The Application of Deterrence Theory to Reduce Illegal Tobacco Sales to Minors in Three Small California Communities

October, 1999

(Front of Postcard #1 of the Deterrence Campaign)

Agency: Leland Stanford Junior University

Project name: Enhancing enforcement of laws affecting tobacco sales to minors and the advertising of tobacco products

Scope of Work: Objective 8

Grant Number: #94-20967

Background

Voluntary merchant education approaches alone have only small or temporary effects in reducing illegal tobacco sales to minors,(1, 2) but regular enforcement employing unannounced purchase attempts (stings) with minors is effective.(3-5) To sustain reductions in illegal sales to minors, however, law enforcement approaches must be conducted on a regular basis. (1, 5) Unfortunately, this level of effort for enforcement may hinder its widespread adoption. According to 1998 data from the Independent Evaluation of the California Tobacco Control Program, only 38% of California enforcement agencies conducted stings of merchants in the past year. (6). The top two barriers to enforcing youth access laws cited by enforcement staff was "limited staff" and "no money in budget".

These constraints have led to increased interest in approaches to reduce tobacco sales to minors that are effective, but that require less staff time and money. One such approach may be derived by applying deterrence theory from the criminal justice literature to the problem of tobacco sales to minors. (7, 8) Deterrence theory may be used to reduce illegal tobacco sales to minors by raising merchants' perceived risk of being detected noncompliant with provisions of laws and regulations. This approach maximizes scarce resources because it amplifies the effect of enforcement actions using highly visible publicity rather than through conducting more extensive and costly law enforcement actions.

Three factors underlying deterrence theory are believed to deter crime: the perceived severity, certainty, and swiftness of punishment. Of these three factors, the most important appears to be the perceived certainty or risk of being detected and punished.(9) Interestingly, perceived risk often influences behavior more than "true" risk. In an effort to reduce drinking and driving, studies have determined that it is the perceived risk of detection, not the actual arrest probability, that predicts the degree to which driving-while-intoxicated (DWI) rates are affected in a community.(10) In fact, some studies have documented reductions in DWI rates simply from the publicity gained by media coverage of detection efforts.(11) Nevertheless, combined efforts (i.e., publicity along with detection and enforcement) seem to be most effective because the impact of publicity alone is short-lived.(12) Although publicity without additional enforcement may provide some deterrence, increased law enforcement without surrounding publicity appears to have little effect. That is, increases in actual risk, in the absence of publicity, often do not lead to increased perceived risk and behavioral changes.(11)

In an earlier study conducted by our research team at Stanford, we attempted to reduce illegal tobacco sales to minors by delivering a deterrence-based intervention designed to increase merchants' perceived risk of being detected and penalized for noncompliance with a multi-provision youth tobacco ordinance.(8) The ordinance regulated the manner of tobacco sales (e.g., prohibited self-service of tobacco, required merchants to check age-identification of customers) because these are risk factors for illegal sales to minors.(1, 13, 14) The campaign was publicized through the mass media (e.g., television spots, newspaper articles) and direct mail channels. Over 100 citations were issued in the intervention communities, but no fines were ever assessed. Based on merchant interviews and purchase surveys, the interventions failed to increase

merchant risk perceptions higher than the significant upward secular trend and the rate of illegal sales to minors was not significantly reduced. The results of this study underscored the critical importance of actual enforcement of the ordinance because, similar to the drunk driving studies cited earlier, publicity without enforcement fails to have lasting effects on behavior. Moreover, this study suggested that efforts that focus on the manner of sale rather than the actual sale itself, may be limited. Therefore, in the current study, we focused directly on the act of selling tobacco to minors and ensured that actual enforcement occurred as part of the intervention.

Based on the experience of the study described above, and an extensive review of deterrence theory and youth access literature, we concluded that there are 10 key components that should be integrated into youth.access interventions based on deterrence theory.(7)

1. A limited set of new or existing enforcement activities should be well publicized so they are highly visible to tobacco merchants. Message channels may include using direct mail and print or electronic media.
2. Enforcement should not be a one-time effort, but should be regular, even if it must be at relatively low levels of enforcement.
3. Selection of merchants for compliance checks should be done randomly. Publicity should highlight the "randomness" of detection to increase merchant risk perceptions. Of course, this does not preclude revisiting the subset of stores found to be noncompliant on initial compliance checks.
4. This publicity should focus more on increasing merchants' perceived risk or certainty of detection rather than on the severity or swiftness of punishment. Thus, the messages must convey the idea that merchants who sell to minors are certain to be caught during sting operations, instead of dwelling on the severity of penalties for those who are caught.
5. Because compliance checks may be perceived as unfair or unethical by merchants and community members, some effort should be made to promote compliance checks as the fairest and most effective way of ensuring compliance with tobacco sales to minors laws.
6. The intervention should provide materials that list all the risk factors for selling to a minor, such as not posting signs, not checking ID's (15), not having strict policies for clerks, and noting that male clerks sell illegally more often than female clerks (1, 13, 16). This could be in the form of an inventory, so merchants can check off what they are doing. This would counter their tendency to believe they are doing "all they can" to reduce their chances of selling illegally to minors.
7. Media reports and direct mail materials could feature case stories of how other merchants are taking precautions to avoid selling to minors with a special focus on model merchants who take extensive precautions. Providing information on the self-protective actions of others should help lessen merchants' bias that they are doing all they are doing "everything possible" to avoid illegal tobacco sales to minors.
8. Materials could provide statistics on how many stores have policies, post signs, check ID's, and do not sell to youth, which will attempt to establish that taking preventive actions and not selling to kids is really "the norm" among merchants.
9. Because clerks are the ones who actually sell or do not sell to minors, intervention materials must also reach them and not just store owners and managers.
10. Social groups have the power to amplify or attenuate risk perceptions: "if the risk is feared, rumor may be a significant element in the formation of public perceptions and attitudes" (17)

(p. 185). Intervention materials and personal contact might be provocative enough to stimulate discussion on the merchant "grapevine" about enforcement activities.

Development of the Merchant Education Component

Based on these 10 summary findings, a merchant education campaign was developed. The merchant education component was delivered as a set of postcards that were jointly developed by the Stanford Center for Research in Disease Prevention (SCRDP) and its subcontractor, O'Rorke Public Relations (PR) in San Francisco. The goal was to develop cards that faithfully apply the concepts listed above into a series of attention-getting postcards that convey the deterrence message. The intervention was carefully developed over several months in a 2-step process described below.

Step 1: Survey merchants about what information they need

O'Rorke conducted brief telephone surveys with 46 tobacco merchants in two Central Valley cities (Turlock and Merced). The table below features verbatim responses.

Question	Responses
What do you think about recent government efforts to crackdown on merchants who sell cigarettes to minors?	• "It is very good. We have a family business and smoking is not good for kids' health" – *Merced small grocery store owner* • "I don't appreciate that. We are trying to make a living and 'dipshits' come in with phony disguises" – *Merced convenience store manager* • "It is a good idea. In America, kids start smoking so young. They are only 10 or 12 years old. A kid that must have been only 10 was smoking outside my door, so I chased him away." " – *Merced convenience store manager* • "I respect it. It is good. But, they are overdoing it. If a cop is driving by, and they catch a young kid smoking and ask where they bought it, then that is one thing, but I don't like these 'chicken-shit' set-up sting operations. We start to doubt ourselves when someone has a mustache and is still a little young looking....To bring a guy in with a mustache to catch a business owner is silly. " – *Merced small grocery store owner* • "The law should be enforced, but the government should not send in minors with full beards to catch people" – *Turlock supermarket manager*
Sometimes merchants sell cigarettes to a minor by mistake. Why do you think this happens?	• "They look older than they are" – *Merced supermarket manager* • "It is a judgement call when you estimate a customer's age. Also, someone may intentionally sell to a friend or be too embarrassed to ask (for I.D.)" – *Turlock supermarket manager*
What is the best way to train employees to comply with laws about not selling to minors?	• "Sit them down and tell them like it is. They should also sign a paper that they won't sell to minors and if they get caught then they should pay the fine." - *Merced liquor store manager* • "Watch a family member die from lung cancer. Watch them

	deteriorate into a bag of bones, vomiting from chemotherapy and losing all self-esteem. This should let them learn what happens." – *Turlock supermarket manager*
What materials would you find helpful	• "Training materials that would really get an employee's attention. Also knowing the consequences of not checking I.D." – *Merced supermarket manager*
Other comments	• "Sometimes I send people away and tell them to go across the street. Other times, I am more lenient and figure I am just contributing to someone's death." – *Turlock gas station clerk*

These responses were used to modify the campaign. For instance, one card showed a young girl as a decoy to convey the idea that the state is not routinely employing older looking teens for compliance checks. The suggestions to have a clerk pledge was added along with the idea of having attention-getting materials.

Step 2: Pretesting of draft intervention materials

Based on these comments from merchants, O'Rorke PR created mock-ups of six deterrence postcards. These cards were then shown to seven local merchants in the Midpenninsula area. Because of time constraints, each merchant viewed three of the six cards. Each merchant examined the cards for less than a minute, which is the expected time that a merchant might expect to spend viewing them after receiving them in the mail. After they finished, the research assistant put the cards away and asked merchants several questions.

We tested **main idea comprehension** by asking merchants to explain the "main idea this message way trying to get across to you". Overall, merchants clearly understood the main point and had no difficulty describing it. Next, we asked **what action does the message ask you to do?** Again, merchants easily identified the target action of the cards (e.g., check ID, train clerks to avoid selling to minors). We also assessed **whether the message was confusing or easy to understand.** Nearly all merchants found the cards easy to understand. Merchants were asked **what they liked and disliked** about the cards. Most said that they liked the information that was provided because it helped them comply with sales-to-minors laws. One said that he appreciated the information, but did not like the fact that there is so much enforcement of youth access laws. That is acceptable because the purpose of the cards was to convey this information, and not to assess the popularity of the message. One of the cards asks the merchant to guess the ages of two potential female buyers (this was a replica of an FDA merchant pamphlet). Several commented that this was a fun activity and it convinced them of the difficulty of estimating ages, underscoring the need to consistently check ID. On the final measures of **believability** and **whether they learned something new**, the cards again scored well. In summary, the cards were very well received by these merchants, they readily understood the messages, and thought they were produced in a convincing manner.

Study Methods

Setting

This study took place in three small communities in California's Central Valley. These more rural areas were chosen because much of Stanford's earlier youth access studies have been done

in more urban areas along the Highway 101 corridor. The three communities chosen were Lodi, Porterville, and Yuba City/Live Oak.

Study Design

The study design is depicted in Figure 1 (see following page). All communities were given baseline measures and then the intervention was delivered, followed by post-intervention measures. This process was delivered in a staggered fashion to each of the communities. One of the goals was to test how long the intervention effects would last, which was possible because of the variable follow-up time of the final measurement (Master follow-up).

Sampling and Procedures

We evaluated the campaign by first conducting youth tobacco purchase surveys and then interviewing tobacco merchants. The sampling method and procedures for both are described below.

Youth purchase survey. All stores in each of the communities were visited for the purchase survey, which was the primary outcome measure. Stores were visited by one youth aged 16 or 17 years who was a smoker or who had experience purchasing tobacco products. Youth were instructed to dress as they normally would at school and no attempt was made to recruit you who looked older than their chronological age. Adults drove youth to the stores and waited in the car out of the sight of the clerk while the purchase attempt was made. Youth purchased the tobacco if the clerk agreed to sell it (i.e., a "consummated" purchase) in Lodi and Yuba City and employed an unconsummated protocol in Porterville because the District Attorney would not grant immunity. If clerks asked for ID, youth were instructed to show an ID if they had one. If clerks asked for age, youth were instructed to answer honestly.

Merchant Interview. Staff conducted face-to-face interviews with 10 - 16 merchants in each of the communities. We did not interview a census of merchants given that the interviewing is far more time consuming (approximately 5-10 minutes of in-store time versus less than 1 minute for purchases), and because the merchant variables were secondary evaluation indicators. Staff attempted to interview an English-speaking owner or manager, and made up to two store visits to interview the respondent. After the interview, our staff person checked to see if someone had posted one of our *Risk Perception* cash register stickers.

Intervention

The intervention is specifically designed to be a low-cost and easy-to-implement intervention that could be easily disseminated to other regions of California. The intervention period lasted three months and consisted of three components.

1. Youth Access Enforcement Activities. After the baseline measurements, the California Food and Drug Branch (FDB) conducted one round of stings in each of the communities. Generally, the FDB visited approximately 10 stores, which is approximately one third of the stores. In the

third community, the Yuba City area, we increased the level of enforcement by supplementing the FDB stings with two rounds of stings by local police.

2. Merchant Education Materials. We developed six postcards, a manager tip sheet for training clerks, cash register stickers, and pledge cards. Local LLA staff mailed merchants one of the six postcards each week. The goal was not to overload them with information, but to have it slowly unfold over a month and a half. Postcards were jumbo size (8.5 by 11 inches) and were chosen instead of pamphlets or letters because they were more visually striking and less likely to be tossed away. Also, merchants in the formative phase asked for something that was attention grabbing. The manager tip sheet was used by managers/owners to train clerks with suggestions, such as always check ID. The clerk pledge sheet asked clerks to sign a pledge that they would not sell to minors.

3. Mass Media. SCRDP and O'Rorke PR developed a press release on the baseline findings that was provided to each LLA so that it could be distributed to local media. Each local newspaper reported on the results of the purchase survey.

Measures

Youth purchase survey. The primary outcome was a dichotomous variable describing whether the store sold or did not sell. In the case of Porterville, the "sale" was an unconsummated sale.

Merchant interviews. Merchants were asked if they received any of our "Tobacco Stings are Happening" postcard mailings (yes/no). This was asked both pre- and post-intervention. Obviously they would not have received the mailing prior to the start of the intervention, but this would allow us to determine whether there was a tendency toward a "yea-saying" response. For instance, if at post-intervention 50% of merchants may report receiving the cards, this number would be inflated because a certain percent would have said "yes" to receiving any type of intervention.

For assessing the merchant risk variables, merchants were asked if they believed that kids had been sent to their store in the past year to check to see if your store would sell them tobacco products. We also asked them if a merchant in their community regularly sold to kids, we wanted them to estimate the chances he or she would have been caught. The number would range from 0% (no chance) to 100% (perfect chances). Interviewers also asked merchants to rate on a scale the level of enforcement activity in their community ranging from 1=Not at all active to 5=very active. Finally, we asked them if they know anyone who had been caught selling to minors in the past year.

Analyses

We conducted statistical tests to assess whether there was a significant post-intervention decline in the rate of illegal tobacco sales to minors. A power calculation revealed adequate power to detect a change in sales if all three communities were aggregated together. We display descriptive results for each wave of purchase surveys so that data from each community is shown. Because of the lower sample size and fact

that these are secondary outcome measures, we did not conduct any statistical tests on the merchant interview variables. They are only presented for descriptive purposes.

Results and Discussion

Merchant interviews. The intervention check variables showed that the majority of merchants recalled receiving the intervention. At least 80% of merchants recalled receiving the postcards suggesting that they had high recall. This is notable because in many stores with different owners and managers that we may not have been interviewing the person to have actually received the cards. Surprisingly, in Porterville 40% of merchants mistakenly reported that they had received our postcards. Thus, the 90.9% number at post-intervention should be viewed with caution. Also, the majority of merchants placed our cash register stickers at the point of purchase. In fact, 100% of stores visited in Lodi displayed them.

Overall, the intervention appeared to have led to increased perceived risk of detection. In each community there was an increase in the percentage of merchants believing the youth had been sent to that store. The increase was largest in Yuba City where there were three sting operations (1 FDB, 2 local police). Surprisingly, the perceived chances of getting caught decreased in two communities and increased in Yuba City. We are uncertain of why this occurred, but the interviewer said that many merchants found this question difficult to understand and so this variable should be interpreted with caution. The perceived level of enforcement activity remained flat in the first two communities and appeared to rise in the third. Finally, merchants reported knowing more merchants who had been stung in two of the communities (Porterville and Yuba City), but this dropped in Lodi.

In summary, the merchant variables suggest that most merchants recalled receiving the intervention suggesting that it succeeded in drawing their attention. The stickers appeared to be useful because most merchants had posted them on their cash registers. The level of perceived risk did not appear to rise consistently in all of the communities. Having looked at the data for the first two communities, our group decided that the intervention was not potent enough and we needed to supplement the relatively low level of enforcement with greater activity in the third community. It seems clear that this increased level of activity may have affected the merchant risk perceptions.

	City		
Variable	Porterville	Lodi	Yuba City
Intervention Check			
Reported Receiving Mailings			
Pre-Intervention	40.0%	0%	6.3%

Post-Intervention	90.9%	90%	80%
Posted Cash Register Stickers			
Pre-Intervention	0%	0%	0%
Post-Intervention	55.5%	100%	70%
Merchant Risk Variables			
Believes underage decoys sent past year			
Pre-Intervention	71.4%	73.3%	42.9%
Post-Intervention	90.0%	80%	70%
Perceived chance of getting caught if sold (1-100)			
Pre-Intervention	80.5%	62.9%	52%
Post-Intervention	64.8%	53%	63.5%
Level of law enforcement activity (1-5)			
Pre-Intervention	4.0	2.7	2.8
Post-Intervention	3.8	2.9	3.6
Knows another merchant who was caught			
Pre-Intervention	30.0%	37.5%	20%
Post-Intervention	45.5%	20%	80%

Youth purchase survey. The results of the purchase survey are presented in the table below. The pre-intervention sales rate was 22.6% and the post-intervention rate was 29.2%. To assess whether this change was statistically significant, we conducted a McNemars test which takes into account that the same stores were visited at both time points. The test showed that there was not a significant change in the rate of illegal sales to minors post-intervention (2-tailed p=.17). Thus, the intervention failed to decrease the rate of illegal sales of tobacco to minors. Figure 1 shows the actual sales data for each of the three communities at all time points. One unusual trend in the data is that with the exception of Yuba City, the secular trend appeared to show that the rate of tobacco sales to minors increased over the study period. This is interesting in light of the fact that the statewide tobacco purchase, which is based on a much larger and more representative sample of stores, also showed an increase. What is puzzling is that there was not a post-intervention drop in illegal sales in Yuba City. There was a large drop at the final follow-up, which may have been caused by a well-publicized sting of alcohol merchants.

	Post-intervention	
Pre-intervention		Row %

	Did not sell	Sold	
Did not sell	69	13	77.%
Sold	6	18	22.6%
Column %	70.8%	29.2%	n=106

Strengths and Limitations

A major strength of this study was the careful attention to developing the intervention. The intervention was based on a sound theoretical background and the materials were rigorously pilot tested prior to launching the intervention in the community. The evaluation employed both behavioral (purchase survey) and self-reported interview data that helped better understand the impact of the intervention. Having multiple intervention communities added to the generalizability of the findings.

Limitations include having a small number of merchants sampled for the interviews. It would have been better to have about double the number of interviews conducted to provide more stable estimates of the process variables. The problem with one of the risk variables suggested that future studies should consider more extensive pilot testing of the interview questions. The purchases were conducted only once at each time period and visiting each stores 2-3 times would have increased the stability of the findings.

Conclusions and Recommendations

The results of this study suggest that the low level of enforcement in two of the cities was inadequate to deter merchants from selling to minors and did not raise merchants' perceived risk of detection. With an average of about .3 compliance checks per store (1/3 were visited), the level of enforcement was probably too low. In fact, in one of the communities none of the 10 stores visited sold, and merchants may have been totally unaware that the FDB had been in the area because nobody was cited. They still received the cards, but may have felt that the cards were "bluffing" because there was no evidence of actual enforcement.

When the level of enforcement was increased in the third community, there were notable increases in perceived risk, but not reduced sales. The overall level of enforcement in the third community (71 visits to 46 stores or 1.5 visits per store) may have contributed to these altered perceptions. Although the study did not reduce illegal tobacco sales as hypothesized, the risk perception approach holds promise and should be employed with higher levels of enforcement to see whether it can successfully reduce tobacco sales to minors as well as it works in reducing drunk driving.

Figure 1. Tobacco Retailer Risk Perception Project

Illegal Sales Rates by City

PORTERVILLE	**Pre-test** 9/27/97 7 of 35 **20.0%**	F D B	Intervention 1	**Post-test** 1/31/98 10 of 30 **33.3%**												**Follow-up** 4/17/99 15 of 36 **41.7%**
LODI	**Baseline** 11/01/97 4 of 46 **8.7%**		Comparison 1	**Pre-test** 1/24/98 11 of 42 **26.2%**	F D B	Intervention 2	**Post-test** 6/20/98 12 of 42 **28.6%**									**Follow-up** 3/26/99 8 of 39 **32.0%**
YUBA CITY AND LIVE OAK	**Baseline** 10/19/97 6 of 51 **11.8%**					Comparison 2	**Pre-test** 5/16/98 10 of 46 **21.7%**	F D B	Sting #1* 7/28/98 1 of 41 **2%** Sting #2** 8/10/98 5 of 23 **22%**		**Post-test** 9/26/98 9 of 46 **19.6%**					**Follow-up** 4/10/99 2 of 47 **4.3%**
	W1			W2			W3				W4					W5
	9/27/97- 11/1/97			1/24/98- 1/31/98			5/16/98- 6/29/98				9/26/98					3/26/99- 4/17/99

* Sting #1 was conducted by Yuba City police only on Yuba City stores. The buyers were two police cadets, both male, age 17. (Of the 41 stores, 10 were new stores added and 31 stores were ones visited earlier by us.)

** Sting #2 was conducted by Yuba City police with 2 female cadets, ages 16 and 17.

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