

Examining How Poverty Status Moderates the Association between Utilizing In-Store Tobacco Promotional Offers and Cessation Behavior

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1. Purpose

This study examines the role of poverty status in moderating the association between using instore tobacco promotional offers and quit attempts among smokers. Data came from a modified Behavioral Risk Factor Surveillance System (BRFSS) survey of U.S. adults participating in the Centers for Disease Control and Prevention's (CDC's) Communities Putting Prevention to Work (CPPW) initiative. CPPW is a locally-driven initiative supporting 50 communities to tackle obesity and tobacco use. More than 50 million people—or one in six Americans—live in a city, town, county, or tribal community that benefits from this initiative. Findings from this study help CPPW communities to reach their goal of reducing tobacco use by providing information about smokers' cessation behavior in relation to their use of tobacco promotional offers and the role poverty might play in moderating this relationship.

2. Background

- Cigarette smoking is one of the most preventable causes of adult morbidity and mortality in the United States (Danaei et al., 2009).
- Despite the continued decline in cigarette smoking prevalence among adults in the United States, large socioeconomic disparities in cigarette smoking persist; U.S. adults who live below the poverty level continue to have higher smoking prevalence (28.9%) than adults living at or above the poverty level (18.3%) (CDC, 2011), and several studies have shown that adult smokers who live below the poverty level are less likely to successfully quit smoking compared with those at or above the poverty level (Barbeau et al., 2000; Fernandez et al., 2006; Flint & Novotny, 1997).
- Evidence-based pricing strategies to make tobacco products less appealing can be an effective means for reducing the number of adult smokers and thus tobacco-related morbidity and mortality (Hyland et al., 2006; Ross et al., 2011).
- Some evidence suggests that lower income smokers might be more responsive to price changes (Licht et al., 2011) and that cigarette price increases are more effective in reducing smoking among adults with lower income than those with higher income (CDC, 1998; McGoldrick et al., 2010; Thomas et al., 2008); however, recent research also highlights the potential financial burden that higher cigarette prices may have on lower income smokers (Farrelly et al., in press).
- Some literature suggests that retail tobacco promotional offers (such as "dollar-off" and "twopacks-for-the-price-of-one") are reaching most tobacco industry-targeted groups, including populations that live below the poverty level. Such promotional offers might be particularly appealing to lower income smokers and thus might hinder cessation among this group of smokers (Laws et al., 2002; Pierce et al., 2005; White et al., 2006).

3. Data and Methods

Data Source

- This study utilized data from 2010 CPPW BRFSS. It is a modified survey from the state-level BRFSS, which is a cross-sectional telephone survey of civilian, noninstitutionalized adults, providing annual state-level prevalence estimates of health risk behaviors, preventive health practices, and health care access. Similar to BRFSS, CPPW BRFSS instrument has three components: (1) a core component that includes standard questions asked by all states; (2) optional modules, including sets of questions on specific health risk topics that are selected by states based on their subject of interest; and (3) and state-optional added questions.
- Through the CPPW program, the state-level BRFSS data collection methodology was modified to collect community-representative data in 50 individual communities participating in CPPW initiative. From September 2010 through February 2011, CPPW BRFSS survey was fielded and data were collected in 49 of the 50 CPPW communities (N = 80,164). Of CPPW communities, 37 (N = 62, 187), collected data for the survey module question that asks cigarette smokers, "About" how often do you take advantage of promotional offers such as 'dollar off' or 'two-packs-for-theprice-of-one'?". From the data of those 37 communities, the study analyses were restricted to current smokers with complete poverty status information (N = 8,047).
- Data for the state-level cigarette taxes were drawn from *The Tax Burden on Tobacco* (Orzechowski & Walker, 2011), and state tax rates for purchasing one pack of cigarettes were added to respondents' data based on respondents' state FIPS code and the month of completed CPPW BRFSS interview.

Study Outcome

We identified current smokers as adults who smoked 100 cigarettes in their lifetime and now smoke every day or some days. The outcome indicator for smokers who made a quite attempt was then identified as smokers who answered "Yes" to the survey question "During the past 12 months, have you stopped smoking for one day or longer because you were trying to quit smoking?"

Key Measures

A dichotomous indicator coded to identify those who responded "Every time you see one" to the question "About how often do you take advantage of promotional offers such as 'dollar off', or 'two-packs-for-the-price-of-one'?". The reference category combined those who responded "Often", "Sometimes", or "Never".

3. Data and Methods (continued)

- Poverty level was determined based on a calculated measure using information from reported household income, number of household members living in the house, and the 2010 poverty guidelines provided by the Centers for Medicare & Medicaid Services. This calculation yields each adult's income as a percentage of the guideline-defined poverty level, given the size of their household. Adults were defined as living below the poverty level if this measure was less than 100%.
- Other covariates used in the analysis included a dichotomous indicator for everyday smokers, personal demographic variables (gender, age, and race/ethnicity), and a continuous variable for state-level cigarette taxes.

Statistical Analysis

- We examined the association between smokers' use of tobacco promotional offers every time they saw one and their quit attempts by conducting chi-square tests for independence.
- To further assess this association, we conducted weighted logistic regression analyses, controlling for personal demographic variables, cigarette taxes, and frequency of smoking (everyday smokers).
- Analyses were stratified by poverty level and were performed using Stata (12.1) (StataCorp, 2011) complex survey design estimators that account for sample weights and stratification to provide representative results for adults in the CPPW communities. We stratified the logistic regression models by poverty level using Stata "subpop" option, which allows for excluded cases to still be included in the calculation of the standard errors for the regression coefficients.

4. Results

- Our analyses were limited to smokers with poverty status information from 37 CPPW communities that asked smokers about the frequency of using tobacco promotional offers (N = 8,047). Among smokers who answered the question about frequency of using tobacco promotional offers (N = 7,152), 58.2% take advantage of in-store tobacco promotional offers, and 41.6% of those who use tobacco offers do so every time they see one.
- Among current smokers who have poverty status information, 32.3% (N = 1,738) live below the poverty level, and 67.7% (N = 6,309) live at or above the poverty level. Weighted percentages/ averages and unweighted sample sizes of demographic characteristics, smoking behavior variables, having a quit attempt, and study predictors are presented in **Table 1**, stratified by smokers' poverty status.
- More than one-fourth (26.4%) of smokers who live below the poverty level take advantage of in-store tobacco promotional offers every time they see one, while 21.7% do so among smokers who live at or above the poverty level (**Figures 1 and 2**).
- Among smokers who live below the poverty level, taking advantage of in-store tobacco promotional offers every time they see one is significantly associated with smokers' quit attempts (p < 0.01) (**Table 2**).
- Smokers living below the poverty level who use in-store tobacco promotional offers every time they see one are less likely to make a quit attempt (OR = 0.49, p < 0.01) (**Table 3**).

Table 1. Weighted Estimates for Current Smokers (N = 8,047), by Poverty Level (2010 CPPW BRFSS)

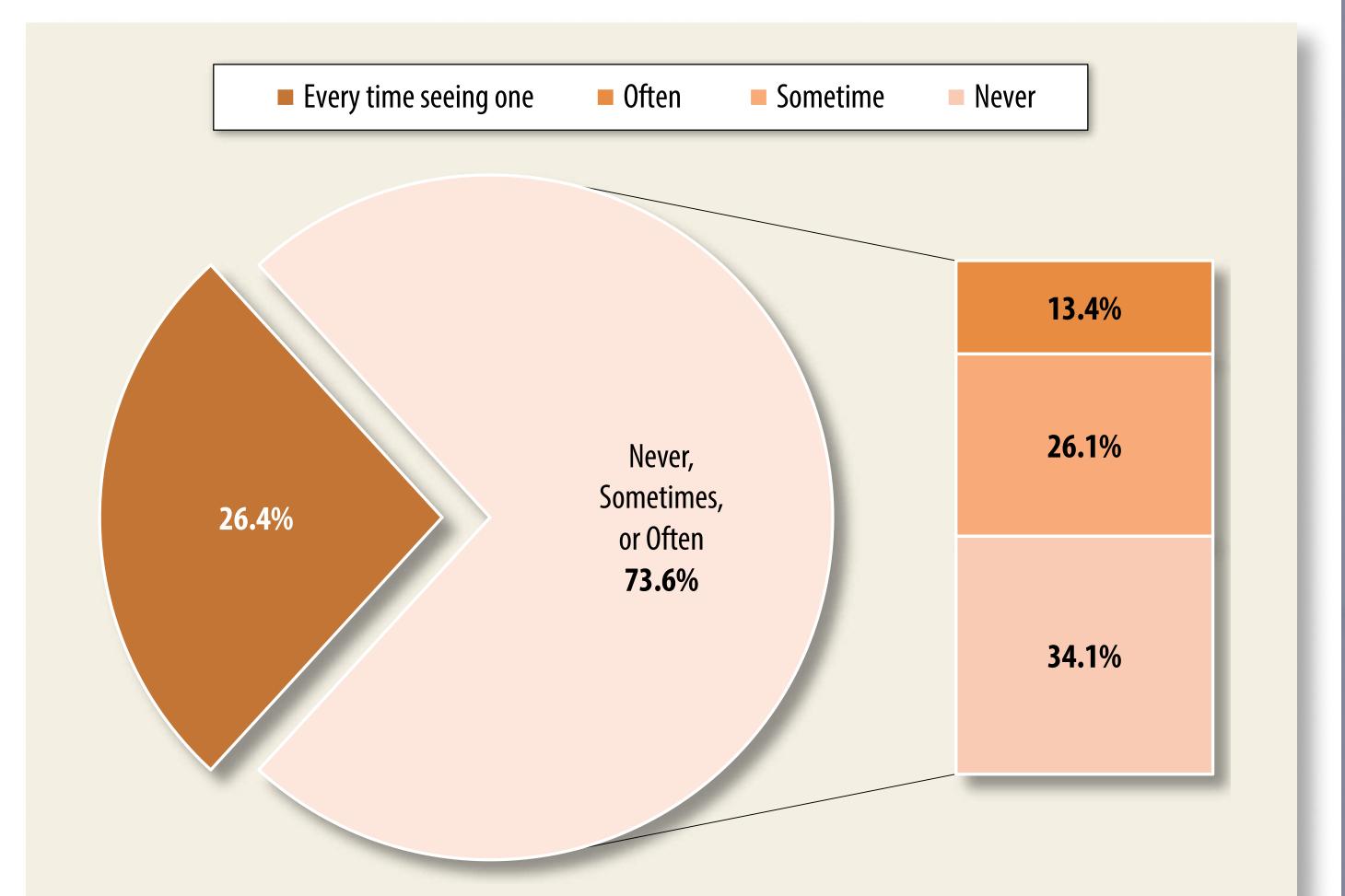
	Variable	Current smokers living below poverty level (N = 1,738)		Current smokers living at or above poverty level (N = 6,309)	
		Weighted %	Unweighted <i>n</i>	Weighted %	Unweighted <i>n</i>
Gender	Female	47.3%	1,126	44.6%	3,660
	Male	52.7%	612	55.4%	2,649
Age	18–34	37.1%	369	30.3%	641
	35–44	21.3%	278	19.9%	885
	45–54	28.4%	511	25.4%	1,684
	55–64	7.7%	353	14.8%	1,758
	≥65	5.1%	222	9.1%	1,314
	Missing	0.3%	5	0.5%	27
Race/ethnicity	White (NH) ^a	33.9%	899	61.0%	4,582
	African American (NH) ^a	28.9%	449	18.4%	926
	Hispanic	27.8%	228	14.2%	393
	Other (NH) ^{a,b}	7.7%	145	5.1%	340
	Missing	1.8%	17	1.3%	68
Current smoking status	Someday smoker	37.0%	523	32.2%	1,794
	Everyday smoker	63.0%	1,215	67.8%	4,515
Frequency of taking advantage of in-store tobacco promotions	Never, sometimes, or often	47.0%	1,063	57.6%	4,549
	Every time seeing one	16.8%	418	15.9%	1,122
	Missing	36.2%	257	26.5%	638
Quit attempts in past 12 months	Did not make a quit attempt	38.5%	655	39.7%	2,855
	Made a quit attempt	61.3%	1,077	60.2%	3,432
	Missing	0.3%	6	0.1%	22
State excise cigarette tax per pack (average)		\$1.40	1,738	\$1.70	6,309

^a Not Hispanic.

^b Asian, Native Hawaiian or Other Pacific Islander, American Indian or Alaska Native, and multiple race (non-Hispanic).

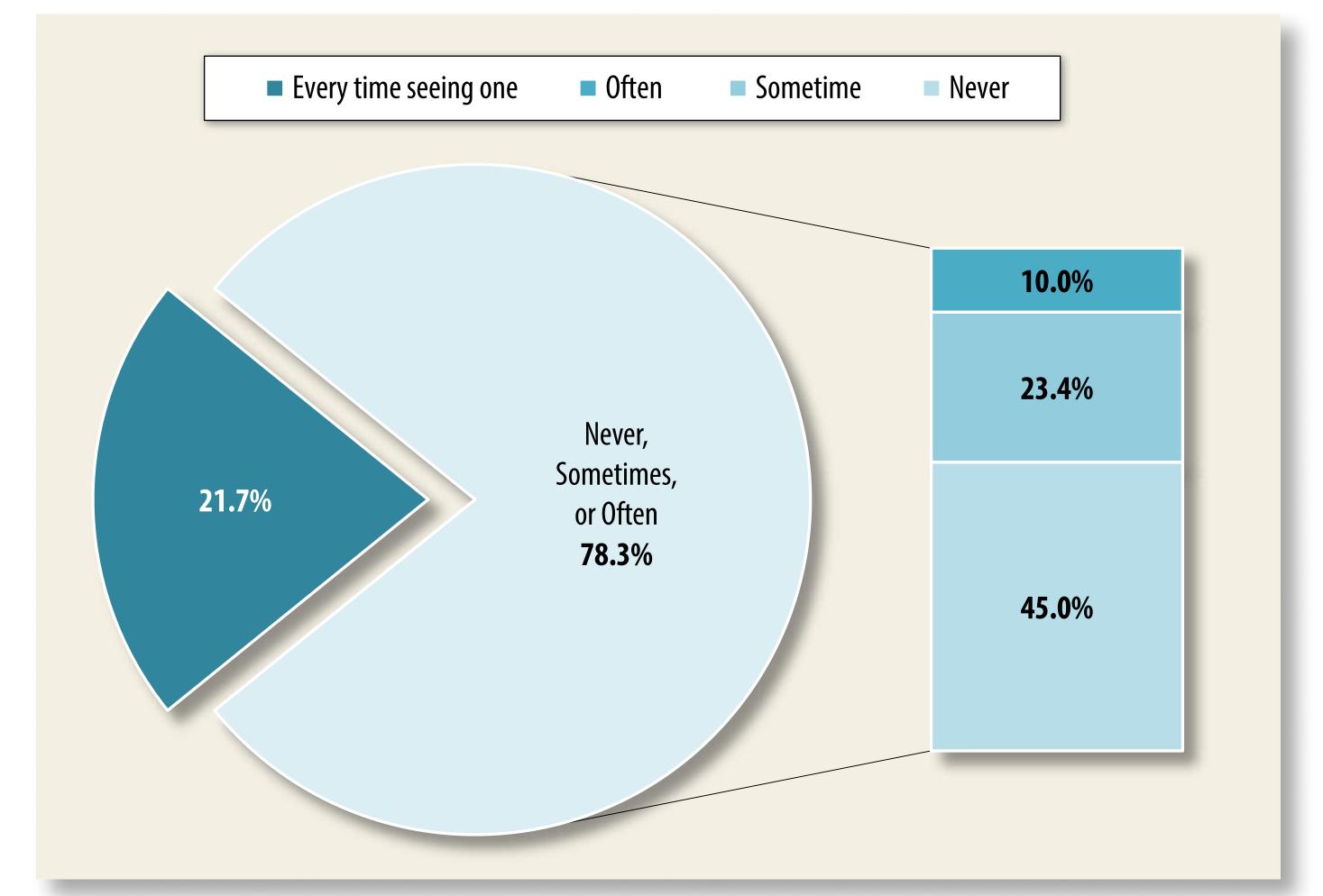
4. Results (continued)

Figure 1. Percentage of Current Smokers Living below Poverty Level Who Take Advantage of In-store Tobacco Promotional Offers (2010, CPPW BRFSS)



Note: excluding missing responses to the question about frequency of using tobacco promotional offers

Figure 2. Percentage of Current Smokers Living At or Above Poverty Level Who Take Advantage of In-Store Tobacco Promotional Offers (2010 CPPW BRFSS)



Note: excluding missing responses to the question about frequency of using tobacco promotional offers

Table 2. Logistic Regression Models Examining Association of Taking Advantage of In-Store Tobacco Promotional Offer with Smokers' Quit Attempts, by Poverty Level (2010 CPPW BRFSS)

	Quit attempt status in past 12 months among current smokers living below poverty level			Quit attempt status in past 12 months among current smokers living at or above poverty level		
	Weighted %		<i>P</i> -value of	Weighted %		<i>P</i> -value of
Frequency of taking advantage of in-store tobacco promotions	Did not make a quit attempt	Made a quit attempt	Chi- Square Test	Did not make a quit attempt	Made a quit attempt	Chi- Square Test
Never, sometimes, or often	60.2% 377	79.4% 681	0.002**	77.7% 2,011	78.7% 2,520	0.754
Every time seeing one	39.8% 171	20.6% 247		22.3% 559	21.3% 561	

**Statistically significant association (p < 0.01).

4. Results (continued)

Table 3. Logistic Regression Models Examining Association of Taking Advantage of In-Store Tobacco Promotional Offer with Smokers' Quit Attempts, by Poverty Level (2010 CPPW BRFSS)

Variable		attempted to below po	nokers who quit and living verty level omplete data)	Current smokers who attempted to quit and living at or above poverty level (5,569 with complete data)	
		Odds Ratio (OR)	Confidence Interval (CI)	Odds Ratio (OR)	Confidence Interval (CI)
Condox	Female	Reference		Reference	
Gender	Male	0.41**	(0.23–0.72)	0.97	(0.67–1.40)
Age	18–34	Reference		Reference	
	35–44	0.33**	(0.15–0.74)	0.51*	(0.29–0.89)
	45–54	0.50	(0.23–1.08)	0.77	(0.46–1.27)
	55–64	0.58	(0.28–1.21)	0.49*	(0.27–0.89)
	≥65	0.50	(0.19–1.31)	0.47**	(0.27–0.83)
Race/ethnicity	White (NH) ^a	Reference		Reference	
	African American (NH) ^a	1.87	(0.96–3.64)	1.80*	(1.10–2.95)
	Hispanic	0.78	(0.35–1.74)	0.81	(0.37–1.76)
	Other (NH) ^{a,b}	1.34	(0.55–3.26)	1.07	(0.50–2.28)
Current smoking status	Someday smoker	Reference		Reference	
	Everyday smoker	0.23**	(0.12–0.46)	0.31**	(0.21–0.47)
Frequency of taking advantage of in-store tobacco promotions	Never, sometimes, or often	Reference		Reference	
	Every time seeing one	0.49*	(0.28–0.86)	1.10	(0.72–1.67)
State excise cigarette tax per pack (continuous)		1.07	(0.81–1.43)	1.10	(0.94–1.29)

^b Asian, Native Hawaiian or Other Pacific Islander, American Indian or Alaska Native, and multiple race (non-Hispanic). ^a Not Hispanic. *Statistically significant (p < 0.05). **Statistically significant association (p < 0.01).

5. Discussion

- For CPPW communities that were included in this study, frequent use of tobacco promotional offers is associated with a decreased likelihood of making a quit attempt among smokers living below the poverty level, but not among smokers living at or above the poverty level.
- U.S. adults who live below the poverty level continue to have higher smoking prevalence than those living at or above the poverty level (CDC, 2011). In addition, smokers living below the poverty level are more likely to engage in one or more behaviors to purchase lower priced cigarettes than those of higher socioeconomic status (Licht et al., 2011).
- It is possible that promotional offers that effectively lower the price smokers pay for cigarettes would be particularly appealing to lower income smokers and may inhibit cessation efforts among this group (Laws et al., 2002; Pierce et al., 2005).
- Our study adds to the existing literature by providing evidence that among current smokers who live below the poverty level, frequent use of tobacco promotions is associated with decreased likelihood of their attempts to guit smoking.
- For communities included in this study, our findings suggest that reducing access to in-store price promotions may contribute to maintaining the price of tobacco products and encouraging quit attempts among low-income populations.
- Our study has some limitations; the CPPW BRFSS sample design misses interviewing persons who live in households without a telephone or in cell-phone-only households. This undercoverage for adults in households without landline telephones can cause bias in the BRFSS data estimates (Thornberry & Massey, 1988). Bias may also be related to the fact that BRFSS data are self-reported by the respondents, which makes reported information subject to underreporting especially of health risk behaviors due to difficulty recalling events, or misunderstanding or misinterpretation of questions (AHRQ, 2012).

References available on request.

More Information

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