Botvin, & Diaz, 1995; Dent et al., 1995; MacKinnon et al., 1991; Pentz et al., 1989). Although many studies have reported the effectiveness of untargeted or targeted prevention curricula in white, minority, or diverse samples, few studies have investigated whether culturally specific curricula are more effective than curricula that do not address cultural issues. One study (Botvin, Schinke, Epstein, Diaz, & Botvin, 1995) found that a culturally targeted program and a
In schools, churches, and neighborhoods in the United States, many groups of adolescents are highly culturally diverse. Within a diverse group of adolescents, presenting a culturally specific prevention program is a challenge. Delivering a culturally specific curriculum that has been developed for one group might stigmatize that particular group or single out that group as being more important than the others. Further research is needed to determine whether specific approaches to smoking prevention are effective in certain cultural contexts but not in others, and whether culturally specific prevention programs are more effective than programs that do not specifically address cultural issues.

**Smoking cessation treatment**

Because smoking initiation, metabolism, tolerance, and withdrawal might vary according to genetic factors, the success of tobacco cessation treatments and programs might be similar among people with similar genotypes. Therefore, when viewed at a group level, certain treatments might appear to be more effective among certain groups of people. Of course, within any cultural group there will be a large amount of genotypic variation. However, on a population level, knowing the population prevalence of certain alleles in a cultural group could be useful in selecting maximally effective prevention and treatment strategies for specific groups of people (Piper, Fox, Welsch, Fiore, & Baker, 2001). For example, a clinician working with Chinese patients might decide to start them on a lower dose of nicotine replacement therapy, knowing that people from this population have a high prevalence of an allele that slows nicotine metabolism. When such clinicians can apply cultural knowledge to identify people who share Chinese ancestry (e.g., Chinese-Vietnamese, Chinese-Burmese, or Chinese-Peruvian), patients of such Chinese ancestry will benefit by avoiding adverse reactions to the usual starting dose.

The Human Genome Project holds out the promise of improved health outcomes through individually tailored medical smoking cessation and relapse prevention programs (Holtzman & Marteau, 2000; Roses, 2000; Stengard et al., 1995). However, in designing tailored treatment programs, it is important not to assume that genotype can be identified from phenotypes such as white skin or coarse, straight, black hair. When researchers use self-identified racial categories or ethnic groups, particularly when a higher prevalence of a risk-conferring allele is found in certain populations, this approach could increase the likelihood that individuals identified with historically marginalized groups will be stigmatized and discriminated against, regardless of their actual genetic status.

In addition, as genetic tests become available to predict an individual’s risk of nicotine addiction and response to treatment, it will become increasingly necessary to create culturally meaningful smoking prevention curricula for specific groups of adolescents (Flora, Schooler, & Pierson, 1997; Pasick, D’Onofrio, & Otero-Sabogal, 1996; Ramirez, Gallion, Espinoza, & Chalela, 1999; Resnics, Cowler, Braithwaite, Ahluwalia, & Butler, 2000). For example, in a society that values slimness at any cost, particularly for females (Amos et al., 1997; Bordo, 1993) research for a prevention program for adolescents might focus on understanding viable, culturally valid alternatives to smoking for weight control, such as dancing. Such a smoking prevention program also might encourage adolescent girls to be critical of popular ideals of feminine beauty and to resist cultural messages that promote dissatisfaction with their bodies. Such approaches to smoking prevention might be less relevant in societies for which culturally defined images of the ideal body are larger. Similarly, research into cultural norms of tobacco experimentation might explore whether promoting critical defiance, such as refusing a cigarette offer with the direct, assertive “just say no” taught in many prevention curricula, is viable or effective in cultural groups that value face-saving conflict avoidance rather than overt confrontation.

Precautions are necessary when creating and implementing culturally targeted prevention programs. In schools, churches, and neighborhoods in which cultural competence is not inherent, research team, conducting pilot research to test assumptions, and conducting process evaluations to determine whether the program components are influencing knowledge, beliefs, and behaviors in the intended ways (Marin & Marin, 1991; Vega, 1992).

The reasons for using tobacco, the meanings of tobacco use, and ways of avoiding tobacco use are determined to a large degree by the cultural context. Thus, one approach to preventing tobacco use is to create culturally meaningful smoking prevention curricula for specific groups of adolescents (Flora, Schooler, & Pierson, 1997; Pasick, D’Onofrio, & Otero-Sabogal, 1996). When such clinicians can apply cultural knowledge to identify people who share Chinese ancestry (e.g., Chinese-Vietnamese, Chinese-Burmese, or Chinese-Peruvian), patients of such Chinese ancestry will benefit by avoiding adverse reactions to the usual starting dose.

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important to understand how values, norms, and patterns of knowledge transmission within cultural groups might affect translation of new genetic research into clinical practice. Physicians and patients who are members of racial and ethnic groups that have been stigmatized or discriminated against by a healthcare system might, understandably, be resistant to genetic testing that could label their group as high risk. If genetic research is to benefit such populations, obtaining community participation, support, and consent where culturally expected, as well as individual consent, will be critical for the application and generalized acceptance of genetic screening among such groups.

Community-based interventions have been used to deliver smoking cessation information to large, broadly defined cultural groups. Typically, those interventions focus on specific characteristics of the population of interest, including language, cultural values, preferred channels of communication, and culture-specific symbols (e.g., Lawrence, Graber, Mills, Meissner, & Warnecke, 2003; Lipkus, Lyna, & Rimer, 1999; Marin, 1996; Marin et al., 1994). Because the populations that community-based programs attempt to reach are often, in actuality, culturally heterogeneous, the degree to which they address the issues that are salient to each individual will vary. Through the process of examining cultural influences in research on culture and tobacco use, it may be possible to understand which aspects of culturally specific programs are effective, and the ways in which individuals vary in their receptivity to such programs.

Suggestions for research on culture and tobacco

For reasons discussed above, transdisciplinary research on culture and tobacco is challenging. We offer the following suggestions to researchers from all scientific disciplines, in the hope of improving communication and collaboration across disciplines and broadening the scope of our current understanding of culture and tobacco.

We suggest that researchers reflect on, and remain aware of, their own intellectually rooted biases about their conceptualization of culture, and their own culturally rooted biases about tobacco use. This process of reflection will probably increase researchers’ understanding of how their biases might shape which research questions they are asking and influence the interpretations they are making. If a transdisciplinary team can facilitate the continual comparison of multiple perspectives, research design and analysis will probably be strengthened.

Similarly, we suggest that researchers examine their own disciplinary biases when formulating research questions, designing studies, or interpreting data. Insights will increase if studies simultaneously employ inductive (hypothesis-generating) and deductive (hypothesis-testing) research processes. Ideally, each process will inform the other, advancing knowledge iteratively.

In our view, it is essential to be precise with constructs and terminology, especially by not using the term culture when referring to other constructs, such as race, acculturation, or socioeconomic status.

Studies will be richer and more informative if they move beyond merely identifying culture as the reason for differences in tobacco use. We suggest that researchers focus on identifying similarities and differences in tobacco use across cultural groups and within cultural groups. Such research can seek to describe the nature of the similarities and differences between and among cultural groups, as well as how and why these patterns relate to tobacco use.

It will be worthwhile to scrutinize the criteria used to classify people into categories. There is often a significant variation between externally imposed categories and the categories with which people identify themselves. In many cases, externally imposed categories are artificial constructs that have ambiguous meanings or limited cultural significance for the people who are being categorized. For example, the classification of Hispanic may refer to nation of ancestry, current nation of residence, preferred language, or the researcher’s perception of a person based on the researcher’s interpretation of the person’s phenotypic characteristics or surname. Moreover, a person who is classified as Hispanic may never have referred to her/himself as such before being exposed to bureaucracies or studies that use such a category.

When researchers are studying the cultural context of tobacco use at one level of scientific investigation, we suggest that they consider how the cultural dynamics at other levels might contribute to, suppress, or interact with tobacco use. For example, when studying how tobacco control policies are created or implemented at the community level, such analysis would be enhanced by identifying linkages to trends in international marketing of Americana or a consumer lifestyle, as well as by identifying local perceptions and interpretations of such marketing.

Cross-cultural research may be a useful strategy for identifying specific cultural patterns in two or more societies. The multilevel, multidimensional framework for studying cultural influences on tobacco use may provide a useful template for such comparisons. For example, if researchers identify a specific gene, personality trait, or social situation that appears to be associated with smoking in one cultural context, it may be informative to replicate the research in another cultural context to examine whether the association is culturally specific. When conducting such cross-cultural research, it is important to be
aware of the challenges of developing research protocols and data collection procedures that are appropriate and valid for research about the cultures of each society (Van de Vijver & Leung, 1997).

Conclusion

Most researchers recognize that in virtually every society in the world, culture has an influence on the uptake, use, and cessation of tobacco. Some researchers also focus on the ways in which tobacco has become deeply imbedded in the symbolic lexicons, value systems, gender ideologies, political economies, and patterns of everyday life that make up culture. Nevertheless, to date, only a very few researchers have thoroughly explored how culture shapes tobacco use and how tobacco use shapes culture. Still, these steps represent an important shift toward studying how people’s cultural context influences their thoughts and feelings about tobacco and their habits of using or not using tobacco (Nichter, 2003; Paknawin-Mock, 2000).

The careful, considered, and comprehensive study of culture and tobacco has proven challenging for any single researcher or scientific discipline to undertake because culture is produced and reproduced simultaneously at multiple nested levels of context and across multiple dimensions of life. The causes of tobacco use similarly coexist at all levels and across many dimensions. Transdisciplinary research collaborations offer a possibility for facilitating deeper, more sophisticated investigations into the complex phenomenon of tobacco use because the resulting analysis will have been informed by, and examined through, multiple perspectives. Rather than operating in isolation, researchers can collaborate, provided they share a common analytical framework, to create comprehensive approaches to understanding tobacco use.

Transdisciplinary research can lead in many directions simultaneously. A transdisciplinary team may pursue a holistic analysis of tobacco use in cultural context while seeking to identify causal associations between specific elements of culture and tobacco use. It is our belief that multifaceted collaborations will enhance our understanding of the etiology of tobacco use, which, in turn, may lead to more effective methods for prevention and cessation. In this article, we, a transdisciplinary group of researchers, have attempted to outline some of the conceptual issues that arise in transdisciplinary research on culture and tobacco. We have proposed a conceptual framework for organizing dialogues and investigations in this line of research. We also have offered some suggestions about how to conduct transdisciplinary investigations. Integrated approaches such as those advocated herein could transform the field of tobacco control research and strengthen efforts to improve human health and well-being.

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