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# Adolescent Smoking Status and Socioeconomic Dependence on the Tobacco Crop in Southeastern Kentucky

Gregory Colwell

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ADOLESCENT SMOKING STATUS AND SOCIOECONOMIC  
DEPENDENCE ON THE TOBACCO CROP  
IN SOUTHEASTERN KENTUCKY

A Thesis  
Presented to  
the Faculty of the Department of Health and Safety  
Western Kentucky University

In Partial Fulfillment  
of the Requirements for the Degree  
Master of Science

by  
Gregory Brian Colwell

August 1988

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ADOLESCENT SMOKING STATUS AND SOCIOECONOMIC  
DEPENDENCE ON THE TOBACCO CROP  
IN SOUTHEASTERN KENTUCKY

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August 1988

59 pages

Directed by: Wayne Higgins, Robert Baum and Richard Wilson

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The purpose of the study was to quantify the relationship between adolescent smoking and economic dependence on the tobacco crop. A survey of 1322 students from a random sample of all secondary schools in four counties in southeastern Kentucky was performed. The survey gathered information concerning smoking behavior and social variables. Chi-square analysis was performed to assess relationships between these variables in students from families who worked with tobacco and families who did not.

Chi square analysis of female adolescent smoking behavior revealed a significant association between the instances of adolescent smoking and age, friend smoking status and sibling smoking status in both families who grew or worked with tobacco and families who did not. The only difference noted between the groups was in females from non-tobacco growing families whose smoking behavior was also significantly associated with mother smoking behavior.

Assessment of males demonstrated no differences between those from tobacco growing families and those from non-tobacco families. In both groups smoking was significantly associated with age, friend smoking status and sibling smoking status.

## CHAPTER ONE

### INTRODUCTION

Tobacco has been used by people for thousands of years and has, within the past century, been linked to the etiology of a number of diseases. Tobacco smoke has been implicated as a causative or contributing factor in lung, oral, bladder, pancreatic and pharyngeal cancers.<sup>1</sup>

Smoking has been shown to increase the breakdown of many drugs, including phenacetin, antipyrine, theophylline, imipramine, pentazocine, ascorbic acid and caffeine.<sup>2</sup> It increases the number of circulating leukocytes, red cell mass and raises levels of hemoglobin, carboxyhemoglobin and the serum hematocrit while decreasing serum levels of creatinine, albumin, globulin and uric acid.<sup>3</sup> Nicotine increases heart rate, blood pressure, myocardial oxygen consumption and arrhythmias, which are linked with sudden cardiac death. Pulmonary effects include bronchoconstriction and development of chronic obstructive pulmonary diseases which decrease the body's ability to respond effectively to physical stresses.<sup>4</sup>

It is widely known that the interaction of many of these factors leads to the onset of coronary disease. According to the U.S. Public Health Service, "Coronary heart disease is the chief contributor to the excess mortality rate among cigarette smokers, followed by lung

cancer and chronic obstructive lung diseases."<sup>5</sup> Since heart disease is now the leading cause of death in the United States, claiming over 985,000 lives each year, it is a major concern to all segments of society charged with health care delivery and preventive health. Persons involved in health education are attempting to educate the populace more effectively about the major risk factors for coronary heart disease, including smoking, diet, exercise, etc. Although the percentage of Americans who are smokers has been steadily declining, approximately one fourth of the United States population still smokes.<sup>6</sup> The rate has steadily declined since the release of the first Surgeon General's Report on Smoking and Health.<sup>7</sup>

Among people who smoke, the onset of smoking appears to occur most often during the adolescent years. This is probably due to a combination of factors, both psychological (internal) and social (external). Both types of factors have been examined, but more definitive conclusions have been drawn concerning the psychological components of adolescent smoking behavior. There exists a relative paucity of conclusive information regarding the social factors which might influence smoking.<sup>8,9,10,11,12</sup>

According to Perry and Murray, four external structures influence health behavior.<sup>13</sup> They are, in order of decreasing importance: the model structure, the behavior of proximal significant others (parents, siblings and best friends); the network structure, loosely organized groups; social systems, the constraints of formal groups such as churches and schools; and the community message structure (e.g. "smoking is harmful").

Psychological variables, as well as social variables, may predispose certain youth to initiate cigarette smoking. As Downey and O'Rourke noted in 1976, both attitudes and beliefs may serve as indicators, or predictors, of future behavior.<sup>14</sup> According to Chassin et al, the child's intent to smoke is the best predictor of future smoking behavior.<sup>15</sup> Using the Ajzen and Fishbein model of predicting behavior (i.e. behavioral intent = attitudes + normative factors), they stated that only attitudinal or normative changes in a person can induce smoking; that is, all external factors either affect attitudes or the social norms to cause an adolescent to begin smoking.

American children are encouraged in many ways to become independent, or at least to assert their independence during childhood and early adolescence. If smoking behavior is considered to be a deviation from the nonsmoking norm, then the postulate that it is due to "... the premature transition by adolescents into adult activities in violation of social norms..." becomes valid.<sup>16</sup>

Can smoking, however, actually be considered a deviant behavior? Salomon et al. stress that it is, as are other self-destructive behaviors. They note a common thread of counterconformity in all smokers which differentiates them from nonsmokers.<sup>17</sup> Berndt, however, explains it merely as nonconformity to parental expectations and authority. He noted that children's compliance with parents' standards either remains unchanged or only slightly diminishes up to late adolescence, but conformity with peers increases steadily from third to ninth grade before tapering off.<sup>18</sup>

Skinner et al. stated that smoking is becoming increasingly



disapproved, and should be considered deviant.<sup>19</sup> The researchers examined social bonding and smoking behavior and noted that as an individual's bond (attachment, commitment, involvement and belief) to society diminishes, "individualistic" (i.e. deviant) behavior increases. This concept will be discussed further in a later portion of this paper.

It can be assumed that smoking is deviant for some populations, but not for others. Such a definition will depend on the norms for the social group in which the person spends his time.

This investigation will focus on a portion of the community structure affecting adolescent smoking-- that of financial or social dependence upon the tobacco crop. The following literature review will discuss general adolescent smoking rates, later discussing social influences on smoking. The final portion will review current literature examining the relationship of the tobacco crop to adolescent smoking.

#### STATEMENT OF THE PROBLEM

The focus of this paper is to examine the effects of one proximal factor, family socioeconomic dependence upon the tobacco crop, on the initiation and/or maintenance of the adolescent smoking habit. It will also examine the association between several social variables -- parent, peer and sibling smoking behavior and demographic variables with adolescent smoking behavior.

#### NEED AND SIGNIFICANCE

As noted in the review of related literature, researchers have gained differing results when examining external influences on smoking behavior. This investigation will attempt to add to that body of knowledge by examining a little studied variable which may have a significant association with smoking.

This information may affect curriculum planning in schools and the public health education arena. Repeating the study may also allow for the assessment of success of smoking education and anti-smoking programs in the counties studied.

#### DELIMITATIONS

The study was delimited to the following:

1. A group of 1322 male and female students between the ages of nine and nineteen years of age.
2. Students were drawn from a stratified random sample of a four county region in eastern Kentucky.
3. Behaviors related to smoking and tobacco crop involvement.

#### LIMITATIONS

The study was limited by the following factors:

1. Survey administration was performed by school teaching

staff. This may have allowed some misinterpretation of instructions to occur as various individuals may have answered questions regarding questionnaires in different ways.

2. Students were allowed to define themselves as a smoker or nonsmoker without researcher control over their self-definition.

#### DEFINITION OF TERMS

Nonsmoker- the student answered "No" to the question, "Do you smoke cigarettes now?"

Smoker- the student answered "Yes" to the question, "Do you smoke cigarettes now?"

Tobacco Crop Dependence- families were considered to be dependent upon the tobacco crop if their family was involved in the growth, transportation or sale of tobacco or tobacco products.

#### HYPOTHESIS

It is hypothesized that significantly more smoking behavior will be observed in students from families economically dependent on the tobacco crop than in students whose families have no direct economic ties to the tobacco crop. Alpha level will be set at 0.05.

## CHAPTER TWO

### REVIEW OF RELATED LITERATURE

A wealth of information has been published concerning almost every aspect of tobacco growth, marketing, sale, smoking and the various diseases it causes. There is, however, a paucity of analyses in which the impact of community and personal economic dependence upon tobacco production (i.e. growth, processing, sales) upon development and/or maintenance of the smoking habit has been assessed. This review will examine research concerning adolescent smoking behavior and social factors, concluding with a review of the only two studies relating smoking and economic dependence upon the tobacco crop.

### DEFINITION OF A SMOKER

Initially, it must be stressed that there is no uniform definition of who a "smoker" actually is. In most studies, children who have a regular pattern of smoking, however infrequent it may be, are considered to be smokers. This is important because of the many and varied results which can be gained by the use of such a definition.

Evans et al. demonstrated that although a student may initially have a low frequency of smoking, it will usually increase with age.<sup>20</sup> This raises the question of whether any person who smokes, however irregularly, should be defined as a smoker. Perhaps Leaventhal and

Clery stated it best when they noted that one's self-image defines one as a regular smoker-- "Once smoking is an integral part of self-regulation in a variety of situations, the individual is truly a smoker."<sup>21</sup>

#### SOCIAL INFLUENCES ON SMOKING

Mausner and Mischler examined several factors influencing the smoking behavior of junior high school students, including intelligence, attitudes and social norms.<sup>22</sup> They noted, not unexpectedly, that smokers had slightly more favorable feelings toward smoking than did nonsmokers. Eighty-one percent of the smokers had one or more parents who smoked ( $p < 0.05$ ). Seventy percent of the smokers stated that they began smoking for social reasons, but of those smokers, sixty-six percent stated that they continued smoking because it was enjoyable and relieved tension. These statements led the authors to propose that there appears to be a set of factors which maintain the smoking habit apart from those factors which influenced initiation of the habit. Distinguishing between these factors has proved nearly impossible. The factors seem to have variable impact on initiation and maintenance in different people.

Foss examined personality and social influences on the smoking behavior of undergraduate students and gained slightly different results than Mausner and Mischler.<sup>23</sup> Smokers were not inclined to see smoking as dangerous enough to cause their death while nonsmokers did, especially citing the relationship between smoking and lung cancer.

These beliefs may provide a very important clue to the future smoking behavior of adolescents.

Kahn and Edwards found that over seventy percent of the junior and senior high school students who they had studied had at least some experience with smoking and 31.5 percent of the males were regular smokers while twenty-four percent of the females were regular smokers.<sup>24</sup> Smoking increased from the seventh to the tenth grade and slightly decreased in the eleventh and twelfth grades. Both male and female student smoking was significantly associated with sibling smoking behavior. Male smoking was associated with parental smoking, but female smoking was not found to correlate significantly with parental smoking activities.

The United States government has attempted to identify and monitor changes in demographic patterns, personality characteristics and social factors associated with adolescent smoking. Studies were conducted in 1968, 1970, 1972, 1974, and 1979.<sup>25,26,27</sup> A general trend was noted from 1970 to 1979 that indicated a decrease in male teen smoking from 18.5 percent regular smokers in 1970 to 10.7 percent in 1979. The trend also revealed a slow increase in female smoking in the early 1970s and a slight decline in the latter part of the decade.

In 1983, when Brunswick and Messeri examined smoking in urban black youth in a longitudinal study, they found that the primary influences on smoking behavior were found in the "microsystem-interpersonal" domain— i.e. the individual's primary orientation toward family and peers....<sup>28</sup> They noted a direct relationship between peer smoking and target adolescent smoking in males, but not in

females. For males, sibling smoking behavior was the salient influence as it was with females, but the effect did not seem so important in females as in males. In their study they also noted that peer and family orientation by the target youth, as well as the number of close friends were the primary influences on smoking behavior.

Zagona and Zurcher sampled a group of 1598 college students in 1965 and found that 40.6 percent of the males and 31.6 percent of the females were regular smokers.<sup>29</sup> Parental influence was noted in smokers but it did not seem, however, to be as important as sibling or peer influence. Parental influence was cited as a factor in smoking initiation by 2.6 percent of students who had quit smoking, 6.4 percent of light smokers and 8.8 percent of heavy smokers.

Twenty-seven percent of male light smokers and 31.4 percent of male heavy smokers had at least one brother who smoked as opposed to 17.6 percent of male nonsmokers. Among female light smokers, 33.1 percent had at least one brother who smoked, as did 33.1 percent of female heavy smokers. Among male light smokers, 16.1 percent had at least one sister who smoked as did 30.3 percent of heavy smokers and 15.8 percent of male nonsmokers. Twenty percent of female light smokers and 29.1 percent of female heavy smokers had at least one sister who smoked while 11.4 percent of female nonsmokers did.<sup>30</sup>

Bawley, Bland and Harris examined two hundred and twenty nine schoolchildren in Britain and discovered that 66.8 percent were smokers.<sup>31</sup> Some of this figure may be due to the definition of smoker that they used, but that was not discussed by the authors. There was a significant correlation between the amount of smoking by a child and

the number of persons in the household who smoked. None of the heavy smokers had nonsmoking parents, only eighteen percent of the light smokers did and forty percent of the nonsmokers did. Of the heavy smokers, fifty-two percent had both parents smoking, forty-six percent of light smokers did and only twenty-six percent of nonsmokers had both parents smoking. Sixty-nine percent of heavy smokers had at least one sibling who smoked. This presents a contrast to the thirty-three percent of light smokers and nine percent of nonsmokers who had at least one sibling who smoked. Seventy-two percent of heavy smokers had at least one friend who smoked; thirty-seven percent of nonsmokers did. A final postulate of the authors was that in males who smoked, the major influence on smoking was a same-sex sibling.

A study published in 1978 by Beaglehole, Eyles and Harding examined the smoking behavior of almost one thousand children, aged twelve to fifteen years.<sup>32</sup> Among families examined 35.6 percent of the females were smokers. Eighty four percent of students who smoked began doing so before entering secondary school. The males began smoking at a median of 2.3 years prior to the survey, females 1.5. Median ages were not noted. Although 67.8 percent of the students were nonsmokers, three quarters of them had tried tobacco in the past. Thus, over eighty percent of all students examined either had used or were actively using tobacco.

Both male and female smoking behaviors were strongly correlated with parents', siblings' and friends' smoking activities. Children were more likely to smoke if one of their parents smoked; the strongest association was with the parent of the same sex. Sixty-two



percent of male smokers and sixty-eight percent of female smokers had a parent of the same sex who smoked.

Adolescent smoking was associated at the  $p < .001$  level with sibling, best friend and other friend smoking activities. Almost sixty-four percent of smokers had at least one sibling who smoked, while 36.9 percent of nonsmokers had at least one sibling who smoked. Eighty-eight percent of nonsmokers had a best friend who did not smoke, 54.6 percent of light smokers had a best friend who smoked and 85.9 percent of heavy smokers had a best friend who smoked. Seventy-two percent of nonsmokers had less than half of their other friends smoke, while 49.4 percent of light smokers and 79.7 percent of heavy smokers had over half of their friends smoke.

Chassin et al. examined the smoking intentions and behavior of over 4600 students in middle and high school, focusing more on *intent* than actual smoking status.<sup>33</sup> They noted that 6.5 percent of male and 5.3 percent of female middle school students were regular smokers. Percentages increased to 13.5 percent for males and 11.3 percent for female high school students. Parent smoking, especially father smoking, was found to affect the smoking intentions of adolescent nonsmokers. The researchers also noted, however, that "...though there is no strong relationship between parent smoking and subjects' behavioral intentions, parent smoking is related to subjects' actual smoking status." The strongest modeling appeared to be with middle school students of both sexes modeling the father's smoking behavior.

Lauer et al. performed a longitudinal study of coronary risk factors on 2156 schoolchildren whose ages ranged from twelve to

fourteen years.<sup>34</sup> In examining the social variables relating to smoking, both parent and friend smoking activities were strongly associated with student smoking. There was also described a "synergistic and cumulative" effect when friends and parents smoked. Only three percent of the students who had neither parents nor best friends smoke, smoked themselves. Seventy-four percent of students who had both parents smoke as well as a best friend smoke, smoked themselves.

#### PEER INFLUENCES ON SMOKING

Several researchers examined only the relationships between adolescent smoking and the smoking behavior of peers. Peer groups consisted of either siblings or friends. The smoking behavior of either one or both of these groups was associated with the adolescent target child smoking upon several occasions.

McAlister, Perry and Macoby stressed "social learning."<sup>35</sup> They found in their investigations that in 1977 over twenty percent of high school seniors smoked more than ten cigarettes per day. Those who smoked began doing so at twelve to thirteen years of age. The students stated that their first cigarette was usually given to them by an older friend and in a social setting. When questioned directly about what influenced them to start smoking, students cited peer pressure most frequently.

A 1977 study published by the National Institutes of Health analyzed the smoking behavior of over five hundred adolescents aged

thirteen to seventeen years and over five hundred young women eighteen to thirty-five years of age.<sup>36</sup> Of the teens in the sample, 51.6 percent of the teen males and 46.8 percent of the teen females were found to be smokers. Researchers found that seventy-two percent of teen girls who smoked had boyfriends that smoked also. Twenty-seven percent of nonsmoking girls with boyfriends said that their boyfriends smoked. Of the adolescent girls who smoked, sixty-six percent stated that over half of their female friends smoked and sixty-nine percent stated that over half of their male friends smoked. When the responses of nonsmoking teen girls were examined, it was noted that only thirty-two percent reported that over one half of their female friends smoked and only nineteen percent stated that at least one-half of their male friends smoked.

Banks et al examined the smoking behavior of over six thousand school children aged eleven to sixteen in the United Kingdom.<sup>37</sup> They found that only six percent of the males and 2.5 percent of the females smoked more than one cigarette per week. Although cultural factors may account for the lower levels of smoking than found in the United States, the researchers noted: "Irrespective of parents' smoking, whether or not siblings smoked had a great influence on whether the index child smoked." The children also seemed to have two sets of influences on their smoking behavior. Just as with American adolescents, parental smoking strongly correlated with the initiation of smoking in younger children, but peer group influences tended to replace parental influence in later adolescence.

The governmental studies performed between 1968 and 1979

revealed that peer behavior also seemingly had a great effect on student smoking.<sup>38,39,40</sup> Over eighty-seven percent of male students who smoked stated that at least one of their four best friends smoked. Of female smokers, ninety-four percent stated that at least one of their four best friends smoked. Of male nonsmokers, sixty-six percent stated that none of their best friends smoked, while female nonsmokers were almost equal at sixty-seven percent.

The 1979 study also stated that most smokers have a lower frequency of smoking when they begin, but this increases with age.<sup>41</sup> Evans et al found in 1978 that in the initiation stage of smoking the family appeared to have a great deal of influence, but this influence declined with age as social factors began to control smoking behavior.<sup>42</sup> Krosnik and Judd stated the same belief when they found that peer influence increased only during adolescence and that preadolescent behavior was, to a great extent, influenced by parents.<sup>43</sup> Leaventhal and Cleary's findings do not contradict the aforementioned, but they stated that social pressure (i.e. that of peers or older siblings) is the prime initiator of smoking behavior and that parental smoking merely decreases the barriers to adolescent smoking.<sup>44</sup>

#### PARENTIAL INFLUENCES ON SMOKING

Three studies by the Department of Health, Education and Welfare demonstrated an increase in smoking behavior in students with one parent who smoked; a larger increase was noted in students with

both parents smoking.<sup>45,46,47</sup> Male students who had one or more siblings who smoked were more than three times as likely to be smokers.

A 1961 study by Salber and MacMahon examined high school smoking behavior in relation to social class and parental smoking.<sup>48</sup> They examined over 2800 students, grades seven to twelve in Massachusetts. Just over forty percent of the males and 41.8 percent of the females were regular smokers. Twenty-five percent of the smokers were from families where neither parent smoked, while fifty percent of the smokers had both parents who smoked. In families with both parents smoking, 15.3 percent of the males and 9.7 percent of the females were heavy smokers. This is in marked contrast to 6.7 percent of males and 1.3 percent of females who were heavy smokers coming from families in which neither parent smoked. The father also apparently had the greatest influence on smoking in both males and females.

Borland and Rudolph examined the impact of socio-economic status (SES), scholastic performance and parental smoking behavior on student smoking in over 1800 students in 1975.<sup>49</sup> They noted that in every grade category and SES level, the percentage of smokers was greater when one or both parents smoked than when neither did. Slightly more than twenty-five percent of students smoked when neither parent smoked and 39.4 percent of the students smoked when one or both parents smoked.

A 1977 article by Allegrante, O'Rourke and Tuncaip described a multivariate analysis of the development of adolescent smoking.<sup>50</sup> They noted no significant interaction between the father's smoking behavior and son or daughter's nonsmoking behavior, but the father's attitude

affected male children's future smoking. Mother's attitudes and smoking behavior affected male children more than females, but this was less so if the attitude was one of approval and the child was a nonsmoker.

Brook, Whitman and Gordon examined maternal smoking in relation to adolescent smoking in a December, 1981 article.<sup>51</sup> They noted that adolescents who identified with a mother who smoked tended to be smokers themselves. They stated that a "significant contribution" could be made by the interaction of the dual influences of maternal smoking and other unidentified personality factors.

A study by Higgins, Kjelsberg and Metzner examined the smoking behavior and related variables of over 2100 students in Michigan.<sup>52</sup> They noted that children and adolescents were more likely to smoke if their parents did. The parental effects decreased with age. The number of children who smoked when both of their parents smoked was greater than those who had only one parent smoke.

A 1985 study by Holmqvist examined smoking rates of students aged thirteen to fifteen in both 1981 and 1983.<sup>53</sup> The most striking figures were noted in the rates of smoking in fourteen/fifteen year olds. In 1981, 21.6 percent of the males and 16.4 percent of the females were smokers. Although the decline in male smoking was encouraging, the author noted that over twenty percent of males who had never used cigarettes had used snuff by the termination of the study.

## TOBACCO CROP INVOLVEMENT AND SMOKING

Evidence of the link between family cultivation of tobacco and adolescent smoking was provided in a study published in 1984 by Wilson and Higgins.<sup>54</sup> This was one of only two articles examining that relationship.

The researchers noted that about thirty percent of children from families economically dependent on tobacco cultivation were smokers. Children of "nongrowers" showed no difference in smoking rates than the children of "growers" in geographic areas of high economic impact, but in geographic areas of lower economic impact, the rate dropped to 15.5 percent of children from "nongrowers" and 30.2 percent of "growers" ( $p < 0.001$ ).

The authors noted no significant relationship between the daily smoking of current smokers and tobacco crop status, although there was a slightly higher amount of smoking in children of "growers". Children of "growers" who were already smokers tended to consume more cigarettes per day than smoking children of "nongrowers," but this difference was not statistically significant.

Since intent is a major predictor of future behavior, it was noted with some alarm that 11.5 percent of nonsmokers predicted that they would be smoking in five years. Over seventy-one percent of current smokers believed that they also would be.

Higgins, Whitley and Dunn also used the same data set to

examine smoking attitudes and behaviors.<sup>55</sup> They noted that fifty-five percent of students whose families worked with tobacco had tried smoking at least once, and twenty-nine percent were regular smokers. This was significantly greater than the forty percent of students from non-cultivating families who had tried smoking and the eighteen percent who were regular smokers. In the discussion it was noted that "... students from tobacco producing families are more likely to smoke, to smoke more and to hold attitudes that are more favorable toward smoking...."<sup>56</sup>

These findings were then discussed in light of the current social and economic environment in eastern Kentucky and the prominence that the tobacco harvest has in that environment. They noted that an activity that is not only an economic mainstay, but a major portion of one's social environment, must surely be looked upon with some favor, thereby decreasing the barriers to smoking.



## CHAPTER THREE

### METHODOLOGY

#### DATA COLLECTION

In December 1980, a random sample of all schools in Knox, Whitley, Jackson and Clay counties in eastern Kentucky was designated. The sample was stratified and ten percent of the students in grades five through twelve were surveyed. One thousand three hundred twenty-two surveys were administered during December, 1980 and January, 1981.

Personnel from the Cumberland Valley District Health Department (CVDHD) coordinated the administration of the survey with each school, while actual administration of the instrument was performed by home room teachers who read standardized instructions. CVDHD personnel then collected the questionnaires from the principals' offices where they had been delivered.

#### DATA PROCESSING

Data from the student questionnaires was tabulated by CVDHD personnel and data was keypunched at the Academic Computing Service at Eastern Kentucky University. Statistical analysis was performed by the Academic Computing Services at Western Kentucky University and

the data stored in files at the University of Kentucky Computing Center in Lexington for general access.

#### INSTRUMENT

The questionnaire was developed by a research advisory committee of the Kentucky Department of Human Resources using standardized questions recommended by the United States Department of Health and Human Services and other attitude and behavior assessment questions designed by the committee. Attitude questions were modifications of questions used in the Fifth Study: Cigarette Smoking Among Teenagers, The 1975 New Prevalence Study of Cigarette Smoking Among Adults and the American College Health Association prepared Report of the Smoking Education Project, which was modified for clarity.<sup>57</sup> Among the questions were queries regarding demographic variables, smoking status and rates, attitudes related to tobacco use and those concerned with the family's involvement in any manner (growth, transportation or sale) with the tobacco crop. Reliability and validity were gained by pilot testing the questions in the Berea Community School Corporation, Berea, Kentucky, in late 1980.

The survey was given in conjunction with surveys of parental and teacher attitudes and behaviors. All three surveys were funded under the DHHS Health Education and Risk Reduction programs.

## STATISTICAL ANALYSIS

The CROSSTABS subprogram of the Statistical Package for the Social Sciences (SPSS) was used for data analysis. This allowed for assessment of the relationship between student smoking and family tobacco cultivation, giving consideration to the interaction of the other variables. All comparisons were tested at an alpha level of 0.05.

## CHAPTER FOUR

### RESULTS

#### SAMPLE CHARACTERISTICS

One thousand three hundred twenty-two questionnaires were administered and one thousand three hundred eighteen were returned. This gave a 99.7 percent response rate. Six hundred sixty eight (50.7 percent) were males, six hundred fifty (49.3 percent) were females. Ages ranged from nine to nineteen. Over ninety-five percent (95.6) of the respondents were white, 1.1 percent were black and 0.7 percent were Hispanic.

Two hundred ninety-two (22.1 percent) students were smokers. Two hundred seventy-six students (20.9 percent) were from families that grew or worked with tobacco.

#### STATISTICAL RESULTS

Males whose families grew or worked with tobacco were more likely to smoke as their age increased ( $\chi^2 = 13.48768$ , 3 df, sig. = .0037). They were also more likely to smoke if their friends smoked ( $\chi^2 = 34.45517$ , 2 df, sig. = .0000) and as the number of their siblings who smoked increased ( $\chi^2 = 9.69778$ , 1 df, sig. = .0018).

Males from nongrowing families showed no significant differences from the males from growing families. More of them also

tended to begin smoking as their age increased ( $\chi^2 = 8.95388$ , 3 df, sig. = .0299). The number who smoked was also significantly greater if their friends smoked ( $\chi^2 = 102.41136$ , 2 df, sig. = .0000) and if their siblings smoked ( $\chi^2 = 20.41350$ , 1 df, sig. = .0000). Tables of these results are located in Appendix A.

Among females from families economically dependent on the tobacco crop, the same pattern that was noted among males appears. As age increased, so also did smoking ( $\chi^2 = 20.16437$ , 3 df, sig. = .0002). Smoking behavior of friends ( $\chi^2 = 27.64508$ , 2 df, sig. = .0000) and siblings ( $\chi^2 = 9.18289$ , 1 df, sig. = .0024) also apparently affected the smoking behavior of these students in that as the number of these peers who smoked increased, so also did the number of target adolescents.

The pattern was somewhat different among females not dependent on the tobacco crop. As their age increased they also tended to increase smoking ( $\chi^2 = 51.35663$ , 1 df, sig. = .0000). Friend smoking also was linked with increased smoking in the target student ( $\chi^2 = 94.31854$ , 2 df, sig. = .0000), as was sibling smoking ( $\chi^2 = 51.35663$ , 1 df, sig. = .0000). These students differed, however, because the smoking behavior of their mothers also significantly affected their own smoking behavior ( $\chi^2 = 51.35663$ , 1 df, sig. = .0000). Tables of these results are located in Appendix B.

To complete the data analysis, there was a comparison between growing and nongrowing families. The results are not statistically significant in all cases, yet some general trends do emerge.

Among female students under fourteen years of age from

nongrowing families, 9.7 percent smoked while only 3.6 percent from families that worked with tobacco were smokers ( $\chi^2 = 2.12$ , 1 df, n.s.). Seventeen percent of males under fourteen years of age from nongrowing families and 21.4 percent of males from families economically dependent on the tobacco crop were smokers ( $\chi^2 = 0.70$ , 1 df, n.s.).

Among females from non-tobacco cultivating families, 23.6 percent of the students whose mother smoked, smoked themselves. Among females from tobacco growing families whose mother smoked 15.7 percent did so themselves ( $\chi^2 = 1.48$ , 1 df, n.s.). Among males from non-tobacco growing families whose mother smoked 25.4 percent were smokers also. Among males from grower families with a mother who smoked 32.5 percent smoked ( $\chi^2 = 1.50$ , 1 df, n.s.).

Of females from nongrowing families whose father smoked, 19.9 percent were smokers themselves. While 21.4 percent of the females from grower families whose father smoked were smokers ( $\chi^2 = 0.22$ , 1 df, n.s.). Among males from nongrowing families with a father who smoked 25.4 percent did so, while 38.2 percent of males from growing families whose father smoked did so ( $\chi^2 = 5.25$ , 1 df,  $p < 0.05$ ).

Among female smokers, 15.3 percent from non-tobacco growing families and 11.5 percent from tobacco growing families had no friends who smoked ( $\chi^2 = 0.22$ , 1 df, n.s.). Among male smokers, 13.5 percent from nongrowing families and 7.5 percent from growing families had no friends who smoked ( $\chi^2 = 1.21$ , 1 df, n.s.).

Among female students from tobacco growing families who had at least one friend who smoked, 51.2 percent were smokers while only forty-four percent of those from nongrowing families stated that one or

more friends were smokers ( $X^2 = 1.92$ , 1 df, n.s.). Among males, 61.8 percent of those from tobacco growing families had at least one friend who smoked while 50.2 percent from nongrowing families did ( $X^2 = 6.21$ , 1 df,  $p < 0.05$ ).

Among female students from non-tobacco growing families 40.1 percent had at least one sibling who smoked while 48.7 percent of those from tobacco growing families did ( $X^2 = 2.92$ , 1 df, n.s.). Among males from non-tobacco growing families who had at least one sibling who smoked 36.2 percent smoked also; that increased to 45.9 percent of those from tobacco growing families ( $X^2 = 4.55$ , 1 df,  $p < 0.05$ ). Among female smokers from nongrowing families, 75.3 percent had at least one sibling who smoked and 76.9 percent from grower families had one or more siblings who smoked ( $X^2 = 0.12$ , 1 df, n.s.). Among male smokers from nongrowing families who had at least one sibling who smoked 56.3 percent smoked, , while 64.2 percent from grower families did ( $X^2 = 0.85$ , 1 df, n.s.).

## CHAPTER FIVE

## DISCUSSION AND RECOMMENDATIONS

## DISCUSSION

The sample of over one thousand three hundred students was large enough, and the response rate of over ninety-nine percent was high enough that one can be confident of the inferences drawn about the adolescent student population for the geographic area studied. Demographically, the sample also appeared representative of the population. The age range of twelve to seventeen years is normal, as is the preponderance of whites. It was also expected that the number of males and females within the sample would be almost equal. Almost twenty-one percent of the students sampled were from families that had some degree of economic involvement with the tobacco crop.

It was expected that, among males and females from both families economically dependent on the tobacco crop and those not dependent, as age increased, smoking would also. This association was discussed in the literature review and appears to be in agreement with other studies. That the number of smokers increases with age into the late teens may either be due to a desire to appear more mature by smoking or else merely a wish to express rebellion against adults by engaging in such a self-destructive behavior.



That smoking increased as the numbers of friends and siblings who smoked increased is also not surprising. Children in this age group are very sensitive to peer pressure, especially from those closest to them, and they are often unwilling to oppose it. This pressure may be so strong that it induces them to engage in a behavior which they know to be harmful. The study suggests that, when studying smoking behaviors, siblings can probably be considered to be equivalent to other peers in terms of social influence. The p-values of less than .005 indicate the great degree of association that both peers and siblings have with adolescent smoking.

It was interesting to note that, with the exception of female adolescents from nongrowing families, parental smoking behavior did not appear to significantly influence the smoking behavior of the target student. This was unexpected and does not agree with the findings of Beaglehole, Eyles and Harding.<sup>58</sup> It is curious and unexplained that only females from nongrowing families should model the smoking behavior of their mothers.

One is able to deduce from this data that, regardless of sex and degree of tobacco crop dependence, adolescents are significantly more likely to smoke as the number of their friends and siblings who smoke increases. It is not realistic to state that economic dependence upon the tobacco crop has no impact on smoking behavior; rather, one can merely state that the instrument did not allow optimal data examination to make that assessment.

Data from male students under fourteen years of age seems to indicate that students from tobacco cultivating families begin smoking

at an earlier age than their counterparts from nongrower families. The percentages for females who smoke are somewhat different, but the number of female smokers under fourteen is too small for the comparison to be very reliable.

The relative importance of mother smoking in growing and nongrowing families is still debatable. Results among females would suggest that mother smoking in tobacco growing families might exert a decreasing effect on smoking activity, while among males, mother smoking adds to the positive effect.

The effect of father smoking is much clearer. More students of both sexes will smoke if their father smokes and they are from a grower family.

In both males and females from grower families, the two greatest risk factors for smoking initiation — friend and sibling smoking — were present at a higher frequency than in nongrower families. Thus, even if economic dependence on the tobacco crop does not represent a major primary risk factor for smoking initiation, it certainly becomes a major secondary risk factor because it is so closely associated with increased chances of having both friends and siblings who smoke (particularly among males). These friends and siblings are themselves major sources of peer pressure to begin smoking, as well as maintain the habit.

While these data have limited value in drawing strong conclusions, they suggest that alternative research designs might well be productive in further substantiating the influence of family involvement in tobacco growing upon adolescent smoking behavior.

Although, with the exception of one case, no significant differences between children from growing and nongrowing families were noted, one cannot state that a relationship does not exist. If a statistical tool were used which allowed the assessment of the interaction of multiple factors, such as analysis of variance, the effect might be better examined. This would require transforming much of the categorical data from the instrument into at least interval-scale data, but the enhanced tools one could then use would give the researcher a much better ability to examine relationships. In the storage and manipulation of data for use by other researchers the information regarding numbers of cigarettes smoked per day was lost. This is unfortunate since this would have provided some of the ordinal-scale data needed to perform the more powerful multivariate analyses.

## RECOMMENDATIONS

The following recommendations can be made from the data examination:

1. Further research concerning the relationship between smoking and tobacco crop dependence should be undertaken. These analyses should include not only adolescent smoking behaviors, but adult patterns as well. Different geographic areas should also be sampled.
2. Further research examining the relationship between adolescent smoking initiation and tobacco crop dependence should be undertaken.
3. Further research examining the relationship between adolescent smoking maintenance and tobacco crop dependence should be undertaken.
4. Identification of all contributing factors to adolescent smoking is an important first step to decreasing smoking activities. Following this, the interaction between these factors can be assessed. This will enable educators to plan more specific and effective smoking intervention efforts.
5. The message against smoking may need to be modified in order to be effective to groups closely linked both socially and economically to the tobacco crop. Use of the community message structure as described by Perry and Murray may be ineffective.<sup>64</sup> Use of additional smoking education techniques which consider the socioeconomic pressures to which this adolescent population is exposed should be explored. Realizing the impact of peer actions on target student behaviors, advocates of antismoking efforts may need to utilize peer counseling and positive peer examples both in the schools and the media.

6. Information concerning the variables measured in this study should be collected in a manner which allows it to be examined as, at least, ordinal-scale data. This would allow the use of much more powerful statistical tools to perform multivariate analyses of all factors involved in adolescent smoking, probably giving a truer picture of the behavior than nonparametric methods.

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APPENDIX A  
CHI SQUARE ANALYSES OF FEMALE SMOKING

Table 1

Chi Square Analysis of Student Smoking Status Related to Age  
Among Females From Tobacco Growing Families

		STUSMD		row total
		yes	no	
AGE	9-11	1	22	23
	12-13	1	31	32
	14-16	18	27	45
	17-19	5	13	18
column totals		25	93	118

$\chi^2 = 20.16437$  3 df  
significance = 0.0002

Table 2

Chi Square Analysis of Student Smoking Status Related to Age  
Among Females From Non-Tobacco Growing Families

		STUSMO		row total
		yes	no	
AGE	9-11	7	113	120
	12-13	19	128	147
	14-16	46	125	171
	17-19	12	36	48
column totals		84	402	486

$\chi^2 = 26.01921$  3 df  
significance = .0000

Table 3

Chi Square Analysis of Student Smoking Status Related to Mother  
Smoking Among Females From Tobacco Growing Families

		STUSMO		row total
		yes	no	
MASHO	YES	8	43	51
	NO	17	49	66
column totals		25	92	117

$\chi^2 = 1.18908$  1 df  
significance = .2755

Table 4

Chi Square Analysis of Student Smoking Status Related to Mother Smoking Among Females From Non-Tobacco Growing Families

		STUSMO		row total
		yes	no	
MASMO	YES	50	162	212
	NO	34	224	258
column totals		84	386	470

$\chi^2 = 7.89193$  1 df  
significance = .0050

Table 5

Chi Square Analysis of Student Smoking Status Related to Father  
Smoking Among Females From Tobacco Growing Families

		STUSMD		row total
		yes	no	
FASMD	YES	15	55	70
	NO	16	35	51
column totals		31	90	121

$\chi^2 = 0.0$  1 df  
significance = 1.0000



Table 6

Chi Square Analysis of Student Smoking Status Related to Father Smoking Among Females From Non-Tobacco Growing Families

		STUSMO		row total
		yes	no	
FASMO	YES	53	214	267
	NO	31	166	197
column totals		84	380	464

$\chi^2 = 1.03155$  1 df  
significance = .3098

Table 7

Chi Square Analysis of Student Smoking Status Related to Friend  
Smoking Among Females From Tobacco Growing Families

		STUSMD		row total
		yes	no	
FRESMD	0	3	55	58
	1 or 2	10	29	39
	3 or 4	13	9	22
column totals		26	93	119

$\chi^2 = 27.64508$  2 df  
significance = .0000

Table 8

Chi Square Analysis of Student Smoking Status Related to Friend  
Smoking Among Females From Non-Tobacco Growing Families

		STUSMO		row total
		yes	no	
FRESMO	0	13	260	273
	1 or 2	27	96	123
	3 or 4	45	48	93
column totals		85	404	489

$\chi^2 = 94.31854$  2 df  
significance = .0000

Table 9

Chi Square Analysis of Student Smoking Status Related to Sibling Smoking Among Females From Tobacco Growing Families

		STUSMO		row total
		yes	no	
SIBSMD	YES	20	38	58
	NO	6	55	61
column totals		26	93	119

$\chi^2 = 9.18289$  1 df  
significance = .0024

Table 10

Chi Square Analysis of Student Smoking Status Related to Sibling  
Smoking Among Females From Non-Tobacco Growing Families

		STUSMO		row total
		yes	no	
SIBSMO	YES	64	132	196
	NO	21	272	293
column totals		85	404	489

$\chi^2 = 51.35663$  1 df  
significance = .0000

APPENDIX B  
CHI SQUARE ANALYSES OF MALE SMOKING

Table 11

Chi Square Analysis of Student Smoking Status Related to Age  
Among Males From Tobacco Growing Families

		STUSMO		row total
		yes	no	
AGE	9-11	4	30	34
	12-13	11	25	36
	14-16	30	32	62
	17-19	8	17	25
column totals		53	104	157

$\chi^2 = 13.48768$  3 df  
significance = 0.0037

Table 12

Chi Square Analysis of Student Smoking Status Related to Age  
Among Males From Non-Tobacco Growing Families

		STUSMO		
		yes	no	row total
AGE	9-11	13	86	99
	12-13	25	99	124
	14-16	42	106	148
	17-19	16	44	60
column totals		96	335	431

$\chi^2 = 8.95388$  3 df  
significance = .0299



Table 13

Chi Square Analysis of Student Smoking Status Related to Mother  
Smoking Among Males From Tobacco Growing Families

		STUSMD		row
		yes	no	total
MASHD	YES	26	54	80
	NO	26	45	71
column totals		52	99	151

$X^2 = 0.12973$  1 df  
significance = .7187

Table 14

Chi Square Analysis of Student Smoking Status Related to Mother Smoking Among Males From Non-Tobacco Growing Families

		STUSMO		row total
		yes	no	
MOSMO	YES	53	156	209
	NO	41	165	206
column totals		94	321	415

$\chi^2 = 1.46500$  1 df  
significance = .2261

Table 15

Chi Square Analysis of Student Smoking Status Related to Father  
Smoking Among Males From Tobacco Growing Families

		STUSMD		row total
		yes	no	
FASMD	YES	34	55	89
	NO	16	45	61
column totals		50	100	150

$X^2 = 1.82699$  1 df  
significance = .1765

Table 16

Chi Square Analysis of Student Smoking Status Related to Father  
Smoking Among Males From Non-Tobacco Growing Families

		STUSMD		row total
		yes	no	
FASMD	YES	61	179	240
	NO	32	131	163
column totals		93	310	403

$\chi^2 = 1.51880$  1 df  
significance = .2178

Table 17

Chi Square Analysis of Student Smoking Status Related to Friend  
Smoking Among Males From Tobacco Growing Families

		STUSMD		row total
		yes	no	
FRESMO	0	4	56	60
	1 or 2	19	26	45
	3 or 4	30	22	52
column totals		53	104	157

$\chi^2 = 34.45517$  2 df  
significance = .0000

Table 18

Chi Square Analysis of Student Smoking Status Related to Friend  
Smoking Among Males From Non-Tobacco Growing Families

		STUSMO		row total
		yes	no	
FRESMO	0	13	203	216
	1 or 2	25	90	115
	3 or 4	58	45	103
column totals		96	338	434

$\chi^2 = 102.41136$  2 df  
significance = .0000

Table 19

Chi Square Analysis of Student Smoking Status Related to Sibling  
Smoking Among Males From Tobacco Growing Families

		STUSMO		row total
		yes	no	
SIBSMO	YES	34	38	72
	NO	19	66	85
column totals		53	104	157

$\chi^2 = 9.69778$  1 df  
significance = .0018

Table 20

Chi Square Analysis of Student Smoking Status Related to Sibling  
Smoking Among Males From Non-Tobacco Growing Families

		STUSMO		row total
		yes	no	
SIBSMO	YES	54	103	157
	NO	42	235	277
column totals		96	338	434

$\chi^2 = 20.41350$  1 df  
significance = .0000