



## A snapshot of parenting practices useful for preventing adolescent vaping

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### ARTICLE INFO

#### Keywords:

Parental practices  
Parental media mediation  
Vaping perception  
Vaping  
And adolescence

### ABSTRACT

**Introduction:** Smoking research demonstrates that parents can influence their adolescent's tobacco smoking perceptions and behaviors, but little is known about the protective effects of different parenting practices on adolescent vaping. In this study we investigate how adolescent perceptions of parents' knowledge of their activities and parental media mediation are associated with adolescents' perceptions of vaping and adolescent vaping behaviors.

**Method:** Six hundred thirty-nine youth (65.7% female, average age: 14.71 years old) recruited through 4-H clubs in nine states participated in a study evaluating a substance use intervention program. Because the evaluation design could influence participants, we used only baseline data. An online self-reported survey was administered. Most youth self-identified as White (87.3%) and only handful youth indicated Asian (3.4%), African American (3.4%), American Indian (1.1%), and other or unreported (4.8%). Approximately 60% of youth lived in small town or rural areas in US.

**Results:** Analyses revealed that parental knowledge was positively related with adolescent perceived harm of vaping and perceived prevalence of vaping, but was negatively related with perceived acceptability of vaping and social expectancy of vaping. In addition, youth who reported greater parental media mediation were more likely to perceive the harm of vaping and less likely to vape compared with youth with lower parental media mediation.

**Conclusion:** These findings suggest that parental education about vaping, including those promoting conversations regarding vaping and vaping ads, may be important to the prevention of adolescent vaping.

### 1. Introduction

Electronic cigarettes (e-cigarettes) are battery-powered devices that contain nicotine, flavorings, and other chemicals that, through heating, produce vapors that users inhale and exhale (vaping) (Centers for Disease Control and Prevention, 2020; Duong & Liu, 2019). E-cigarettes, sometimes called e-cigs, vapes, e-hookahs, and vape pens, are all Electronic Nicotine Delivery Systems (ENDS). While cigarette smoking among adolescents in the United States has decreased over the past four decades, U.S. adolescents are now using more e-cigarettes than traditional cigarettes and ENDS<sup>1</sup> are now the most commonly used tobacco

product by youth in the United States (Gentzke et al., 2019). In 2020, the Monitoring the Future (MTF) study estimated that nearly 28% of 12th graders reported past-month vaping, nearly double the rate from reports in 2015 and approximately, 19% of 10th graders reported that they specifically used nicotine-contained e-cigarette and vaping nicotine increased by 0.9% even among 8th graders (Johnston et al., 2021). These statistics are alarming because most e-cigarettes contain nicotine, which can have long-term negative impacts on brain development, behavior, increase risk for drug dependence (Health and Human Service, 2016; 2018), and other serious health consequences such as an increase in chronic bronchitis symptoms and asthma (McConnell et al., 2017;

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<sup>1</sup> For purposes of this paper, we refer to the practice of using ENDS as vaping.

Schweitzer et al., 2017). Given these health consequences and the increasing prevalence of vaping it is essential that we understand processes that may influence adolescent e-cigarette consumption, with extant research suggesting that parenting practices may be especially influential in shaping adolescent's vaping behaviors and perceptions.

### 1.1. Parental influences on adolescent vaping

There is ample research evidence to support that parents play an important role in influencing adolescent behavior, including risky behaviors such as substance use (Choi et al., 2017; Ladis et al., 2019). Research suggests that parental knowledge promotes positive youth development in general (Jacobson & Crockett, 2000) and protects youth from tobacco use (Tornay et al., 2013). The construct "parental knowledge" refers to an adolescents' perception of their parents' knowledge about their life, friends, whereabouts, and activities (Dishion and McMahon 1998).

The term parental knowledge is used in this study instead of parental monitoring because, as Kerr and Stattin (2000) argue, even though many studies have claimed that "parental monitoring" is related to measures of positive youth development, these studies are actually measuring parental knowledge of adolescents' activities and not parental monitoring in terms of tracking and surveillance. Contemporary understanding is that the strongest link to positive youth adjustment including adolescent tobacco use is parental knowledge of adolescents' activities (Kerr & Stattin, 2000; Thomas et al., 2000; Waizenhofer et al., 2004). While these effects of parental knowledge may extend to vaping, there is scant research support for this idea to-date. We do know that, while many parents may have general knowledge of their adolescent's life, most parents are generally ignorant of vaping as a risky activity. Patel et al.'s (2019) nationally representative study of parents of 11 to 18-year-old children revealed that most parents are unaware of their child's vaping and more than half of the parents in the study failed to identify vaping products. Among the parents who were aware of their child's vaping, less than half believed that vaping always included nicotine (Patel et al., 2019). While Patel et al.'s (2019) research provides preliminary information about linkages between parental knowledge and even ignorance of vaping products, more research is needed to understand which practices may be most useful to delay or deter adolescent vaping.

Parental media mediation is another parenting practice that shows potential for influencing adolescent vaping. Parental media mediation is a parenting practice that includes restrictive media monitoring (limiting the amount of time children spend on media) and active media monitoring (parental discussion of media content with the intent to help children become critical consumers of media) (Valkenburg et al., 2013). Given aggressive marketing by tobacco companies on the Internet, social media, and other forms of media to promote vaping as harmless and as a replacement for combustible cigarettes (Andrews, 2019; Cullen et al., 2018; Laestadius et al., 2019), it seems likely that the protective effects of parental media mediation may extend to adolescent vaping. Vaping is currently allowed to be advertised on television and this advertising accounts for a considerable segment of overall tobacco product sales and advertising dollars in the United States (Duke et al., 2014; Kornfield et al., 2015). Because the majority of an adolescent's media consumption occurs in his or her home (Hogan, 2012), parents may play a significant role in influencing their child's perceptions of media messages about vaping such as vaping advertising and vaping behaviors in entertainment media. Although there is evidence to support the protective effect of parental media mediation in the prevention of substance use (Collier et al., 2016; Dalton et al., 2006; Schooler et al., 1996), to our knowledge, there is no existing research examining the relationship among parental media mediation, adolescent vaping perceptions, and vaping behavior.

The current study builds on the parenting practices literature by examining the role of parental knowledge and parental media mediation

in shaping the perceptions of youth about vaping and their vaping behaviors. It is important to investigate adolescent perceptions of vaping such as perceived harm of vaping, perceived acceptability, perceptions of peer vaping prevalence, and vaping social expectancies because these are all predictive of vaping behaviors (Amrock et al., 2015; Barrington-Trimis et al., 2015; Brose et al., 2015; Kong et al., 2015). Therefore, the current study seeks to understand if greater levels of parental knowledge and parental media mediation are related to increased perceptions of the harm of vaping, lower perceptions of the prevalence of vaping, acceptability and social expectancies of vaping, and less lifetime experience with vaping.

## 2. Materials and methods

### 2.1. Procedure and participants

A total of 639 youth participants (Mean age = 14.71,  $SD = 1.34$ ; Range: 12 ~ 17) were recruited through their involvement with 4-H clubs across nine states (i.e., New Jersey, Pennsylvania, Ohio, West Virginia, Louisiana, Arizona, Illinois, Colorado, and Washington). 4-H is the US's largest youth development organization, focused on empowering nearly six million young people with skill development for life success. 4-H is delivered by university cooperative extension in a community of more than 100 public universities across the US that provides experiences where young people learn by doing. More than 100 years old, 4-H membership includes young people of all beliefs and backgrounds and works to give youth a voice to express who they are and how they can make their lives and communities better. Nearly six million 4-H youth have taken on critical societal issues, such as addressing community health inequities, engaging in civil discourse and advocating for equity and inclusion for all. Despite the potentially protective influence of club involvement, 4-H members externalizing behavior levels reflect national averages (Lerner & Lerner, 2013). Participants were recruited to evaluate a substance use prevention intervention and, as a result the current study utilized only the baseline dataset.

As mentioned, nine states were recruited through 4-H county leadership. 4-H county leaders in those states were contacted and provided written materials (i.e., fliers) for leaders to distribute to the youth in their clubs. The materials also provided links to a project website, Facebook pages, and an online video presentation to additional information about the research project including how to participate in the project. Club leaders were asked to encourage their members within the targeted age range to visit our project website and participate in the project. Once the teens expressed interest in participation, we obtained parental consent through email, mail, fax, text, and through the project website link (Dropbox). Parental consent forms included contact email for all youth and phone for some youth. Participants provided youth assent after research staff obtained parental consent. After we obtained both parental consent and youth assent, we distributed an online pretest survey. A three-week window for youth was allotted to complete the survey and reminders were sent through email and text to encourage participation. A university Institutional Review Board approved the study procedures. The project additionally employed a data safety monitoring board consisting of three members who reviewed these procedures and monitored compliance.

More than half of the participants (65.7%) were female (see Table 1). A majority reported themselves as White (87.3%) followed by Asian (3.4%), African American (3.4%), American Indian (1.1%), and other or unreported (4.8%). Most youth reported that they lived in small town (30.4%), rural (29.3%), and suburban (23.0%) areas. Almost two thirds of participants attended public schools (70.7%). Approximately 21% of the sample qualified for free-lunch program; the free-lunch program is a proxy for low socio-economic status. Only nine youth (1.4%) reported that they did not have a computer or tablet at home. Most participants were in 8th to 11th grade (85%), followed by 6-7th grade (8%) and 12th

**Table 1**  
Characteristics of sample (N = 639).

	Frequency (%)
Sex	
Female	420 (65.7)
Male	219 (34.3)
Ethnicity	
American Indian/Alaska Native	7 (1.1)
Asian	22 (3.4)
Black/African American	22 (3.4)
White	558 (87.3)
Others	30 (4.8)
Living location	
Urban	39 (6.1)
Suburban	147 (23.0)
Smaller City	67 (10.5)
Small town	194 (30.4)
Rural	187 (29.3)
Other	5 (0.8)
Age (Mean/SD)	14.71(1.34)
Education type	
Public	452 (70.8)
Private	57 (8.9)
Home-school and others	129 (20.2)
Free-lunch qualification	
Yes	131 (20.6)
No	506 (79.4)

Note. Percentages were rounded to two decimals; thus, it is possible that sums do not equal 100%.

grade (7%).

## 2.2. Measures

### 2.2.1. Parental knowledge

Parental knowledge was measured from the perspective of the youth using the Reinterpretation of Caregiver Monitoring scale (Kerr et al., 2010) consisting of four items responded to on a 1 = never to 4 = always scale asking participants how often the caregiver “knows what you do during your free time,” “knows which friends you hang out with during your free time,” “asks about things that happened while you were not with them,” “makes you tell them where you are going and with whom before you go out.” Scores on the items were averaged, with higher scores indicating greater parental knowledge (Cronbach’s alpha = 0.72).

### 2.3. Parental media mediation

This construct was operationalized using three items from the primary caregiver media mediation scale (Valkenburg et al., 2013) that were responded to on a 1 = never to 5 = very often scale. Participants reported how often the caregiver tells them that 1) “there is too much violence (fighting, shooting) in the media (for example, in movies or games),” 2) “what you see in the media (for example, in movies and commercials) is different from real life,” and 3) how often the caregiver “limits the amount of time you are allowed to spend using media (for example, playing computer games or watching TV).” We averaged the scores, with higher scores indicating greater parental media mediation (Cronbach’s alpha = 0.66).

### 2.4. Perceived harm of vaping

One item was selected from those use in the Population Assessment of Tobacco and Health Study (NAHDAP, 2019) was used to assess perceived harm. It asked “How much do you think people harm themselves when they use an electronic vapor product some days but not every day?” with four-point scale (1 = no harm to 4 = a lot of harm).

### 2.5. Perceived acceptability of vaping

Acceptability was measured by two items from the Population Assessment of Tobacco and Health Study (NAHDAP, 2019) that were averaged to create a composite variable. Participants responded on a five-point scale (1 = very unacceptable to 5 = very acceptable) to items asking, “how acceptable do you think people who are important to you find the following?” Participants reported on the acceptability of: (1) “using an electronic vapor product occasionally” and (2) “using an electronic vapor product regularly.” After averaging, higher scores indicated individuals’ greater perceived vaping acceptability (Cronbach’s alpha = 0.92).

### 2.6. Perceived prevalence of vaping

One item from the Population Assessment of Tobacco and Health Study (NAHDAP, 2019) assessed perceived prevalence of vaping, asking participants to report how many people their age vape. Specifically, participants were asked “If you had to estimate, what percentage of people at your age use an electronic vapor product? Please insert a number from 0 to 100.”

### 2.7. Vaping social expectancies

Three items from the Population Assessment of Tobacco and Health Study (NAHDAP, 2019) were assessed to measure vaping social expectancies. Participants reported whether using vaping 1) “is enjoyable” 2) “makes it easier to fit in at parties” and 3) “not attractive” (Reverse) with a five-point scale (1 = strongly disagree to 5 = strongly agree). We averaged the three items, with higher scores indicating more positive social expectancies of vaping (Cronbach’s alpha = 0.70).

### 2.8. Lifetime vaping experience

One item from the Youth Risk Behavior Survey (Kann et al., 2018) assessed lifetime vaping experience. Participants were asked “Have you ever tried an electronic vapor product, even one or two times” with the option of a yes (1) or no (0) response.

### 2.9. Demographics

Several demographic items were measured using checklists including age (choices 12–17), biological sex (female/male), ethnicity (Hispanic/non-Hispanic), race (American Indian/Alaskan Native, Asian, Black/African American, Native Hawaiian/Other Pacific Islander, White, Something else), and education type (e.g., public, private, home-schooling, and others).

### 2.10. Analytical plan

Baseline data from the larger randomized control trial were analyzed. We used Mplus with two regression models to test whether parental knowledge and parental media mediation were related to vaping outcomes. We do not report model fit indices because the model is saturated. In this model, we include general parental knowledge and parental media mediation as our independent variables of interest and perceived harm, perceived acceptability, perceived prevalence, social expectancies, and lifetime vaping experience were included as dependent variables of interest. Because lifetime vaping experience was a binary variable, we employed a logistic regression with robust maximum likelihood (MRL). Otherwise, we used the maximum likelihood (ML) method. Eight dummy-coded state variables, age, gender (female = 0 vs 1 = male), ethnicity (white = 0 vs others = 1), and education type (non-public = 0 vs public = 1) were included in the analyses as covariates.

### 3. Results

A total of 12% of youth reported lifetime vaping (see Table 2), however, youth perceived that 44% of their peers vaped. Generally speaking, youth reported high levels of parental knowledge and moderate levels of parental media mediation. On average, youth reported that they spent 2 weekdays of “free” time without adults.

Analyses (See Table 3) revealed that youth with higher levels of parental knowledge (H1a) were more likely to perceive more harmful effects of vaping ( $b = 0.21, SE = 0.07, p = .001$ ) and to perceive that most youth their age vaped ( $b = 4.43, SE = 2.18, p = 0.04$ ). These youth were less likely to find vaping acceptable ( $b = -0.18, SE = 0.08, p = 0.03$ ) and had more positive expectancies about vaping ( $b = -0.22, SE = 0.07, p = .002$ ). Parental knowledge, however, was not associated with lifetime vaping.

Youth with greater parental media mediation (H1b) perceived greater harmful effects of vaping ( $b = 0.10, SE = 0.04, p = .004$ ) and were less likely to vape (aOR = 0.70,  $SE = 0.10, p = .01$ ). Parental media mediation was not significantly related to perceived prevalence of vaping, acceptability of vaping, nor To social expectancies of vaping.

### 4. Discussion

This paper examined the role of two parenting practices in the emerging public health challenge of adolescent vaping. Parental knowledge, defined as soliciting and securing knowledge of your child’s daily life (Kerr et al., 2010), and parental media mediation, defined as restricting or limiting access to media content and/or actively engaging youth about their media youth (Valkenburg et al., 1999), were both hypothesized to influence vaping. In general, results support these hypothesized relationships and the findings increase our understanding of parenting practices that influence youth perceptions of vaping and vaping behavior. However, what is clear from these findings is that beyond parental knowledge, media mediation provides an additional approach to preventing vaping. This finding has important implications for prevention theory and practice.

Parental knowledge serves to help shape the widest array of youth perceptions about vaping, with analyses revealing significant associations with all four of the perceptual variables (i.e., vaping expectancies, acceptability, prevalence, and harm). Our findings are consistent with previous studies in adolescent substance misuse (Amrock et al., 2015; Brose et al., 2015; Kong et al., 2015). Parental knowledge can shape adolescent rule for behaviors (Hayes et al., 2007) and for substance misuse (Donaldson et al., 2016) and it can expand to other relatively “new” substance such as vaping. Also, because youth with higher parental knowledge may be less exposed to “free time” activities or certain peers who engage in problematic behaviors (Hayes et al., 2007), youth may believe that any type of substance is unacceptable and harmful. Furthermore, youth with higher parental knowledge may have greater self-disclosure to their parents (Stattin & Kerr, 2000). Parents may have a chance to correct adolescents’ positive social expectancies on vaping.

Parental knowledge, however, was not significantly related with lifetime vaping. Recent studies showed that higher parental knowledge is a significant predictor of vaping initiation in 6 months (Mantey et al., 2022). Similarly, parental monitoring defined as child disclose (e.g., whether children disclose their unsupervised time with peers) is negatively related with lifetime vaping and 30 days vaping (Szoko et al., 2021). We speculate that the difference might be due to 1) excluding parental media mediation in those studies and 2) measurement differences. Given that medium size of correlation between parental knowledge and parental media mediation in our data ( $r = 0.30, p < .05$ ) and medium to large size of correlation among parental knowledge and youth disclose in previous literature (e.g., “ $r = 0.66, p < .001$ ”, Stattin & Kerr, 2000, p.1077), parental knowledge may not be independently related with lifetime vaping. Targeted conversation regarding substance can be a more salient predictor for actual behavior compared to general child disclosure (Miller-Day & Kam, 2010). Parents’ general knowledge may not afford active moments to regulate vaping behavior but can be used to provide guidance to inform youth perceptions about vaping. Further studies on parental knowledge, parental media mediation, and child disclose should be considered to understand vaping and parental factors.

Parental media mediation is positively related with perceived harm and negatively related with lifetime vaping behaviors, even after controlling for parental knowledge. Because parents’ media mediation strategies include actively discussing media with children, restricting media content, and restricting the amount of time engaged with media (Nathanson, 2004; Nathanson & Cantor, 2000), parental management of media content may positively impact the harmful effects of vaping to adolescents. Parental media mediation strategies may provide an opportunity to establish rules and boundaries around media consumption, limiting children’s exposure to pro-vaping messages and opportunities to discuss vaping messages if and when they arise. Given that vaping industry spend million dollars to advertising targeting to adolescents (Beleva et al., 2019) and adolescents held misconceptions about vaping (e.g., vaping is not harmful; Russell et al., 2020), educating parents to increase vaping media literacy for their children might be a good strategy to reduce the adolescent vaping population. The results of this study extend research on parental practices that are useful to protect youth from risky behaviors, demonstrating effects on perceptions of vaping as well as vaping behavior.

These findings suggest that family-based prevention interventions might benefit from content on how to monitor adolescent media consumption. For example, parents can be told that consuming media with vaping content commercial might present be a good opportunity to discuss the risks of vaping with adolescents without violating the adolescent’s autonomy. Taking advantage of “teachable moments” such as these can build a foundation for open discourse between the adolescent and parent. The novel web-based intervention “REAL Parenting(<https://real-prevention.com/programs-under-development/>)” adapted from the evidence-based “A Parent Handbook for Talking with College Students about Alcohol” (Turrisi et al., 2020) includes direction on how to identify teachable moments, strategies for how to address these

**Table 2**  
Descriptive Statistics and Pearson Correlations for Variables of Interest.

	Mean	SD	1	2	3	4	5	6
1. Parental knowledge	3.40	0.52						
2. Parental media mediation	3.10	0.97	0.30***					
3. Social expectancies of vaping	1.97	0.89	-0.16***	-0.11**				
4. Perceived harm	3.12	0.81	0.19***	0.18***	-0.48***			
5. Perceived acceptability of vaping	1.82	0.97	-0.10**	-0.11**	0.46***	-0.40***		
6. Perceived prevalence of vaping	44.32	28.13	0.08*	-0.10*	0.23***	-0.12**	0.17***	
	Frequency (%)							
7. Lifetime vaping	Y: 78 (12.2) N: 561 (87.8)		-0.06	-0.15***	0.40***	-0.30***	0.31***	0.23***

Note. \*  $p < .05$ , \*\*  $< 0.01$ , \*\*\*  $< 0.001$ .

**Table 3**

Association between Parental Monitoring, Parental Media Monitoring, and Unmonitored Time and Perception of Vaping and Lifetime Vaping.

	Perceived harm		Perceived prevalence of vaping		Perceived acceptability of vaping		Social expectancies of vaping		Lifetime Vaping#	
	Beta	SE	Beta	SE	Beta	SE	Beta	SE	aOR	(SE)
State 1	0.20	0.15	-6.61	4.92	-0.13	0.18	-0.11	0.16	1.04	0.81
State 2	0.03	0.12	2.05	3.95	0.16	0.15	0.09	0.13	3.89	2.27
State 3	0.07	0.11	5.49	3.64	-0.00	0.13	0.24	0.12	3.24	1.77
State 4	-0.30	0.21	-10.31	6.85	0.29	0.25	1.08***	0.23	7.43	5.71
State 5	0.15	0.13	2.74	4.19	-0.11	0.15	0.15	0.14	5.91	3.52
State 6	0.09	0.11	-3.44	3.66	-0.15	0.13	0.01	0.12	2.47	1.41
State 7	-0.03	0.15	7.30	5.07	0.19	0.19	0.32	0.17	2.27	1.46
State 8	0.10	0.13	8.14	4.37	-0.12	0.16	0.02	0.14	2.82	1.74
Male	-0.04	0.07	-8.74***	2.23	-0.12	0.08	-0.03	0.07	1.18	0.34
Other all non-White <sup>a</sup>	-0.10	0.10	1.44	3.24	-0.04	0.12	-0.00	0.11	1.17	0.48
Attending Public school <sup>b</sup>	-0.01	0.07	7.16**	2.31	0.01	0.09	0.02	0.08	1.78	0.55
Age	-0.05	0.02	5.42***	0.79	0.12***	0.03	0.08**	0.03	1.65***	0.15
Parental knowledge	0.21**	0.07	4.43*	2.18	-0.18*	0.08	-0.22**	0.07	1.02	0.27
Parental media mediation	0.10**	0.04	-1.44	1.16	-0.04	0.04	-0.04	0.04	0.70**	0.10
R <sup>2</sup>	0.07***		0.16***		0.06**		0.09***		0.25***	

Note. #Because lifetime vaping was a binary variable, we used logit regression. <sup>a</sup>White served as a reference group. <sup>b</sup>Non public-school (e.g., home-schooling, private school) served as a reference group. \**p* < .05, \*\* < 0.01, \*\*\* < 0.001.

teachable moments while also inviting youth dialogue and feedback, handle difficult conversations, and address challenging questions. Programs such as these can be informed by the research results from this study, integrating additional parental media monitoring strategies into the modules with opportunities for practice.

Although the findings from this study align with and extend previous research, several limitations should be noted. First and perhaps foremost, the cross-section design limits our ability to make causal claims. Although the youth in this study had similar levels of substance use compared with nationally representative samples (Lerner & Lerner, 2013), generalization should not be made given the characteristics of the current sample (e.g., most white, mostly rural areas). Second, parental media mediation did not directly measure monitoring about vaping media including social media. Future studies are needed to directly measure parental media mediation related to vaping. Although some variables (e.g., perceived prevalence of vaping, lifetime vaping) are measured by self-reporting with one item, these measures are based on nationally reputational surveys (e.g., Kann et al., 2018). Finally, we did not include parental vaping behavior which could influence both adolescent vaping behavior and vaping perceptions.

**5. Conclusion**

In conclusion, this study extended previous research on parental knowledge by examining effects on the emerging public health challenge of vaping. Parental knowledge and parental media mediation were examined to investigate their effects on youth vaping perceptions and vaping behaviors in a national sample of adolescent 4-H members. Findings indicate that while parental knowledge influences perceptions of vaping, parental media mediation, specifically, was related to vaping behaviors even when controlling for parental knowledge. Longitudinal studies are needed to clarify the direction of causality and further develop this line of research.

**CRedit authorship contribution statement**

**Hye Jeong Choi:** Conceptualization, Methodology, Investigation, Formal analysis, Writing – original draft. **Michelle Miller-Day:** Conceptualization, Writing – original draft. **Michael Hecht:** Writing – review & editing, Funding acquisition, Supervision, Resources, Investigation. **Shannon D. Glenn:** Writing – review & editing, Data curation, Project administration, Investigation. **Rachel E. Lyons:** Writing – review & editing, Project administration. **Kathryn Greene:** Writing –

review & editing, Funding acquisition, Supervision, Investigation, Resources.

**Declaration of Competing Interest**

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

**Acknowledgements**

We gratefully acknowledge the contributions of the 4-H clubs and their members, particularly 4-H at Rutgers University.

**Funding sources**

Supported by NIDA/NIH (R42DA039595) grant funding.

**Human rights**

All procedures involving human participants were in accordance with institutional review board ethical standards and with the 1964 Helsinki declaration and its later amendments. IRB protocol approval #15-544Rc (Rutgers University).

**Informed consent**

Informed consent from parents and youth assent was obtained from all study participants.

**Contributions**

Drs. Hecht and Greene designed the study and aided in draft of the manuscript. Dr. Lyons and Ms. Glenn aided in the data collection and the draft of manuscript. Dr. Miller-Day aided in the first draft of the manuscript. Dr. Choi conceptualized, conducted statistical analyses and wrote the first draft of the manuscript. All authors contributed to and have approved the final manuscript.

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