

Smokeless Tobacco Expectancies Among a Sample of Rural Adolescents

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Objective: To examine the role of expectancies in adolescent smokeless tobacco (ST) use. **Methods:** Self-report measures of students' ST expectancies, cigarette and ST use, and peer and family tobacco use were collected from a sample of 978 rural high school students. **Results:** Student expectancy beliefs significantly predicted ST use and intention to try ST in the next year. Student ex-

pectancies about ST were influenced by gender, cigarette use, and peer tobacco use. Family-member tobacco use did not strongly affect expectancies. **Conclusion:** Expectancies play a meaningful role in students' current and future decisions whether to use ST.

Key words: smokeless, spit tobacco, expectancies, rural adolescents

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Expectancies are the anticipated outcomes of a particular behavior.^{1,2} Smokeless tobacco (ST) expectancies are the anticipated outcomes of using ST. Expectancy theory is one version of a number of related theories concerning the cognitive mechanism by which early learning experiences influence later behavior choices. Expectancies have been found to be strong predictors of behavior. This paper describes the relationship between ST expectancies and the behavior of the sample of rural adolescents.

Over the past several decades there has been an apparent increase in the use of ST among adolescents. At the same time there has been little research on adolescent ST use. What research there has been suggests that the dynamics of ST

use may differ from cigarette smoking.³

Prevalence

Like cigarette smoking, national surveys suggest that ST use may be on the decline. The Youth Risk Behavior Surveillance System suggests that in 1995, 11.4% of students in grades 9 – 12 had used ST or snuff on one or more of the past 30 days. In 2001 this proportion was 8.2%.⁴ The Centers for Disease Control reported in 2002 that 6.6% of the high school population had used ST in the last 30 days.⁵

Gender differences were significant. The YRBSS for 2001 reported that 14.8% of the males and 1.9% of the females had used ST in the last 30 days.⁶ The Centers for Disease Control reported in 2002 that 10.8% of the high school males and 1.4% of the high school females had used ST in the last 30 days.⁵ Lifetime use was significantly higher. Among high school students, the 1999 National Youth Tobacco Survey estimated that 28.5% of the males and 7.6% of the females had tried ST at some time in their lifetime.⁷

Onset

Studies of the age of first ST use suggest that adolescence is an important period for establishing ST use patterns.

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Riley et al⁸ found that 12% to 14% of adult ST users recalled beginning their use of ST before the age of 12. Creath et al⁹ reported that 77% of those who had tried ST had done so by the age of 14. These findings are similar to those of Simon et al¹⁰ who reported that 24% of their sample had tried ST the summer between seventh and eighth grade. Around the ninth grade seemed to be the time of initial onset of ST use.

Age of onset is important because the duration of use increases addiction rate and increases the risk of long-term health problems. Riley et al¹¹ reported that longer and more frequent use greatly increased the likelihood the user would be addicted. Early onset increased the chances of continued use throughout adolescence and adulthood.^{8,9} Continued ST use appears to increase the use of smoked tobacco, alcohol, and other drugs.^{3,9,10} Understanding the factors that influence adolescent ST use, therefore, is especially important for intervention and prevention programming.

Determinants

The few available studies of ST use suggest that most adolescent users are white males. One of the most important determinants of ST use was reported to be peer use. Several studies have presented data to support this conclusion. Boyle et al,¹² Creath et al,⁹ Horn et al,¹³ and Kury et al¹⁴ all reported that a person is more likely to try ST if he had a friend who used. Other significant determinants included family use (parent or sibling), favorable attitudes towards use, and inflated perceptions of the importance of tobacco use. ST users tended to be more prone to higher rates of other risky behaviors.¹⁰

Many ST users felt that sanctions (consequences/punishment) for ST use from schools and parents were minimal.^{9,12,15} Many adolescent users used ST at home and started their use in the presence of family members. Smokeless tobacco users reported few consequences for their use at school and home. They also report that it was easy to obtain ST from stores, peers, or family members. Students reported that school rules about ST use were rarely enforced, and they viewed the punishment as minimal for tobacco use at school.^{9,12,15}

ST and other Substance Use

Hu et al³ have suggested that cigarette

smoking and ST represent 2 different locations on the drug continuum and should, therefore, be treated separately. The use of one does, however, greatly increase the use of the other. ST use and cigarette smoking are highly correlated. Studies suggest that ST use may be a gateway to cigarette smoking or other drugs or vice versa.^{3,9,10} The most common comorbid use with ST is cigarette smoking.³ People who use any form of tobacco are at a much greater risk for the use of other substances.^{3,9,10}

ST Expectancies

Expectancies concerning the outcomes of a behavior have been found to be potent predictors of that behavior. A considerable body of work has found that expectancies influence alcohol use.^{1,2,16} A smaller, but growing, literature has identified expectancies as important factors in smoking.¹⁷⁻¹⁹ We found only 2 studies^{20,21} that examined expectancy influences on ST use. These studies suggested initial evidence that outcome expectancies were a determinant of ST use. However, a significant gap remains in our understanding of how expectancies affect adolescent ST use and how expectancies interact with other known influences on ST use such as smoking and family and peer tobacco use patterns.

The Present Study

The limited amount of research in the last 10 years on ST use contrasts with the large amount of research on adolescent smoked tobacco use. The Centers for Disease Control and Prevention can now advocate the use of school curricula to prevent and reduce smoked tobacco use, based on the quantity of quality science. Data on ST are not sufficient to make similar recommendations. The objective of this study was to increase our understanding of the dynamics of adolescent ST use, focusing especially on the role of expectancies in current and intended ST use.

METHODS

Study Population

We recruited 978 high school students from 10 rural Nebraska high schools (518 female; 458 male; 2 unstated; 296 freshmen, 243 sophomores, 267 juniors, and 131 seniors; 41 not reporting grade). Students were classified as users of ST if

they reported using ST one or more times in the past 30 days. There were 176 ST users (18.0%), 6.0% females and 31.5% males.

Schools were selected purposely to provide reasonable representation of the rural parts of the state and to have an adequate enrollment to justify data collection. Classes were selected at random to provide approximately 100 students per school. Data were collected by a member of our staff who followed a standard protocol. No teachers or other school personnel were involved in data collection, and no school personnel saw the completed questionnaires. Responses were anonymous, and students were assured confidentiality. The project was approved by the university's research review board. Schools observed their own policies for informing parents about the study.

Expectancy Measure

Adolescent ST expectancies were elicited during focus group discussions with groups of 5 to 12 students in 4 rural high schools in 4 different regions of Nebraska. These discussions led to the creation of an inventory of more than 100 expected outcomes from ST use. The outcomes were rewritten as expectancy statements. The list of expectancy statements was revised and reworked several times by a team of researchers experienced in expectancy questionnaire development. The resulting questionnaire contained 38 expectancy items. These items were pilot tested with high school students for clarity of meaning.

Other Measures

The questionnaire contained demographic questions and questions about personal, family, and peer use of ST and cigarettes. Questions from the 1999 Youth Risk Behavior Survey²² about lifetime and last-30-day use of ST and cigarettes were used to measure behaviors.

Statistical Analysis

Using a random split-half sample of 489 students, the expectancy items were factor analyzed with exploratory factor analysis using principal components extraction with Varimax rotation. This analysis resulted in the identification of 5 factors and the elimination of 18 poorly fitting items. Using the second half of the split sample (489 students), a confirmatory

factor analysis was done to verify the adequacy of the identified factors. Results confirmed the adequacy of the 5-factor solution and item-factor fit.

The 20 expectancy items were measured on a 7-point Likert scale (1=strongly agree, 2=agree, 3=somewhat agree, 4=neither agree nor disagree, 5=somewhat disagree, 6=disagree, and 7=strongly disagree). The 5 identified subscales were

- safety and convenience (5 items, alpha = .84; eg, If I chew, my boss will be happier than if I smoke. If I use chew when I am working on my job, I will be safer than if I smoke.);

- physical pleasure (3 items, alpha = .78; eg, If I chew tobacco, it will relieve stress in my life. If I chew, it will taste good.);

- effects on peers (4 items, alpha = .73; eg, If I chew, I will not harm others like smoking does. If I chew around my friends, it will not bother them like smoking.);

- image (4 items, alpha = .77; eg, If I chew tobacco, I will look cool. If I do not chew tobacco, my friends will make fun of me.); and

- negative consequences (4 items, alpha = .59; eg, If I chew, my girlfriend/boyfriend will not approve. If I chew, I will waste a lot of money.).

Scores were computed by taking the mean score of the items in the subscale.

Factors influencing current ST use were determined using logistic regression. Linear regression analysis was done to predict future ST use. Analyses of group differences used t-tests. An Alpha level of .05 was used for all significance tests. Cohen's d was used for effect sizes for between-group comparisons. All analyses were done with SPSS for Windows V. 11.5.

RESULTS

Relations Between Expectancies and Students' Use and Intentions to Use ST

ST users had significantly more positive and less negative expectancies about ST than did nonusers (Table 1). The effect sizes for the physical pleasure and effects on peers scales exceeded 1 standard deviation and for the safety and convenience and image scales approached 1 standard deviation. Even though smaller, the effect size for negative consequences approached two thirds of a standard deviation. Interestingly, for the physical plea-

Table 1
Students' Mean Scores on Expectancies by ST Use

	df	ST User		Non-User		t	Cohen's d
		M	SD	M	SD		
Safety and Convenience	224.90	4.28	1.56	5.58	1.22	10.41***	.94
Physical Pleasure	207.55	3.95	1.75	5.98	1.11	14.79***	1.38
Effects on Peers	266.83	2.96	1.32	4.58	1.37	14.62***	1.08
Image	205.81	5.53	1.34	6.42	.83	8.53***	.89
Negative Consequences	246.21	2.72	1.25	1.97	1.15	-7.30***	.62

Note.

ST Users, n=176; Nonusers, For Safety and Convenience and Effects on Peers, n=785; for all others, n=786. For all tests, unequal variances were assumed. Cohen's d=effect size in standard deviation units.

*P<.05. **P<.01. ***P<.001.

sure and effects on peers scales, ST users and nonusers not only differed relative to one another but also had mean scores on opposite sides of the Likert midpoint. This suggested that ST users, on average, agreed with these expectations whereas nonusers disagreed.

We examined the association between students' expectancies and current ST use. We used logistic regression to predict whether the student had used ST in the past 30 days. To examine expectancy influences relative to other student and demographic characteristics that might

Table 2
Logistic Regression Results for Predicting Students' Chewing

	B	SE B	Odds ratio	95% Confidence Interval
Gender	1.514	.258***	4.545	2.74 – 7.53
Student Ever Smoked	1.269	.292***	3.556	2.01 – 6.30
Family History of Chewing	.344	.234	1.410	.89 – 2.23
Family History of Smoking	.073	.248	1.075	.66 – 1.75
Friends' Chew	.829	.372*	2.291	1.11 – 4.75
Friends' Smoke	.597	.491	1.817	.69 – 4.76
Safety and Convenience	-.062	.107	.940	.76 – 1.16
Physical Pleasure	.647	.102***	1.909	1.56 – 2.33
Effects on Peers	.313	.105**	1.367	1.11 – 1.68
Image	.001	.121	1.001	.79 – 1.27
Negative Consequences	-.175	.096	.839	.70 – 1.01
Constant	-3.652	.772	.026	

Note.

N=923. Coding for categorical variables was as follows. Gender 0=Female, 1=Male. Student smokes 0= Yes, 1=No. Family History of Chewing and Family History of Smoking 0=Yes, family member uses, 1=No, family member does not use. Friends' Chew and Friends' Smoke 0=Yes, friends use, 1=No, friends do not use.

*P<.05. **P<.01. ***P<.001.

Table 3
Regression Results for Predicting Students' Use Intentions from
Expectancies Controlling for Student Characteristics

	B	SE B	Beta
Step 1			
Gender	-.402	.063	-.165***
Student Smokes	.321	.067	.131***
Family History of Chewing	.111	.063	.044
Family History of Smoking	-.063	.060	-.027
Friends' Chew	.102	.071	.042
Friends' Smoke	.053	.088	.017
Step 2			
Safety and Convenience	-.006	.029	-.007
Physical Pleasure	.315	.029	.380***
Effects on Peers	.141	.026	.174***
Image	.020	.037	.017
Negative Consequences	-.076	.026	-.075**
Constant	1.518	.252	—

Note.

R²=.25 for Step 1. R² change=.22 for Step 2. N=937. Gender 0=Female, 1=Male. Student smokes 0=Yes, 1=No. Family History of Chewing and Family History of Smoking 0=Yes, family member uses, 1=No, family member does not use. Friends' Chew and Friends' Smoke 0=Yes, friends use, 1=No, friends do not use.

***P<.05. **P<.01. ***P<.001.**

influence use, we entered gender, whether the student smoked, family history of tobacco use, and friends' tobacco use as a block. Then, we entered the 5 expectancy variables as a block. The final regression model of all variables significantly predicted students' use ($\chi^2 = 362.46$, $P<.001$). Estimated R^2 values indicated a moderate to large effect size (Cox and Snell $R^2 = .33$; Nagelkerke $R^2 = .53$). The addition of expectancy beliefs significantly contributed to the model (Step 2 $\chi^2 = 127.00$, $P<.001$) with a substantial increase in estimated R^2 (Cox and Snell increase .10; Nagelkerke increase .16). As shown in Table 2, students' gender, personal history of smoking, and friends' chewing significantly predicted ST use. Male students were $4^{1/2}$ times more likely to use, students who had ever smoked were $3^{1/2}$ times more likely to use, and students with friends who chewed were slightly more than 2 times as likely to use ST. Expectancy beliefs for physical pleasure and effects on peers significantly predicted use, with higher physical plea-

sure expectancies increasing the odds of use by almost 2 and effects on peers expectancies increasing the odds of use by about $1^{1/3}$.

We also examined the extent to which expectancies could predict students' intentions to use ST. Students were asked to indicate whether they thought they would try ST anytime in the next year on a 5-point Likert scale (1=definitely yes, 2=probably yes, 3=maybe, 4=probably not, and 5=definitely not). We conducted multiple regression analysis controlling for the effects of student and demographic characteristics by first entering gender, whether the student smoked, family history of tobacco use, and friends' tobacco use as a block. Then, we entered the 5 expectancy variables as a block. The final regression model of all variables significantly predicted students' reported intentions to try ST, $R = .68$, $R^2 = .47$, $F(11, 930) = 73.14$, $P<.001$. Expectancy beliefs made a significant contribution to predicting students' intentions beyond the effects of student characteristics, R^2 change = .22,

Table 4
Students' Mean Scores on Expectancies by Gender

	df	Males		Females		t	Cohen's d
		M	SD	M	SD		
Safety and Convenience	868.51	4.89	1.48	5.72	1.17	9.67***	.60
Physical Pleasure	800.98	5.16	1.65	6.00	1.15	9.13***	.57
Effects on Peers	931.69	3.78	1.49	4.70	1.37	10.08***	.62
Image	791.56	5.98	1.15	6.49	.79	7.92***	.50
Negative Consequences	940.90	2.25	1.24	1.98	1.16	-3.58***	.23

Note.

Males, n=458; Females, For Safety and Convenience and Effects on Peers, n=518; for all others, n=517. For all tests, unequal variances were assumed. Cohen's d=effect size in standard deviation units.

*P<.05. **P<.01. ***P<.001.

$F(5, 925) = 75.20, P<.001$. Table 3 shows that students' gender and personal history of smoking significantly predicted intentions to use ST, with males and those who reported having smoked expressing stronger intention to try. For expectancy beliefs, physical pleasure and effects on peers were the strongest predictors, with negative consequences making a smaller contribution to the prediction.

Influences on the Development of ST Expectancies

To better understand how ST expectancies develop, we examined differences in students' expectancies as a function of student characteristics and family and peer tobacco use. Gender exerted a strong influence on expectancies. Males had significantly more positive and less negative expectancies about ST than did females (Table 4). The effect sizes for all scales except negative consequences ranged from one half to almost two thirds of a standard deviation. These differences likely reflect, in part, the fact that males are much more likely to chew. Only 31 of 512 females in the sample chewed, compared to 144 of the 445 males. However, as indicated in Table 1, chewers regardless of gender differed from nonchewers by a much larger amount than males differed from females.

A personal history of smoking was linked to expectancies. As shown in Table 5,

students who reported having ever smoked had significantly more positive and less negative expectancies about ST than did nonsmokers. The effect sizes for physical pleasure and effects on peers were approximately one half of a standard deviation. The remaining scales had effect sizes of about one third of a standard deviation.

Tobacco use by family members had inconsistent influences on ST expectancies. Table 6 shows that students who reported having someone in their family who chewed had significantly more positive and less negative expectancies than did those who did not. However, only the effects for physical pleasure and effects on peers had effect sizes of one fourth of a standard deviation or more, with neither exceeding .30. Students who reported having someone in their family who smoked (Table 6) differed significantly only for image expectancies; however, the effect size of .15 suggests a relatively small effect. Taken together, these findings suggest that the family history of tobacco use has only a small effect on students' expectancies about ST use.

Peer tobacco use exerted more influence on expectancies than family tobacco use did. Students were asked whether none, some, or all of their peers used tobacco in a 3-response question. Very few students reported that all their friends smoked or chewed; therefore, the some and all categories were combined for this

Table 5
Students' Mean Scores on Expectancies by Smoking

	df	Smoker		NonSmoker		t	Cohen's d
		M	SD	M	SD		
Safety and Convenience	949.17	5.13	1.45	5.60	1.26	5.37***	.34
Physical Pleasure	973.78	5.28	1.59	6.04	1.17	8.58***	.51
Effects on Peers	924.48	3.92	1.49	4.73	1.39	8.72***	.54
Image	973.25	6.09	1.09	6.47	.84	6.07***	.37
Negative Consequences	941.11	2.28	1.24	1.87	1.11	-5.45***	.34

Note.

Smoker, For Effects on Peers, n = 558, for all others, n = 559; Nonsmokers, For Safety and Convenience, n = 416; for all others, n = 417. For all tests, unequal variances were assumed.

Cohen's d = effect size in standard deviation units.

*P<.05. **P<.01. ***P<.001.

analysis. Students who reported having a friend or friends who chewed had significantly more positive and less negative expectancies toward ST use than did those who did not have a friend who chewed (Table 6). Effect sizes for all scales except negative consequences ranged from approximately one half to two thirds of a standard deviation. The effect size for negative consequences approached one third of a standard deviation.

Students who reported having a friend who smoked (Table 6) had significantly more positive and less negative expectancies than did those who did not have a friend who smoked. Effect sizes for all scales except safety and convenience ranged from about one third to one half of a standard deviation. The effect size for safety and convenience was approximately one fourth of a standard deviation. Taken together, these findings suggest that friends' use of tobacco influences students' expectancies about ST.

DISCUSSION

The relations of expectancies to ST use mirror those found between expectancies and smoking¹⁷⁻¹⁹ and expectancies and alcohol use,^{1,2,16} suggesting that expectancies have similar influences on ST use. Chewers and nonchewers differed substantially in their expectancies about ST. As would be expected, chewers expressed more positive and less negative expectancies. Expectancies contributed signifi-

cantly to predicting current ST use even when the known predictors of gender, students' smoking history, and family or friends' tobacco use were considered. Expectancies also predicted students' intentions to use ST over and above gender, smoking, and family or peer tobacco use. Taken together, these findings suggest that expectancies play a meaningful role in students' current and future decision making about whether to use ST. As a result, public health education and prevention programs should consider addressing students' expectancies about ST as a way to impact use.

Because expectancies are learned^{1,2} and because ST use appears to begin around ages 12 to 14 (Grades 7 and 8),⁸⁻¹⁰ education designed to encourage the development of more realistic expectancies needs to begin before age 12 and continue through the time of onset.

The finding that expectancies predicted intention to use ST, even when other predictors of ST use were considered, suggests that intentions could be a useful focus for those developing prevention/educational programs. Although there is a growing body of work describing the relationship between tobacco-related intentions and behaviors,¹⁷⁻¹⁹ much less has been done to evaluate the effectiveness of educational programs designed to reform expectancies.

Expectancies were influenced by students' gender and smoking history. Males

Table 6
Students' Mean Scores on Expectancies by Family and Peer Tobacco Use

	df	Yes		No		t	Cohen's d
		M	SD	M	SD		
Family Member Chews							
Safety and Convenience	705.68	5.16	1.46	5.44	1.33	2.97**	.20
Physical Pleasure	686.79	5.33	1.57	5.77	1.38	4.34***	.29
Effects on Peers	718.76	4.03	1.56	4.41	1.45	3.77***	.25
Image	676.02	6.13	1.09	6.33	.95	2.86**	.20
Negative Consequences	770.35	2.23	1.19	2.04	1.21	-2.38*	.16
Family Member Smokes							
Safety and Convenience	948	5.35	1.35	5.34	1.41	-.06	.00
Physical Pleasure	949	5.55	1.43	5.73	1.51	1.85	.12
Effects on Peers	948	4.21	1.49	4.39	1.50	1.88	.12
Image	949	6.19	1.03	6.34	.96	2.26*	.15
Negative Consequences	949	2.12	1.17	2.06	1.24	-.78	.05
Friends Chew							
Safety and Convenience	780.58	5.09	1.44	5.82	1.14	8.50***	.52
Physical Pleasure	901.34	5.31	1.57	6.20	1.02	10.58***	.68
Effects on Peers	712.59	3.92	1.47	4.99	1.30	11.53***	.71
Image	853.40	6.10	1.08	6.57	.76	7.89***	.47
Negative Consequences	688.68	2.23	1.22	1.84	1.12	-4.91***	.32
Friends Smoke							
Safety and Convenience	314.26	5.27	1.40	5.60	1.31	3.01**	.24
Physical Pleasure	352.28	5.49	1.50	6.09	1.24	5.68***	.40
Effects on Peers	314.43	4.11	1.48	4.94	1.40	7.26***	.55
Image	447.37	6.17	1.05	6.61	.69	7.20***	.44
Negative Consequences	319.15	2.18	1.21	1.79	1.12	-4.29***	.32

Note.

For Family Member Chews: Yes, n=363; No, For Safety and Convenience and Effects on Peers, n=609; for all others, n=610. For Family Member Smokes: Yes, For Safety and Convenience, n=550; for all others, n=551; No, For Effects on Peers, n=399; for all others, n=400. For Family Member Chews, unequal variances were assumed for all tests. For Family Member Smokes, equal variances were assumed for all tests. For Friends Chew: Yes, For Effects on Peers, n=650; for all others, n=651; No, For Safety and Convenience, n=320; for all others, n=321. For Friends Smoke, Yes, n=764; No, For Safety and Convenience, n=195; for all others, n=196. For all tests except Family Member Smokes, unequal variances were assumed. Cohen's d=effect size in standard deviation

were much more likely to use ST and had considerably stronger positive expectancies for ST use. Also, student smoking strongly influenced expectancies about chewing, with smokers expressing more positive and less negative ST expectancies. These findings confirm the potentially important links between smoking and chewing beliefs and behaviors.^{3,9,10}

Expectancies were also influenced by whether student's family or peers smoked or chewed, but peer use of tobacco had far more influence on expectancies than did family member use. This finding also confirms findings of earlier studies.^{9,12-14} These findings help place in perspective the relative importance of family and peer influences. Clearly family influences

are important, but not nearly as important as peer influences. The greater contribution of peer influence, compared to family influence, suggests priorities for the educational planner.

Finally, expectancies about long-term health consequences of ST such as cancer did not form a coherent factor in the development of the ST expectancy instrument.²³ Further research is needed to clarify the role of expectancies concerning serious and long-term health consequences in ST use decision making. Notwithstanding these limitations, this study contributes to our understanding of adolescent ST-use and the role that expectancies about ST play in decisions to use ST.

This study is limited by the examination of one rural convenience sample. The extent to which study findings might generalize to urban or suburban populations or to other rural populations is not known. Also, the study is limited in that only self-report measures were used. Certainly, more independent measurement of family and peer tobacco use and attitudes would allow greater precision in determining their influences on expectancies. Nevertheless, this study is one of the few that has attempted to describe ST use among a rural Midwestern sample of high school students. The incidence of ST use among young males in urban states is significantly lower than that of cigarette use, but it is still significant when the base population is considered. In Massachusetts, for example, 2001 YRBS data suggest that 7.4% of the males had chewed tobacco in the previous 30 days. In the largely rural states of Wyoming, Montana, South Dakota, Iowa, and Nebraska, male use of ST in the last 30 days was 28.6%, 25.2%, 24.3%, 20.0%, and 16.8%, respectively. Female use of ST continues to be lower than male use in all states.²⁴

This study identified positive expectancies for ST as seen by ST users and potential users. The perceived utility of ST use suggests that as efforts to discourage cigarette smoking increase, there is a distinct possibility of inadvertently encouraging ST use. Added to this, the significant number of young people already using ST should encourage prevention researchers to pay more attention to this behavior.

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