Coupons and state tobacco policy context as predictors of tobacco use among those reporting e-cigarette use in the U.S.: Findings from the Population Assessment of Tobacco and Health (PATH) Study waves 5–6 (2018–2021)

J.H. Kingsbury [a,b,*], H.L. Kimmel [a], M.J. Parks [a,b], M.R. Creamer [a], C. Blanco [a], W.M. Compton [a]

[a] National Institute on Drug Abuse, 6001 Executive Blvd, N. Bethesda, MD 20852, USA
[b] Kelly Government Solutions, 8380 Colesville Rd #500, Silver Spring, MD 20910, USA

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ABSTRACT

Background: Receipt of cigarette and e-cigarette coupons predicts initiation and progression of use and hinders cessation. Less is known about how coupons operate in different tobacco regulatory environments. The current study utilized longitudinal data from the Population Assessment of Tobacco and Health (PATH) Study to address this research gap.

Methods: Adults who reported past 30-day (P30D) e-cigarette use at Wave 5 (2018–2019) were included (*N* = 3632). The primary outcome was Wave 6 (2021) P30D any tobacco use. Wave 5 predictors were receipt of e-cigarette coupons, state e-cigarette tax, state tobacco policy context, flavored e-cigarette use, income, and education. Covariates were age, sex, race, state coupon policy, and Wave 5 use of tobacco other than e-cigarettes. Weighted logistic regression models examined effects overall and in samples stratified by state e-cigarette tax and tobacco policy context.

Results: Controlling for covariates, Wave 5 coupon receipt (AOR = 1.57; 95 % CI: 1.07, 2.31) and preference for flavored e-cigarettes (AOR = 1.70; 1.37, 2.10) were positively associated with Wave 6 tobacco use. Stronger state tobacco policy context was negatively associated with tobacco use (AOR = 0.69; 0.55, 0.88). Coupon receipt predicted tobacco use in states with an e-cigarette tax (AOR = 2.39; 1.22, 4.68) and with stronger tobacco policy contexts (AOR = 1.80; 1.07, 3.02), but not in states without an e-cigarette tax (AOR = 1.29; 0.83, 1.99) or with weaker tobacco policy contexts (AOR = 1.33; 0.78, 2.24).

Conclusions: Policies that restrict price-discounting could help discourage e-cigarette use, reinforce e-cigarette taxes and other tobacco control policies, and promote cessation of all tobacco among those reporting e-cigarette use.

1. Introduction

Cigarette use is declining in the U.S. and many adults who used to smoke cigarettes have switched to e-cigarettes (Brouwer et al., 2024; Sanford et al., 2024). While there is support among many public health officials for the notion that those who smoke would benefit from completely transitioning to e-cigarettes (Centers for Disease Control and Prevention, 2024b), quitting *all* tobacco product use is optimal for health. Despite the large body of research examining factors that predict cigarette cessation and transitioning to e-cigarettes, little is known about

predictors of e-cigarette cessation among adults who use e-cigarettes, as much of the work in this area has targeted youth and young adults (Palmer et al., 2022). Researchers have cited an urgent need for additional work in this area to better understand the conditions in which adults who use e-cigarettes stop using these products (Palmer et al., 2022).

Tobacco use initiation, progression, and cessation are influenced by a combination of both micro- and macro-level factors (Han and Son, 2022). While individual-level factors such as risk perceptions consistently predict tobacco use (Kim et al., 2022; Hyland et al., 2004),

altering the environment is among the most effective ways to change tobacco use behavior (Caraballo et al., 2019). Where people live and what they are exposed to can have a dramatic influence on tobacco use. State-level clean indoor air policies have become increasingly common and have led to reductions in use and exposure to secondhand smoke (Siegel et al., 2005; Mojtabai et al., 2019). Use of flavored tobacco, both menthol and other flavors, has become widespread (Odani et al., 2020) and preference for flavors is a commonly cited reason for e-cigarette use among adults trying to quit smoking cigarettes (Russell et al., 2018; Mok et al., 2022). However, flavored e-cigarettes are also associated with onset of tobacco use and continued vaping among youth (Goldenson et al., 2019; Leventhal et al., 2019); local- and state-level restrictions on the sale of flavored tobacco have correspondingly increased (Truth Initiative, 2024a). Perhaps the most successful tobacco control measure is increasing the price of tobacco via taxation (Chaloupka et al., 2011; Chaloupka et al., 2012). Recently, e-cigarette taxes have been proposed in several states in an attempt to curb e-cigarette use (Centers for Disease Control and Prevention, 2024a). In sum, by increasing the price of tobacco and restricting where people can smoke and where tobacco products are sold, public policies promote decreased tobacco initiation and increased cessation at the population level.

Conversely, exposure to tobacco marketing, including price discounting strategies such as direct mail coupons, is associated with socioeconomic and tobacco use status. Previous research using the Population Assessment of Tobacco and Health (PATH) Study found that receipt of coupons for cigarettes and e-cigarettes is more common among those reporting lower socioeconomic status and those with current use. To our knowledge, only one study has examined the effects of e-cigarette coupon receipt on e-cigarette use. This study found that e-cigarette coupon receipt prospectively predicted e-cigarette initiation, decreased cessation of e-cigarettes, and increased relapse (Duan et al., 2023). These results are similar to studies on cigarette coupon receipt, which have reported that coupon receipt prospectively predicts initiation of smoking, progression to established smoking among those reporting experimental use, and smoking relapse among those who report former use (Choi et al., 2018; Hamilton-Moseley et al., 2023). Collectively, these studies suggest that receipt of coupons for tobacco products are associated with subsequent use of these products.

However, while there is strong evidence that (1) coupon receipt increases tobacco use and (2) regulatory actions have the potential to reduce tobacco use, no studies have examined the association between coupon receipt and future tobacco use within different tobacco control contexts. Furthermore, research on how different regulatory environments promote (or inhibit) cessation has not focused on cessation of all tobacco products, including e-cigarettes. The current study utilized longitudinal data from the PATH Study to address these research gaps.

2. Methods

2.1. Sample

This study utilized data from the PATH Study, a nationally representative, longitudinal cohort study of tobacco use among U.S. adults and youth (Piesse et al., 2021). The PATH Study used a stratified address-based, area-probability sampling design and oversampled those who use tobacco, those aged 18 to 24 years, and African American individuals.

The current study utilized data from Waves 5 and 6 of the PATH Study. Data collection dates were December 2018 to November 2019 for Wave 5 and March 2021 to November 2021 for Wave 6. Adults (18+) who reported past 30-day e-cigarette use at Wave 5 and had complete data for all study variables were included in the current study ($N = 3632$). PATH Study data collection is conducted by Westat and these procedures were approved by Westat's Institutional Review Board in July 2021 (Project Number 8954). Adult participants completed written informed consent. Additional details on the PATH Study design and

methods are published elsewhere (Hyland et al., 2017). Details on interview procedures, questionnaires, sampling and weighting and information on accessing the data are available at https://doi.org/10.3886/Series606.

2.2. Measures

The primary outcome was *any tobacco use* at Wave 6. Tobacco use behaviors were assessed with the question, "In the past 30 days, have you used ___, even one or two times?" for the following products: cigarettes, e-cigarettes, traditional cigars, little cigars or cigarillos, filtered cigars, premium cigars, pipe, hookah, snus, and smokeless tobacco. Participants who responded "yes" to any of these questions were coded as a "yes" for *any tobacco use*. *Established e-cigarette use* was assessed by asking whether participants had ever used e-cigarettes fairly regularly. *Current established e-cigarette use* was determined by identifying those who newly reported using e-cigarettes "fairly regularly" (i.e., responded "no" to fairly regular use in all previous waves) and reported current past 30-day use.

The primary predictor was *receipt of e-cigarette coupons* in Wave 5. Participants who reported receiving a coupon in the past 12 months for "e-cigarettes or other electronic nicotine products (including e-liquid)" were coded as a "yes." *Preference for flavored e-cigarettes* was assessed with the item, "E-liquid comes in flavors I like" (yes/no). State policy data were obtained from websites of public health, nonprofit organizations that focus on commercial tobacco prevention and control (i.e., Truth Initiative (Truth Initiative, 2024a), Campaign for Tobacco-Free Kids (Campaign for Tobacco-Free Kids, 2024a; Campaign for Tobacco-Free Kids, 2024b), American Nonsmokers' Rights Foundation (American Nonsmokers' Rights Foundation, 2024)). Participants living in a state that had implemented an e-cigarette tax prior to Wave 6 data collection were coded as a "yes" for *state e-cigarette tax* (Campaign for Tobacco-Free Kids, 2024b). Participants whose home states had implemented comprehensive clean indoor air laws (American Nonsmokers' Rights Foundation, 2024), flavored tobacco sales restrictions (Truth Initiative, 2024a), and/or menthol tobacco sales restrictions (Campaign for Tobacco-Free Kids, 2024a) prior to Wave 6 data collection were coded as "stronger" policy contexts for the *state tobacco policy context* variable and those whose home states had not implemented any of these policies prior to Wave 6 were coded as "weaker" policy contexts. Annual household income (<$50,000; $50,000–$99,999; $100,000+) and education (less than high school diploma; high school diploma or General Educational Development diploma (GED); some college or Associate degree; Bachelor's degree or more) were also included as predictor variables. Covariates were age, sex, race (White; Black; Other race, including multi-racial), use of any tobacco other than e-cigarettes in the past 30-days at Wave 5 (yes/no), and state coupon policy (yes/no). State tobacco coupon policy was included as a covariate because three states (New York, New Jersey, and Rhode Island) had implemented policies prohibiting the redemption of tobacco coupons prior to Wave 6 (Truth Initiative, 2024b).

2.3. Statistical analysis

Weighted logistic regression models were used to examine the effects of coupon receipt (plus other predictors) on any tobacco use. Effects were first estimated in the overall sample, and then stratified models were run to examine associations by state e-cigarette tax status and state tobacco policy context. Of note, state tobacco coupon policy was not included as a covariate in models stratified by state tobacco policy context because there were no respondents who lived in states with a weaker tobacco policy context and a tobacco coupon policy.

Follow-up analyses examined the effect of e-cigarette coupon receipt on progression from past 30-day use at Wave 5 to current established e-cigarette use at Wave 6. For these analyses, the sample was limited to those reporting that they had never used e-cigarettes fairly regularly but

had used in the past 30 days at Wave 5. The original logistic regression model was employed with current established e-cigarette use at Wave 6 as the outcome.

Due to the COVID-19 pandemic, Wave 6 data were collected via two modes: in-person and telephone. In-person was prioritized over telephone data collection where permitted by local jurisdictions and participant comfort. Sensitivity analyses were conducted to determine if study results were different when accounting for mode. The mode effect variable did not alter study results and was left out of final models.

Analyses were conducted in 2023 using the default mode for SPSS Complex Samples v25. The current study analyzed the adult restricted use files (National Addiction and HIV Data Archive Program, 2024) and state identifier restricted use files, and used the Wave 6 all-waves longitudinal weights for the W4 cohort.

3. Results

Table 1 presents weighted characteristics of people who used e-cigarettes in the past 30 days at Wave 5 overall and by e-cigarette coupon receipt status. Those who used e-cigarettes at Wave 5 were 55.5 % male, 77.7 % White, and had a mean age of 35.6 at Wave 6. In Wave 5, 9.7 %

received an e-cigarette coupon. A majority preferred flavored e-cigarettes at Wave 5 (72.4 %) and lived in states with stronger tobacco policy contexts (53.8 %) and no e-cigarette tax (62.4 %). At Wave 5, 67.2 % used tobacco other than e-cigarettes. At Wave 6, 73.6 % used any tobacco.

As shown in Table 2, those who received an e-cigarette coupon (AOR = 1.57; 95 % CI: 1.07, 2.31) and preference for flavored e-cigarettes at Wave 5 (AOR = 1.70; 95 % CI: 1.37, 2.10) had higher odds of tobacco use at Wave 6, while living in stronger tobacco policy contexts at Wave 5 was negatively associated with Wave 6 tobacco use (AOR = 0.69; 95 % CI: 0.55, 0.88). Wave 6 tobacco use was more common among those with lower levels of education compared to a Bachelor's degree or higher (<high school diploma: AOR = 1.87; 95 % CI: 1.21, 2.89; high school diploma or GED: AOR = 1.56; 95 % CI: 1.15, 2.10).

Table 3 shows models stratified by those living in states with and without an e-cigarette tax. Estimates were similar between states with and without e-cigarette taxes, with two notable exceptions: the odds of any tobacco use at Wave 6 were higher for those who received an e-cigarette coupon at Wave 5, but only among those living in states with an e-cigarette tax (AOR = 2.39; 95 % CI: 1.22, 4.68; no e-cigarette tax: AOR = 1.29; 95 % CI: 0.83, 1.99). There was no effect of state tobacco

Table 1

Weighted characteristics by e-cigarette coupon receipt for PATH Study adults, Waves 5 (2018–2019) and 6 (2021), United States.

Characteristics	Overall		Coupon receipt		No coupon receipt	
	N	Weighted % (95 % CI)	n	Weighted % (95 % CI)	n	Weighted % (95 % CI)
Wave 6 Age	3632	*35.6 (35.0, 36.3)	343	*37.4 (35.7, 39.1)	3289	*35.4 (34.7, 36.2)
Wave 6 Sex						
Male	1874	55.5 (53.5, 57.4)	165	51.0 (44.5, 57.5)	1709	56.0 (53.9, 58.0)
Female	1758	44.5 (42.6, 46.5)	178	49.0 (42.5, 55.5)	1580	44.0 (42.0, 46.1)
Wave 6 Race						
White	2719	77.7 (75.1, 80.1)	276	83.0 (78.5, 86.6)	2443	77.1 (74.4, 79.7)
Black	450	12.1 (10.2, 14.2)	34	9.0 (6.1, 12.9)	416	12.4 (10.5, 14.7)
Some other race	463	10.2 (8.9, 11.7)	33	8.1 (5.5, 11.7)	430	10.5 (9.1, 11.9)
Wave 5 Annual household income						
<$50,000	2182	58.6 (55.9, 61.3)	205	59.1 (52.8, 65.0)	1977	58.6 (55.7, 61.4)
$50,000–99,999	820	24.3 (22.5, 26.2)	73	21.7 (17.5, 26.6)	747	24.6 (22.7, 26.6)
$100,000+	630	17.1 (15.1, 19.2)	65	19.2 (14.2, 25.5)	565	16.8 (14.9, 19.0)
Wave 5 Education						
< High school education	356	9.3 (7.9, 10.9)	31	8.1 (5.2, 12.5)	325	9.4 (8.0, 11.0)
High school diploma or GED	1204	33.3 (31.4, 35.3)	92	26.8 (21.7, 32.7)	1112	34.0 (31.9, 36.2)
Some college or associate	1543	41.3 (39.4, 43.2)	168	47.7 (41.6, 53.8)	1375	40.6 (38.6, 42.6)
Bachelor's degree +	529	16.1 (14.4, 17.9)	52	17.4 (12.9, 23.0)	477	16.0 (14.2, 17.9)
State tobacco coupon policy						
Yes	215	6.9 (4.8, 9.8)	18	4.9 (3.0, 8.0)	197	7.1 (4.9, 10.2)
No	3417	93.1 (90.2, 95.2)	325	95.1 (92.0, 97.0)	3092	92.9 (89.8, 95.1)
Wave 5 Preference for flavored e-cigarettes						
Yes	2647	72.4 (70.2, 74.5)	280	80.3 (74.7, 85.0)	2367	71.6 (69.2, 73.8)
No	985	27.6 (25.5, 29.8)	63	19.7 (15.0, 25.3)	922	28.4 (26.2, 30.8)
Wave 5 State tobacco policy context						
Stronger	2016	53.8 (49.2, 58.3)	192	51.7 (43.7, 59.5)	1824	54.0 (49.5, 58.5)
Weaker	1616	46.2 (41.7, 50.8)	151	48.3 (40.5, 56.3)	1465	46.0 (41.5, 50.5)
Wave 5 State e-cigarette tax						
Yes	1346	37.6 (31.9, 43.7)	120	34.7 (27.2, 42.9)	1226	37.9 (32.1, 44.1)
No	2286	62.4 (56.3, 68.1)	223	65.3 (57.1, 72.8)	2063	62.1 (55.9, 67.9)
Wave 5 Tob. use other than e-cigarettes						
Yes	2332	67.2 (65.0, 69.3)	220	67.9 (62.5, 72.8)	2112	67.1 (64.8, 69.3)
No	1300	32.8 (30.7, 35.0)	123	32.1 (27.2, 37.5)	1177	32.9 (30.7, 35.2)
Wave 6 Any tobacco use						
Yes	2581	73.6 (71.4, 75.6)	277	81.2 (75.7, 85.6)	2304	72.7 (70.3, 75.0)
No	1051	26.4 (24.4, 28.6)	66	18.8 (14.4, 24.3)	985	27.3 (25.0, 29.7)
Wave 5 E-cigarette coupon receipt						
Yes	343	9.7 (8.7, 10.8)	–	–	–	–
No	3289	90.3 (89.2, 91.3)	–	–	–	–

NOTE: *Indicates mean. GED = General Educational Development diploma. Tob. = Tobacco. Ns are unweighted. Wave 5 Preference for flavored e-cigarettes was assessed with the item, "E-liquid comes in flavors I like." Participants whose home states had implemented at least one of comprehensive clean indoor air laws, flavored tobacco sales restrictions, or menthol tobacco sales restrictions prior to Wave 6 were coded as "stronger" policy contexts for the Wave 5 state tobacco policy context variable and those whose home states had not implemented any of these policies prior to Wave 6 were coded as "weaker" policy contexts. Participants living in a state that had implemented an e-cigarette tax prior to Wave 6 were coded as a "yes" for state e-cigarette tax. Wave 6 any tobacco use represents past 30-day use of one or more of cigarettes, e-cigarettes, traditional cigars, little cigars or cigarillos, filtered cigars, premium cigars, pipe, hookah, snus, and smokeless tobacco. Wave 5 e-cigarette coupon receipt was assessed by asking whether respondents had received a coupon in the past 12 months for "e-cigarettes or other electronic nicotine products (including e-liquid)."

Table 2

Weighted associations for PATH Study adults between Wave 5 (2018–2019) e-cigarette coupon receipt, preference for flavored e-cigarettes, and state tobacco policies and Wave 6 (2021) any tobacco use, United States.

		AOR	Weighted 95 % CI
Receipt of e-cigarette coupon	Yes	1.57*	1.07, 2.31
	No	1.00	–
Preference for flavored e-cigarettes	Yes	1.70***	1.37, 2.10
	No	1.00	–
State tobacco policy context	Stronger	0.69**	0.55, 0.88
	Weaker	1.00	–
State e-cigarette tax	Yes	1.14	0.89, 1.46
	No	1.00	–
Annual household income	<$50,000	1.05	0.81, 1.37
	$50,000-99,999	1.04	0.77, 1.40
	$100,000+	1.00	–
Education	< High school education	1.87**	1.21, 2.89
	High school diploma or GED	1.56**	1.15, 2.10
	Some college or associate degree	1.21	0.90, 1.62
	Bachelor's degree+	1.00	–

Notes. $N = 3632$. *$p < .05$, **$p < .01$, ***$p < .001$. GED = General Educational Development diploma. Age, sex, race, state tobacco coupon policy, and Wave 5 Tobacco use other than e-cigarettes were included as covariates. AOR: Adjusted odds ratio. CI: Confidence interval.

policy context on tobacco use in states with an e-cigarette tax (AOR = 0.85; 95 % CI: 0.63, 1.14), whereas in states without an e-cigarette tax, a stronger tobacco policy context at Wave 5 was negatively associated with Wave 6 tobacco use (AOR = 0.63; 95 % CI: 0.47, 0.84).

Table 4 shows results of models stratified by state tobacco policy context. Among those living in states with stronger tobacco policy contexts, both coupon receipt (AOR = 1.80; 95 % CI: 1.07, 3.02) and e-cigarette tax (AOR = 1.36; 95 % CI: 1.02, 1.80) positively predicted tobacco use. Conversely, among those living in states with weaker tobacco policy contexts, neither coupon receipt (AOR = 1.33; 95 % CI: 0.78, 2.24) nor e-cigarette tax (AOR = 0.99; 95 % CI: 0.69, 1.44) predicted tobacco use.

Analyses examining the effects of study predictors on established e-cigarette use at Wave 6 among those with past 30-day use, but not established use, at Wave 5 are shown in Supplemental Table 1. Wave 6 established e-cigarette use was more common among those who received an e-cigarette coupon (AOR = 1.98; 95 % CI: 1.14, 3.44) and preference for flavored e-cigarettes (AOR = 1.73; 95 % CI: 1.21, 2.48).

4. Discussion

This nationally representative study of adults who use e-cigarettes finds that receipt of e-cigarette coupons predicted subsequent tobacco use even when controlling for use of other tobacco products, as well as progression of e-cigarette use. Notably, the significant results for any tobacco use were only present among those living in states with e-cigarettes taxes or strong state tobacco policy contexts. These findings suggest that direct mail coupons may undermine e-cigarette taxes and other tobacco regulations (Sheikh et al., 2023), which is similar to results of other studies examining coupon receipt and redemption following cigarette tax increases (Choi et al., 2012; Hyland et al., 2005). Typically, receipt of these coupons is unsolicited. Previous research on the PATH Study found that less than 10 % of those who currently use tobacco, and only 5 % of those not currently using signed up for email alerts or other tobacco promotions (Choi et al., 2018). Moreover, tobacco direct mail coupons are frequently targeted to those in lower income communities (Choi et al., 2018) so, if left unregulated, this marketing strategy has the potential to perpetuate tobacco-related health disparities.

The results showing that coupon receipt predicts progression to regular e-cigarette use (among those who had not used regularly in the past) is consistent with previous research on coupon receipt for both cigarettes (Choi et al., 2018) and e-cigarettes (Duan et al., 2023). This finding highlights how coupons can encourage more intense usage among those who had not used as intensely in the past.

For those living in states with a stronger tobacco policy context, state e-cigarette tax predicted an increased likelihood of any tobacco use. Previous studies have reported similar results, demonstrating that e-cigarette taxes can increase cigarette use and decrease e-cigarette use (Pesko et al., 2020), and that cigarettes and e-cigarettes are economic substitutes for each other (Stoklosa et al., 2016). The current study builds on this research by highlighting how this pattern of substituting may be more common for those in states with stronger tobacco regulation. Taken together, findings from the current study and the extant literature suggest that tax increases may be more beneficial if they apply to all tobacco and nicotine products, thereby avoiding the unintended consequence of incentivizing tobacco products unaffected by a single-product tax.

A stronger state tobacco policy context was negatively associated with tobacco use, suggesting that tobacco control policies are working as intended. Interestingly, the effect of tobacco policy context was more evident in states without an e-cigarette tax, suggesting that state tobacco control policies, such as those that prohibit tobacco use indoors or restrict the sale of flavored tobacco, have more impact in locales with

Table 3

Weighted associations for PATH Study adults between Wave 5 (2018–2019) e-cigarette coupon receipt, preference for flavored e-cigarettes, and state tobacco policy context and Wave 6 (2021) any tobacco use, stratified by state e-cigarette tax, United States.

		State e-cigarette tax, $n = 1346$		No State e-cigarette tax, $n = 2286$	
		AOR	Weighted 95 % CI	AOR	Weighted 95 % CI
Receipt of e-cigarette coupon	Yes	2.39**	1.22, 4.68	1.29	0.83, 1.99
	No	1.00	–	1.00	–
Preference for flavored e-cigarettes	Yes	1.54**	1.12, 2.12	1.83***	1.42, 2.34
	No	1.00	–	1.00	–
State tobacco policy context	Stronger	0.85	0.63, 1.14	0.63**	0.47, 0.84
	Weaker	1.00	–	1.00	–
Annual household income	<$50,000	1.04	0.74, 1.46	1.07	0.76, 1.52
	$50,000–99,999	1.09	0.72, 1.66	1.00	0.71, 1.41
	$100,000+	1.00	–	1.00	–
Education	< High school education	2.81**	1.52, 5.21	1.45	0.84, 2.50
	High school diploma or GED	2.21**	1.38, 3.56	1.25	0.87, 1.78
	Some college or associate degree	1.38	0.87, 2.20	1.09	0.80, 1.50
	Bachelor's degree+	1.00	–	1.00	–

Notes. *$p < .05$, **$p < .01$, ***$p < .001$. GED = General Educational Development diploma. Age, sex, race, state tobacco coupon policy, and Wave 5 Tobacco use other than e-cigarettes were included as covariates. AOR: Adjusted odds ratio. CI: Confidence interval.

Table 4

Weighted associations for PATH Study adults between Wave 5 (2018–2019) e-cigarette coupon receipt, preference for flavored e-cigarettes, and state e-cigarette tax and Wave 6 (2021) any tobacco use, stratified by state tobacco policy context, United States.

		Stronger policy context, $n = 2016$		Weaker policy context, $n = 1616$	
		AOR	Weighted 95 % CI	AOR	Weighted 95 % CI
Receipt of e-cigarette coupon	Yes	1.80*	1.07, 3.02	1.33	0.78, 2.24
	No	1.00	–	1.00	–
Preference for flavored e-cigarettes	Yes	1.76***	1.34, 2.31	1.58**	1.14, 2.20
	No	1.00	–	1.00	–
State e-cigarette tax	Yes	1.36*	1.02, 1.80	0.99	0.69, 1.44
	No	1.00	–	1.00	–
Annual household income	<$50,000	1.07	0.76, 1.50	1.08	0.69, 1.69
	$50,000-99,999	0.97	0.66, 1.42	1.17	0.74, 1.87
	$100,000+	1.00	–	1.00	–
Education	< High school education	2.13**	1.21, 3.76	1.37	0.72, 2.61
	High school diploma or GED	1.81**	1.21, 2.73	1.14	0.72, 1.80
	Some college or associate degree	1.45	0.99, 2.14	0.85	0.55, 1.33
	Bachelor's degree+	1.00	–	1.00	–

Notes. *$p < .05$, **$p < .01$, ***$p < .001$. GED = General Educational Development diploma. Age, sex, race, and Wave 5 Tobacco use other than e-cigarettes were included as covariates. AOR: Adjusted odds ratio. CI: Confidence interval. "Stronger policy context" refers to states that had implemented comprehensive clean indoor air laws, flavored tobacco sales restrictions, and/or menthol tobacco sales restrictions prior to Wave 6 data collection (2021), and "Weaker policy context" refers to states that had not implemented any of these policies prior to Wave 6.

weaker pricing or taxation policies.

Preference for flavored e-cigarettes was among the strongest predictors of future tobacco use. While flavors may help some adults who smoke to transition to e-cigarettes (Chen, 2018), use of flavored products predicts continued tobacco product use (Chen, 2018) and thus may deter those who use from quitting all tobacco. Targeted interventions aimed at supporting those who use flavored e-cigarettes are needed to help these individuals successfully quit tobacco completely.

4.1. Limitations

The current study has several limitations. First, tobacco use and coupon receipt data were based on self-report, and the number and type of coupon received (e.g., buy-one-get-one, $2.00 off) were not assessed. In addition, while this study measured the influence of various state-level tobacco policies, it did not account for all state tobacco policies or local policies. However, state-level policies are often correlated with a range of state and local policies that influence tobacco use (Fox et al., 2017), indicating omitted variable biases were likely minimal.

4.2. Conclusion

The current study highlights the harmful effects of tobacco industry marketing via coupons on future tobacco use for those reporting past e-cigarette use, and that e-cigarette coupons may be used to undermine the effects of e-cigarette taxes and other tobacco control policies. This study also provides valuable information on how contextual variables, and in particular, state-level tobacco policies, can support cessation of all tobacco, including e-cigarettes, among those with past e-cigarette use. Findings suggest that policies prohibiting e-cigarette coupons could help protect those who use e-cigarettes from subsequent tobacco use. Given the powerful role that contextual factors have on tobacco use, public health practitioners should focus efforts on promoting policy and retail environments that are most conducive to reducing and quitting tobacco use.

Disclosures

Wilson Compton reports long-term stock holdings in General Electric Company, 3M Company, and Pfizer Incorporated, unrelated to this article. The other authors have no conflicts of interest.

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The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the U.S. Department of Health and Human Services or any of its affiliated institutions or agencies.

CRediT authorship contribution statement

J.H. Kingsbury: Writing – review & editing, Writing – original draft, Methodology, Investigation, Formal analysis, Conceptualization. **H.L. Kimmel:** Writing – review & editing, Supervision, Project administration, Funding acquisition, Conceptualization. **M.J. Parks:** Writing – review & editing, Methodology, Investigation. **M.R. Creamer:** Writing – review & editing, Investigation, Funding acquisition. **C. Blanco:** Writing – review & editing, Project administration, Funding acquisition. **W.M. Compton:** Writing – review & editing, Project administration, Investigation, Funding acquisition.

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Wilson Compton reports long-term stock holdings in General Electric Company, 3M Company, and Pfizer Incorporated, unrelated to this article. The other authors have no conflicts of interest.

Data availability

Data are stored on a private enclave, and access to the data used in the project are available through an application process. See NAHDAP website: https://www.icpsr.umich.edu/web/NAHDAP/studies/36231

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