ONLINE SUPPLEMENTARY MATERIALS

Table S1. Survey measures

* Registered as the primary outcome of the experiment
** Registered as a secondary outcome of the experiment

Construct	Item	Response scale	Source
	The next questions are about e-cigarettes. People also sometimes call them vape-pens, mods, pods, and JUUL. The picture below shows examples of e-cigarettes. [insert image]		UNC
E-cigarette: current use	Do you now use e-cigarettes…	1=Every day 2=Some days 3=Not at all	Adapted from PATH
	The next questions are about cigarettes.		
Cigarette use: lifetime	Have you smoked at least 100 cigarettes in your entire life?	1=Yes 2=No	Item from BRFSS
Cigarette use: days	Do you now smoke cigarettes…	1=Every day 2=Some days 3=Not at all	Item from PATH
	Experiment		
	You will now look at 3 messages about e-cigarettes and answer questions about each one. [Include below text only if randomized to text + image condition] By message, we mean both the text and the image.		UNC
Random assignment	[Randomly assign participants to 1 of 7 conditions; 3 messages per condition in random order; See Figure 1]		UNC
	Within-subjects *[After each message, ask the following questions]*		
	The next questions are about the message above.		
Attention**	How much does this message grab your attention?	1=Not at all 2=A little 3=Somewhat 4=Quite a bit 5=Very much	Adapted from Nonnemaker et al. (2010)
Believability	How believable is this message?	1=Not at all 2=A little 3=Somewhat 4=Quite a bit 5=Very much	Adapted from Lazard et al. (2017)
	Say how much you agree or disagree with the next statements about the message.		
Perceived message effectiveness**	This message makes me concerned about the health effects of vaping.	1=Strongly disagree 2=Somewhat disagree 3=Neither agree nor disagree	UNC PME Scale (Baig et al., 2018)

		4=Somewhat agree 5=Strongly agree	
Perceived message effectiveness**	This message makes vaping seem unpleasant to me.	1=Strongly disagree 2=Somewhat disagree 3=Neither agree nor disagree 4=Somewhat agree 5=Strongly agree	UNC PME Scale (Baig et al., 2018)
Perceived message effectiveness**	This message discourages me from wanting to vape.	1=Strongly disagree 2=Somewhat disagree 3=Neither agree nor disagree 4=Somewhat agree 5=Strongly agree	UNC PME Scale (Baig et al., 2018)
	Between-subjects *[After all 3 messages have been shown, ask the following questions]*		
	Here are the 3 messages you just saw. [Insert image of all 3 messages in condition]		
Negative affect**	How much do the messages make you feel…? anxious	1=Not at all 2=A little 3=Somewhat 4=Very 5=Extremely	Adapted from Nonnemaker et al. (2010)
Negative affect**	sad	1=Not at all 2=A little 3=Somewhat 4=Very 5=Extremely	Adapted from Watson (1988)
Negative affect**	scared	1=Not at all 2=A little 3=Somewhat 4=Very 5=Extremely	Adapted from Nonnemaker et al. (2010)
Negative affect	guilty	1=Not at all 2=A little 3=Somewhat 4=Very 5=Extremely	Adapted from Nonnemaker et al. (2010)
Negative affect**	disgusted	1=Not at all 2=A little 3=Somewhat 4=Very 5=Extremely	Adapted from Nonnemaker et al. (2010)
Cognitive elaboration**	How much do the messages cause you to think about…? the health problems caused by vaping	1=Not at all 2=A little bit 3=Somewhat 4=Quite a bit 5=Very much	Adapted from Moodie et al. (2011)
Cognitive elaboration**	the information they convey	1=Not at all 2=A little bit 3=Somewhat 4=Quite a bit 5=Very much	Adapted from Hammond et al. (2003)

Cognitive elaboration**	quitting e-cigarettes	1=Not at all 2=A little bit 3=Somewhat 4=Quite a bit 5=Very much	Adapted from Brewer et al. (2018)
	These questions are about your feelings about experiencing health problems in the future due to smoking or vaping.		
Affective risk**	When you think about smoking-related health problems for a moment, to what extent do you feel scared?	1= Not at all 2=2 3=3 4=4 5=5 6=6 7=Extremely	Adapted from TRIRISK model, Ferrer et al. (2016)
Affective risk**	When you think about vaping-related health problems for a moment, to what extent do you feel scared?	1= Not at all 2=2 3=3 4=4 5=5 6=6 7=Extremely	Adapted from TRIRISK model, Ferrer et al. (2016)
	These questions are about your "gut reactions" about experiencing health problems in the future due to smoking or vaping.		
Experiential risk**	How concerned are you about developing smoking-related health problems in your lifetime?	1=Not at all 2=2 3=3 4=4 5=5 6=6 7=Extremely	Adapted from TRIRISK model, Ferrer et al. (2016)
Experiential risk**	How concerned are you about developing vaping-related health problems in your lifetime?	1=Not at all 2=2 3=3 4=4 5=5 6=6 7=Extremely	Adapted from TRIRISK model, Ferrer et al. (2016)
	These questions are about your beliefs about experiencing health problems in the future due to smoking or vaping. If you are not sure of the answer, give us your best guess.		
Perceived likelihood**	If you regularly smoked cigarettes, what is the chance that you would one day get smoking-related health problems?	1=No chance 2=Low chance 3=Moderate chance 4=High chance 5=Certain	Adapted from Brewer et al. (2017, 2018)
Perceived likelihood**	If you regularly vaped, what is the chance that you would one day get vaping-related health problems?	1=No chance 2=Low chance 3=Moderate chance 4=High chance 5=Certain	Adapted from Brewer et al. (2017, 2018)

Perceived severity**	How much would getting smoking-related health problems affect your life?	1=Not at all 2=A little 3=Somewhat 4=Quite a bit 5=Very much	Adapted from Brewer et al. (2017, 2018)
Perceived severity**	How much would getting vaping-related health problems affect your life?	1=Not at all 2=A little 3=Somewhat 4=Quite a bit 5=Very much	Adapted from Brewer et al. (2017, 2018)
Perceived harm (likelihood x severity)**	How harmful is smoking cigarettes to your health?	1=Not at all 2=2 3=3 4=4 5=5 6=6 7=Extremely	Adapted from PATH; Wackowski et al. (2017)
Perceived harm (likelihood x severity)**	How harmful is vaping to your health?	1=Not at all 2=2 3=3 4=4 5=5 6=6 7=Extremely	Adapted from PATH; Wackowski et al. (2017)
Perceived harm (likelihood x severity)**	Compared to smoking cigarettes, vaping is…	1=Much less harmful to my health 2 3 4=As harmful 5 6 7=Much more harmful to my health	Adapted from Wackowski et al. (2017)
	Say how much you agree or disagree with the next statements about the messages.		
Reactance**	The messages are trying to manipulate me.	1=Strongly disagree 2=Somewhat disagree 3=Neither agree nor disagree 4=Somewhat agree 5=Strongly agree	Adapted from Hall et al. (2016, 2017)
Reactance**	The messages annoy me.	1=Strongly disagree 2=Somewhat disagree 3=Neither agree nor disagree 4=Somewhat agree 5=Strongly agree	Adapted from Hall et al. (2016, 2017)
Reactance**	The messages are overblown.	1=Strongly disagree 2=Somewhat disagree 3=Neither agree nor disagree 4=Somewhat agree 5=Strongly agree	Adapted from Hall et al. (2016, 2017)

Anticipated social interaction about the messages**	How likely are you to talk about these messages with others in the next week?	1=Not at all likely 2=A little likely 3=Somewhat likely 4=Very likely 5=Extremely likely	New item
	Imagine that all e-cigarettes had these messages on them.		
Anticipated avoidance**	How likely is it that you would try to avoid thinking about these messages?	1=Not at all likely 2=A little likely 3=Somewhat likely 4=Very likely 5=Extremely likely	Adapted from Yong et al. (2015); PATH 2018
Anticipated avoidance**	How likely is it that you would try to avoid looking at these messages?	[program horizontally] 1=Not at all likely 2=A little likely 3=Somewhat likely 4=Very likely 5=Extremely likely	Adapted from Yong et al. (2015); PATH 2018
	Intentions		
Intentions to quit e-cigarettes*	How interested are you in quitting e-cigarettes in the next 30 days?	1=Not at all interested 2=A little interested 3=Somewhat interested 4=Very interested 5=Extremely interested	Adapted from Klein et al. (2009)
Intentions to quit e-cigarettes*	How much do you plan to quit vaping in the next 30 days?	1=Not at all 2=A little bit 3=Somewhat 4=Quite a bit 5=Very much	Adapted from Klein et al. (2009)
Intentions to quit e-cigarettes*	How likely are you to quit vaping in the next 30 days?	1=Not at all likely 2=A little likely 3=Somewhat likely 4=Very likely 5=Extremely likely	Adapted from Klein et al. (2009)
Interest in e-cigarette use**	In the next 30 days, do you plan to…	1=Stop vaping 2=Vape less 3=Vape the same amount 4=Vape more	Adapted from Pepper et al. (2017)
Interest in cigarette use**	In the next 30 days, do you plan to start smoking cigarettes?	1=Yes 2=No	Adapted from Pepper et al. (2017)
Interest in cigarette use**	In the next 30 days, do you plan to…	1=Stop smoking cigarettes 2=Smoke less 3=Smoke the same amount 4=Smoke more	Adapted from Pepper et al. (2017)

	Demographics		
Gender (Prime Panel)	What is your gender?	1=Male 2=Female 3=Other	Asked by Prime Panel
Age (Prime Panel)	What is your age?	_____	Asked by Prime Panel

Hispanic ethnicity (Prime Panel)	Are you of Hispanic, Latino or Spanish origin?	1=No 2-14=Hispanic 15=Prefer not to answer	Asked by Prime Panel
Race (Prime Panel)	What is your race?	1=White 2=Black or African American 3=American Indian or Alaska Native 4-10=Asian 11-14=Pacific Islander 15=Other 16=Prefer not to answer	Asked by Prime Panel
Education	What is the highest degree or level of school you have completed?	1=Less than high school graduate 2=High school graduate (or GED) 3=Some college or technical school 4=Associate's degree 5=Bachelor's degree 6=Graduate or professional degree	Adapted 2010 Census
Sexual orientation	The next question is about your sexual orientation. Do you consider yourself to be…	1=Straight or heterosexual 2=Gay or lesbian 3=Bisexual	Item from Williams Institute
Number in household	How many people are in your household, including you?	_____ (restrict to 1-20)	Item from USDHHS 2016
Poverty: total household income	Which of the following categories best describes your total household income in the last 12 months?	1=Less than $10,000 2=$10,000 to $14,999 3=$15,000 to $24,999 4=$25,000 to $34,999 5=$35,000 to $49,999 6=$50,000 to $74,999 7=$75,000 to $99,999 8=$100,000 to $149,999 9=$150,000 to $199,999 10=$200,000 or more	Item from PATH
Poverty	Which of the following categories best describes your total household income in the last 12 months?	[categories based on federal poverty level definition for respondent's household size]	Brewer et al. (2017); Based on 2018 USDHHS poverty guidelines

Table S2. Impact of type of e-cigarette warning on risk beliefs

	Type of warning				
	1. Control	**2. Text-only**	**3. Pictorial**	1 vs. 2	2 vs. 3
Vaping	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	*d*	*d*
Affective risk	3.68 (1.95)	4.01 (1.97)	4.28 (1.99)	.17*	.14*
Experiential risk	3.45 (2.05)	3.66 (2.11)	3.84 (2.15)	.10	.08
Perceived likelihood	3.02 (1.03)	3.15 (1.05)	3.24 (1.02)	.13	.08
Perceived severity	3.50 (1.30)	3.62 (1.25)	3.74 (1.23)	.10	.09*
Perceived harm	4.50 (1.86)	4.84 (1.79)	5.01 (1.76)	.19*	.10*
Smoking	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	*d*	*d*
Affective risk	4.60 (1.81)	4.60 (1.75)	4.85 (1.64)	.00	.14*
Experiential risk	4.91 (1.87)	4.96 (1.78)	5.11 (1.71)	.03	.08
Perceived likelihood	3.69 (.87)	3.68 (.87)	3.73 (.82)	-.01	.06
Perceived severity	4.07 (1.04)	4.01 (1.00)	4.07 (1.01)	-.05	.05
Perceived harm	6.08 (1.29)	5.99 (1.38)	6.05 (1.32)	-.06	.04
Vaping as or more harmful than smoking	*%*	*%*	*%*	*h*	*h*
Direct assessment (one item)	44	55	59	.22**	.08
Indirect assessment (difference of two items)	37	47	48	.22**	.00

Note. *d* = standardized mean difference. *h* = standardized proportion difference. SD = standard deviation. Control condition received text about not littering.

* $p < .05$, ** $p < .001$

Table S3. Impact of topic of text-only e-cigarette warning on risk beliefs

	Topic of text-only warning				
	1. Nicotine addiction	**2. Hazard**	**3. Hazard + Harm**	1 vs. 2	2 vs. 3
Vaping	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	*d*	*d*
Affective risk	3.82 (1.94)	4.21 (1.89)	3.99 (2.05)	.20*	-.11
Experiential risk	3.73 (2.06)	3.70 (2.06)	3.55 (2.20)	-.01	-.07
Perceived likelihood	3.12 (1.03)	3.20 (1.03)	3.15 (1.08)	.08	-.05
Perceived severity	3.58 (1.20)	3.71 (1.29)	3.58 (1.27)	.10	-.10
Perceived harm	4.76 (1.78)	4.93 (1.74)	4.82 (1.86)	.10	-.11
Smoking	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	*d*	*d*
Affective risk	4.53 (1.83)	4.71 (1.62)	4.57 (1.81)	.11	-.08
Experiential risk	4.95 (1.76)	5.05 (1.71)	4.89 (1.87)	.06	-.09
Perceived likelihood	3.68 (.88)	3.71 (.86)	3.67 (.97)	.03	-.04
Perceived severity	3.99 (.99)	4.11 (.97)	3.95 (1.04)	.12	-.15
Perceived harm	6.02 (1.38)	6.02 (1.34)	5.94 (1.43)	.00	.05
Vaping as or more harmful than smoking	*%*	*%*	*%*	*h*	*h*
Direct assessment (one item)	54	57	55	.06	-.03
Indirect assessment (difference of two items)	47	48	49	.02	.02

Note. d = standardized mean difference. *h* = standardized proportion difference. SD = standard deviation.

* $p < .05$, ** $p < .001$

Figure S1. Evaluation of the 18 warnings used in experiment