

# An Experimental Analysis of Sociocultural Variables in Sales of Cigarettes to Minors

## ABSTRACT

*Objectives.* This study assessed the role of age, racial/ethnic group, and gender, as well as that of other sociocultural variables, in minors' access to tobacco.

*Methods.* Thirty-six minors attempted to purchase cigarettes once in each of 72 stores (2592 purchase attempts). The minors represented equal numbers of girls and boys; 10-year-olds, 14-year-olds, and 16-year-olds; and Whites, Blacks, and Latinos. Equal numbers of stores were in Black, White, and Latino neighborhoods.

*Results.* Older children were more likely than younger ones to be sold cigarettes, and Latino children were more likely than Whites to be sold cigarettes. Older Black children (irrespective of gender) were the single most likely group to be sold cigarettes. Cigarettes were significantly more likely to be sold to children by male than female clerks and in specific sociocultural contexts.

*Conclusions.* Interventions with retailers must address sociocultural variables to improve effectiveness in reducing minors' access to tobacco. (*Am J Public Health.* 1997;87:823-826)

Elizabeth A. Klonoff, PhD, Hope Landrine, PhD, and Roxanna Alcaraz, MA

## Introduction

Research has shown that most minors who smoke buy cigarettes themselves in gas stations, convenience stores, and grocery stores.<sup>1-7</sup> Minors are successful at purchasing cigarettes 40% to 70% of the time,<sup>1-5,7</sup> and they purchase 1 billion packs of cigarettes each year.<sup>8</sup> Hence, intervening with retailers who persist in selling cigarettes to children despite the legal ban on such sales<sup>1-4,7</sup> is one approach to preventing minors' smoking. Unfortunately, such interventions are based on the assumption that clerks sell cigarettes to children because the consequences (profits) of so doing are positive.<sup>8,9</sup> Thus, these interventions typically highlight the negative (legal and financial) consequences of selling cigarettes to minors. This kind of intervention had no effect in New York<sup>5</sup> and was only modestly successful in California,<sup>10-12</sup> where decreases in sales occurred in 25% (two of eight) of store types.<sup>12</sup>

The minimal success of such interventions, along with other data, suggests that perhaps more than profit motive is involved in selling cigarettes to children. For example, cigarettes are most likely to be sold to minors who claim that they are buying them for a parent<sup>7</sup>; if making a profit alone explained selling cigarettes to children, then such claims would not affect sales. Likewise, cigarettes are sold more frequently to girls than to boys<sup>1-5,12</sup>; if sales solely reflect the desire for profits, cigarettes would be sold to minors irrespective of gender. These findings suggest that sociocultural variables also play a role in minors' access to tobacco.<sup>9</sup> Empirical evidence on this possibility is needed because, if such variables are involved, interventions with retailers can be improved by addressing them. Thus, we examined the role of minors' age, gender,

and ethnicity in their access to cigarettes by varying these characteristics systematically in a full factorial experimental design. We also explored the role of clerk's gender and ethnicity, presence vs absence of other customers, and ethnicity of the community in sales of cigarettes to minors.

## Methods

Participants were 18 girls and 18 boys (divided equally into groups of 10-, 14-, and 16-year-olds and groups of Whites, Latinos, and Blacks). Two children in each Gender  $\times$  Age  $\times$  Ethnicity group participated. Seventy-two stores were selected, 24 each in Black, White, and Latino communities. Each minor made one purchase attempt in each of the 72 stores (a total of 2592 attempts [36 minors  $\times$  72 stores]). On 50% of the occasions, the child attempted to purchase a pack; the child attempted to purchase a single cigarette on the remaining occasions (there were 1296 attempts made for each purchase type). Details on the design, training of minors, selection of stores, and procedures for standardizing minors' purchase attempts have been provided elsewhere.<sup>13</sup> Only the results for packs are presented here.

Chi-square and logistic regression analyses were used in evaluating successful (vs unsuccessful) attempts by each of

Elizabeth A. Klonoff and Roxanna Alcaraz are with the Behavioral Health Institute, California State University, San Bernardino. Hope Landrine is with the Public Health Foundation, City of Industry, Calif.

Requests for reprints should be sent to Elizabeth A. Klonoff, PhD, Behavioral Health Institute, California State University, 5500 University Pkwy, San Bernardino, CA 92407.

This paper was accepted July 29, 1996.

**TABLE 1—Percentages of Packs of Cigarettes Sold to Minors (n = 36) of Various Groups**

Group	Sample, %
Gender (648)	
Girls	26.39
Boys	18.21
Ethnicity (432)	
Whites	21.06
Blacks	28.41
Latinos	17.36
Age, y (432)	
10	4.17
14	21.53
16	41.20
Gender × Ethnicity (216)	
Girls	
White	23.61
Black	27.31
Latino	28.24
Boys	
White	18.60
Black	29.49
Latino	6.48
Gender × Age, y (216)	
Girls	
10	6.02
14	32.41
16	40.74
Boys	
10	2.31
14	10.65
16	41.67
Ethnicity × Age, y (144)	
White	
10	3.47
14	25.00
16	34.97
Black	
10	1.39
14	20.14
16	63.45
Latino	
10	7.64
14	19.44
16	25.00

(continued)

the sociocultural variables (and their interactions).

**Results**

Percentages of cigarettes sold to minors of various sociocultural groups are detailed in Table 1 and Figure 1. Of the 1296 attempts to purchase a pack of cigarettes, there were 289 sales; packs were sold to minors 22.3% of the time. Although this figure reveals that minors

**TABLE 1—Continued**

Group	Sample, %
Gender × Ethnicity × Age (72)	
Girls	
10-year-old White	6.94
10-year-old Black	0.00
10-year-old Latino	11.11
14-year-old White	37.50
14-year-old Black	23.61
14-year-old Latino	36.11
16-year-old White	26.39
16-year-old Black	58.33
16-year-old Latino	37.50
Boys	
10-year-old White	0.00
10-year-old Black	2.78
10-year-old Latino	4.17
14-year-old White	12.50
14-year-old Black	16.67
14-year-old Latino	2.78
16-year-old White	43.66
16-year-old Black	68.49
16-year-old Latino	12.50

Note. Percentages are based on 1296 purchase attempts by 36 minors. Numbers of purchase attempts by each group are shown in parentheses. Age,  $\chi^2 = 194.62$ ,  $df = 2$ ,  $P = .00005$ ; 14-year-olds vs 10-year-olds,  $\chi^2 = 58.14$ ,  $df = 2$ ,  $P = .00005$ ; 16-year-olds vs 14-year-olds,  $\chi^2 = 38.84$ ,  $df = 2$ ,  $P = .00005$ ; 16-year-olds vs 10-year-olds,  $\chi^2 = 168.94$ ,  $df = 2$ ,  $P = .00005$ ; gender,  $\chi^2 = 14.73$ ,  $df = 1$ ,  $P = .0001$ ; Gender × Age,  $\chi^2 = 19.60$ ,  $df = 2$ ,  $P = .0001$ ; ethnicity,  $\chi^2 = 18.10$ ,  $df = 2$ ,  $P = .0001$ ; Black vs White,  $\chi^2 = 6.17$ ,  $df = 2$ ,  $P < .05$ ; Black vs Latino,  $\chi^2 = 14.95$ ,  $df = 2$ ,  $P = .0001$ ; White vs Latino,  $\chi^2 = 1.96$ ,  $df = 2$ , NS; Ethnicity × Age,  $\chi^2 = 30.35$ ,  $df = 4$ ,  $P = .0001$ ; Gender × Ethnicity,  $\chi^2 = 25.64$ ,  $df = 2$ ,  $P = .00005$ ; Gender × Age × Ethnicity,  $\chi^2 = 13.05$ ,  $df = 4$ ,  $P = .01$ .

have considerable access to cigarettes, it is lower than the 40% to 70% rate reported in most studies and is an artifact of the low rate for 10-year-olds. Very young children rarely have been included in studies (typically participants are 16-year-olds). The 10-year-olds successfully purchased cigarettes only 4.2% of the time, whereas the 16-year-olds in this study were successful 41.2% of the time. The latter figure is comparable to that of many previous studies because of the comparable age of the minors.

As shown in Figure 1 and Table 1, a main effect for minors' age emerged: sales increased with age. Ten-year-olds were sold to less often (4.2% of the time) than 14-year-olds (21.5% of the time), who were sold to less often than 16-year-olds

(41.2% of the time). Likewise, a main effect for minors' gender appeared in which girls were sold cigarettes more often (26.4% of the time) than boys (18.2% of the time). Similarly, a main effect for minors' ethnicity emerged; Black children (28.41% of the time) were sold cigarettes more often than Latino (17.36%) and White (21.06%) children. There was no difference between the latter groups.

All first-order interactions also were significant. The Gender × Age interaction revealed that girls were sold to more often than boys at ages 10 and 14 but not age 16. The Ethnicity × Age interaction (144 purchase attempts by each of the 9 groups) revealed that Blacks were sold to more frequently at age 16 and less frequently at age 10 than other ethnic groups, whereas Latinos were sold to more frequently at age 10 and less frequently at age 16 than the other ethnic groups. The Gender × Ethnicity effect revealed that White and Latino girls were sold cigarettes more often than their male counterparts, whereas there were no gender differences in sales to Black minors. The three-way interaction (based on 72 purchase attempts by each of the 18 groups) revealed an increase with age in sales to White (from 0% to 43.66%) and Black (from 2.78% to 68.49%) boys; sales to Latino boys increased only at age 16 and remained lower than sales to other boys. For girls, sales to Blacks more than doubled from age 14 to 16 (from 23% to 58% of the time), sales to Whites decreased from age 14 to 16 (from 37% to 26%), and sales to Latinos remained the same (37%). The most frequent sales to 10-year-olds were to Latino girls; the most frequent sales to 14-year-olds were to White and Latino girls; and the most frequent sales to 16-year-olds were to Black girls and boys.

No differences in sales by neighborhood ethnicity ( $\chi^2 = 2.30$ ,  $df = 2$ ,  $P = .32$ ) or by presence vs absence of other customers ( $\chi^2 = 0.63$ ,  $df = 1$ ,  $P = .43$ ) were found. However, the ethnicity of the clerk played a role ( $\chi^2 = 9.71$ ,  $df = 4$ ,  $P < .04$ ); as shown by others,<sup>14</sup> Asian clerks were most likely and Black clerks least likely to sell. There also was a trend in which men sold more frequently than women ( $\chi^2 = 3.05$ ,  $df = 1$ ,  $P = .08$ ). Analyses of sales to 16-year-olds only (the group comparable to participants involved in other studies) revealed that men (46.6% of the time) sold cigarettes to them more often than did women (31% of the time) ( $\chi^2 = 8.95$ ,  $df = 1$ ,  $P = .002$ ).

These results were consistent with those of other studies.<sup>14</sup>

Sale (vs no sale) was the outcome predicted in a logistic regression analysis with nine sociocultural variables: age, ethnicity, gender, ethnicity of neighborhood, presence vs absence of other customers, gender of clerk, Age  $\times$  Ethnicity, Gender  $\times$  Age, and Ethnicity  $\times$  Gender. Eight of these variables were selected, and the final model (Table 2) fit the data well (goodness of fit  $\chi^2 = 212.24$ ,  $df = 192$ ,  $P < .151$ ). As shown in Table 2 on the next page, being 14 or 16 years old, Latino, or a 16-year-old Black increased sales, whereas being a Latino boy decreased sales. Men were more likely than women to make these sales, and sales were more likely in Latino neighborhoods than in other neighborhoods.

## Discussion

These data support our hypothesis that sales of cigarettes to minors involve more than the desire to make profits and that sociocultural variables also are involved.<sup>9,15</sup> This, in turn, suggests that clerks' decisions may be more complex than previously thought and that interventions with them thereby may need to be similarly complex. Analyses of 432 purchase attempts by each of three age groups revealed age to be the best predictor of sales; sales increased as age increased. One explanation for this is that clerks may view 16-year-olds as socially "old enough" to buy cigarettes. In any case, this finding suggests that interventions with retailers may be improved by specific efforts to decrease sales to older children.

Many studies have reported greater sales to girls than boys. However, we examined 648 purchase attempts by girls and 648 by boys, as well as 216 attempts by each of six Gender  $\times$  Age groups, and found that girls' greater access held only at younger ages, disappearing at age 16. There are two possible explanations. The first is that girls may appear to be older than their male counterparts and, hence, may be viewed as old enough to buy cigarettes. Alternatively, clerks may assume that younger girls do not smoke and hence must be purchasing cigarettes for an adult, whereas younger boys might be viewed as making the purchase for themselves; thus, younger girls are sold to while their male counterparts are refused, in a manner consistent with studies<sup>7</sup> demonstrating greater sales to minors who appear to be making the purchase for an

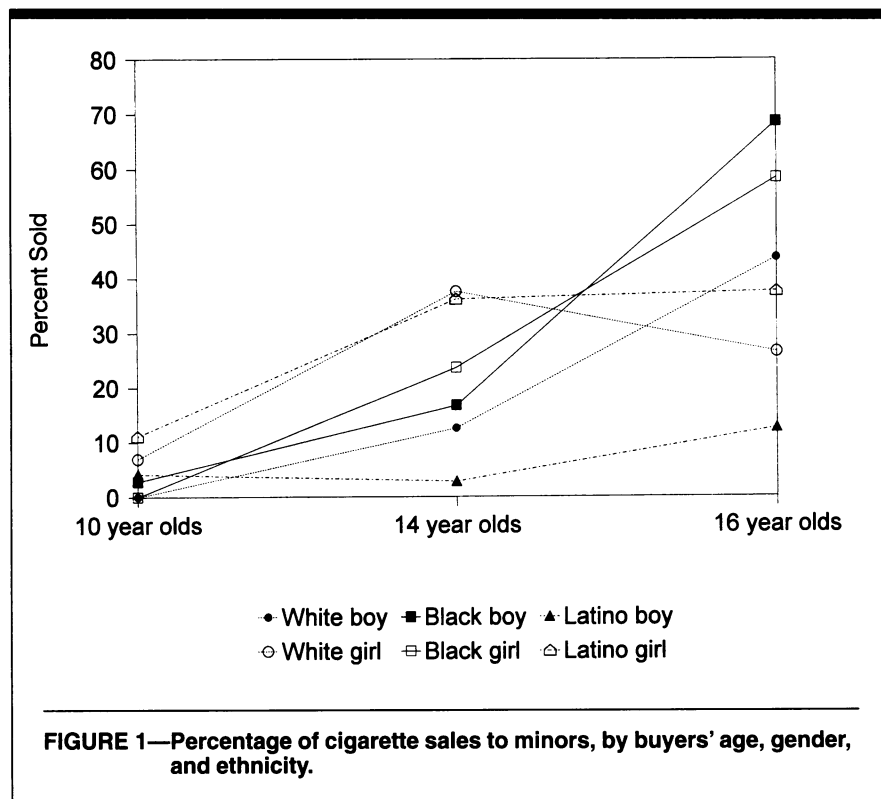


FIGURE 1—Percentage of cigarette sales to minors, by buyers' age, gender, and ethnicity.

adult. In any case, specific efforts to decrease sales to younger girls are needed.

In terms of ethnicity, we found that clerks were most likely to sell cigarettes to 16-year-old Black girls and boys. There are three possible explanations. One is that clerks feared that older Black children might behave violently or return to the store with friends to seek revenge on the clerk if sales were refused. There are three reasons to reject this possible fear explanation. First, clerks refused to sell to 16-year-old Latino boys, who received cigarettes less frequently than 16-year-old girls (of every ethnicity) even though they are as likely (or unlikely) as their Black male counterparts to belong to gangs. Second, sales to 16-year-old Black girls were as frequent as those to their male cohorts, even though girls are far less likely to be gang members. Finally, if fear of violence from 16-year-old Black girls and boys accounts for frequent sales to them, one might expect such fear to be more prevalent among female clerks than among male clerks, and hence one might expect greater sales by women than men; however, the reverse was found. These three findings are inconsistent with a fear hypothesis.

A second possible explanation for frequent sales to Black 16-year-olds is that clerks may view them as old enough to buy cigarettes because they know that

many of them have jobs and adult responsibilities. Frequent sales to 16-year-old Blacks may reflect not fear but a misguided sensitivity to the economic realities some of these children face.

A third possibility is garden-variety racism; clerks may view these children not as children but as Blacks whose health they could not care less about, and that attitude and effect may increase with the child's age. In any event, interventions with clerks may be improved by focusing on their tendency to sell to older Black minors rather than older White and Latino minors.

Explaining the role of being Latino is more difficult because of the gender effect. Clerks were more likely to sell cigarettes to Latino children but simultaneously were unlikely to sell cigarettes to Latino boys at any age, and particularly at age 16. At all ages, Latino girls were more likely to be sold cigarettes than their male counterparts. As suggested earlier for Blacks, it is possible that misguided cultural sensitivity leads clerks to view Latino girls as responsible, mature, and old enough to buy cigarettes. Alternatively, it is possible that clerks hold racist attitudes toward Latinos that are enhanced by gender; gender stereotypes (the assumption that young girls are purchasing cigarettes for an adult family member) may be enhanced when the girl is Latino.

**TABLE 2—Stepwise Logistic Regression Predicting Sales of Cigarettes from Sociocultural Variables: Statistics for the Final Model**

	Odds Ratio	95% Confidence Interval	Coefficient/SE
Constant	.024	.0078, .0712	-6.64
Age, y			
10	1.0	Reference	...
14	13.5	4.42, 41.4	4.57
16	11.4	3.77, 34.5	4.31
Gender			
Girls	1.0	Reference	...
Boys	0.725	0.216, 2.44	-0.520
Age × Gender			
10-year-old girls	1.0	Reference	...
14-year-old boys	0.391	0.109, 1.40	-1.44
16-year-old boys	1.91	0.564, 6.48	1.04
Ethnicity			
White	1.0	Reference	...
Black	0.325	0.059, 1.80	-1.29
Latino	3.53	1.10, 11.3	2.12
Age × Ethnicity			
White 10-year-olds	1.0	Reference	...
Black 14-year-olds	1.84	0.313, 10.8	0.674
Black 16-year-olds	7.81	1.37, 44.5	2.32
Latino 14-year-olds	0.288	0.079, 1.05	-1.89
Latino 16-year-olds	0.340	0.097, 1.20	-1.68
Gender × Ethnicity			
White girls	1.0	Reference	...
Black boys	1.56	0.743, 3.27	1.18
Latino boys	0.218	0.094, 0.505	-3.56
Clerk's gender			
Woman	1.0	Reference	...
Man	1.61	1.13, 2.28	2.66
Ethnicity of neighborhood			
White	1.0	Reference	...
Black	1.32	0.910, 1.92	1.47
Latino	1.49	1.02, 2.17	2.09

However, irrespective of the reasons for these sales, it is clear that retailers may benefit from culturally tailored interventions that address the role of ethnicity.

In summary, our data indicate that sociocultural variables play an important role in minors' access to tobacco, and we have offered several possible explanations for such effects. Whether our hypotheses are, in fact, the reasons behind differential sales by minors' sociocultural characteristics remains a question for which an answer may not be forthcoming. Certainly, future studies might interview store clerks in an effort to uncover the decision rules they use when they sell cigarettes to

one child but not to another, but the value of such data necessarily will be limited by social desirability, overjustification, and other effects on self-reports. However, the reasons for clerks' behavior are less important than the need to alter it. Thus, our findings imply that interventions with retailers may need to devote attention to decreasing sales to those minors who have the greatest access (e.g., older Blacks, Latino girls) by attending to neglected sociocultural variables. □

### Acknowledgments

This research was supported by funds provided by the Cigarette and Tobacco Surtax Fund of

the State of California through the University of California Tobacco-Related Disease Research Program (grant 4RT-0348 to Hope Landrine).

We are grateful to Dr Bruce Levin for his comments on an earlier version of this paper.

### References

1. DeClaire J. Babies in tobacco land: can tougher laws snuff out cigarette sales to kids? *View*. 1990;32:25.
2. Forster JL, Hourigan M, McGovern P. Availability of cigarettes to underage youth in three communities. *Prev Med*. 1992;21:320-328.
3. Hoppock KC, Houston TP. Availability of tobacco products to minors. *J Fam Pract*. 1990;30:174-176.
4. Kim TF. Laws ban minors' tobacco purchases but enforcement is another issue. *JAMA*. 1987;257:3323-3324.
5. Skretny MT, Cummings KM, Sciandra R, Marshall J. An intervention to reduce the sale of cigarettes to minors. *N Y State J Med*. February 1990:54-55.
6. Forster JL, Klepp KI, Jeffery RW. Sources of cigarettes for 10th graders in two Minnesota cities. *Health Educ. Res*. 1989;4:45-50.
7. Barovitch M, Sussman S, Dent CW, Burton D, Flay BR. Availability of tobacco products at stores located near public schools. *Int J Addict*. 1991;26:837-850.
8. DiFranza JR, Tye JB. Who profits from tobacco sales to children? *JAMA*. 1990;263:2784-2787.
9. Landrine H, Klonoff EA, Fritz JM. Preventing cigarette sales to minors: the need for contextual, sociocultural analysis. *Prev Med*. 1994;23:322-327.
10. Keay K. *Can I Have a Pack of Cigarettes, Please?* San Diego, Calif: San Diego State University; 1992. News release.
11. Altman DG, Foster V, Rasenick-Doug L, Tye JB. Reducing the illegal sale of tobacco to minors. *JAMA*. 1989;261:80-83.
12. Altman DG, Rasenick-Doug L, Foster V, Tye JB. Sustained effects of an educational program to reduce sales of cigarettes to minors. *Am J Public Health*. 1991;81:891-893.
13. Landrine H, Klonoff EA, Alcaraz R. Asking age and identification may decrease minors' access to tobacco. *Prev Med*. 1996;25:301-306.
14. Erickson AD, Woodruff SI, Wildey MB, Kenney E. A baseline assessment of cigarette sales to minors in San Diego, California. *J Community Health*. 1993;18:213-224.
15. Klonoff EA, Fritz JM, Landrine H, Riddle R, Tully-Payne L. The problem and socio-cultural context of single cigarette sales. *JAMA*. 1994;271:618-620.