



# Risk Communication to Adults: How Should Relative Risk be Conveyed?

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NYU

COLLEGE OF GLOBAL  
PUBLIC HEALTH

Risk Communication to Adults:  
How Should Relative Risk be Conveyed?

***By Telling the Truth—  
The Whole Truth***

**CHERYL HEALTON, DrPH  
OCTOBER 24, 2019**

# TOTAL INDUSTRY-RELATED DEATHS

| INDUSTRY         | NUMBER OF DEATHS<br>(NOTE: 2,626,418 TOTAL U.S. DEATHS ANNUALLY) |
|------------------|--|
| Firearms         | 39,773<br>(23,854 suicides; 15,919 homicides)                    |
| Opioids          | 70,237   |
| Alcohol          | 88,000   |
| Obesity          | 186,000  |
| <b>Tobacco</b>   | <b>480,000</b>   |
| Carbon emissions | Unclear for U.S., but high globally, and growing*                |
| <b>TOTAL</b>     | 864,010 (32.8%)  |

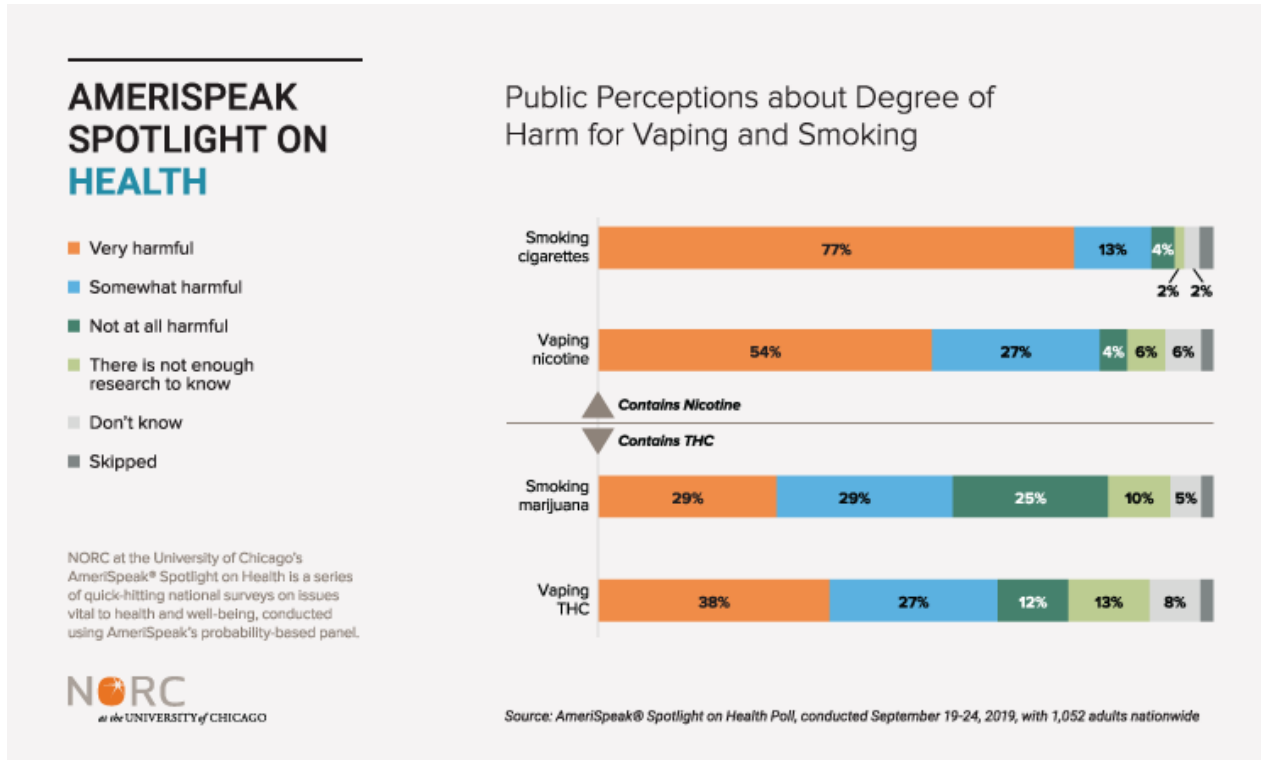
\* World Health Organization (2014). *Quantitative risk assessment of the effects of climate change on selected causes of death. 2030s and 2050s.* Geneva, Switzerland.

# COMMUNICATING RISK

- **Public perception is the best measure for determining the effectiveness of ethical risk communications.**
  - i.e., Whether these cognitions reflect a reasonable understanding of risk
- **At present, the THC issue is creating more doubt about nicotine vaping.**
  - However, based on the available data, vaping is likely to be at least 95% less risky than smoking per the Royal College of Physicians
- **The unintended consequences of poor risk communication include:**
  - Driving people to riskier behavior
  - Leading people to stop attempting to quit (persisting in risky behavior)
  - Leading people to initiate a risky behavior thinking it is risk free

# PUBLIC PERCEPTIONS ABOUT HARM IN 2019

- The National Opinion Research Center found that the public believes that vaping nicotine-based e-liquids is much more harmful than vaping THC e-liquids.



# THE ADVERSE IMPACT OF INCOMPLETE OR UNTIMELY COMMUNICATIONS

**While 54% of the public believes that vaping nicotine is very harmful, only 38% believe vaping THC is very harmful.**

- Yet, more than 1,000 people are experiencing respiratory failure and/or death.
- The overwhelming majority of these cases vaped THC oils and contaminated or bootleg THC vape cartridges (75% acknowledged THC-use, some of whom also used nicotine).
- For example: 10 of the 11 reported case patients in Delaware admitted to using THC vapes.



NEWS

WEATHER

SPORTS

NOTICIAS

WATCH LIVE

...

## Del. Division of Public Health announces state's first vaping-related death

October 3, 2019 by Sarah Ash

# THE ADVERSE IMPACT OF INCOMPLETE OR UNTIMELY COMMUNICATIONS

- This summer, physicians in North Carolina noted that the first three outbreak cases had vaped with THC oils.
- Though all of these patients were vaping black market THC, the CDC refused to issue a detailed warning to the public.
- Instead, its warnings were vague and ultimately implicated nicotine e-cigarettes.
- On October 4th, 2019, the CDC's Principal Deputy Director, Anne Schuchat, stated that she "wish[ed] we had more answers."
- The information was incomplete, but one segment of risk became clear before public advisement occurred





# HARM REDUCTION WORKS: RESISTED EMOTIONALLY, BUT SCIENCE AND RATIONALITY HAVE PREVAILED IN OTHER AREAS

- **Opioids**

- Clean needle exchange
- Safe injection sites
- Naloxone
- Methadone
- Naltrexone

- **Safer Sex**

- Contraception
- Condoms
- Plan B
- PReP
- HPV vaccine

- Seatbelts, life jackets, helmets for motorcycles and bicycles—**these all still have risks.**

# THE FDA'S COMPREHENSIVE PLAN FOR TOBACCO AND NICOTINE REGULATION

- Lowering nicotine in cigarettes to a minimally or non-addictive level.
- Provide an array of noncombustible alternatives for those who need or want to continue using nicotine.
  - Nicotine replacement therapies
  - Consumer nicotine and tobacco products (including e-cigarettes that can satisfy and displace combustibles)
- Push-Pull Strategy to move smokers from cigarette smoke (dangerous) to nicotine sans smoke (safer).
- Protect youth as much as we can.

# FAMILY SMOKING PREVENTION AND TOBACCO CONTROL ACT (2009)

## Public Health Standard

*Calls for the review of the scientific evidence regarding:*

1. Risks and benefits **to the population as a whole**, including both users and non-users of tobacco products;
2. Whether there is an increased or decreased likelihood that existing users of tobacco products will **stop** using such products; and
3. Whether there is an increased or decreased likelihood that those who do not currently use tobacco products, most notably youth, will **start** to use tobacco products

# NASEM REPORT, USA 2018

## CHARGE TO THE NASEM COMMITTEE

Framework for public health effects

- The net public health effect of e-cigarettes will depend on the balance of 3 factors:
  1. Potential to increase the uptake of *combustible tobacco use*
  2. Inherent toxicity absolute *and relative to combustible tobacco*
  3. Potential to help current *smokers to quit*



## Levels of Evidence Framework

- Conclusive
- Substantial
- Moderate
- Limited
- Insufficient
- No available  
( $\neq$  evidence of no effect)

- Number of studies
- Quality of studies
  - Study design
  - Ability to rule out chance, bias, confounding

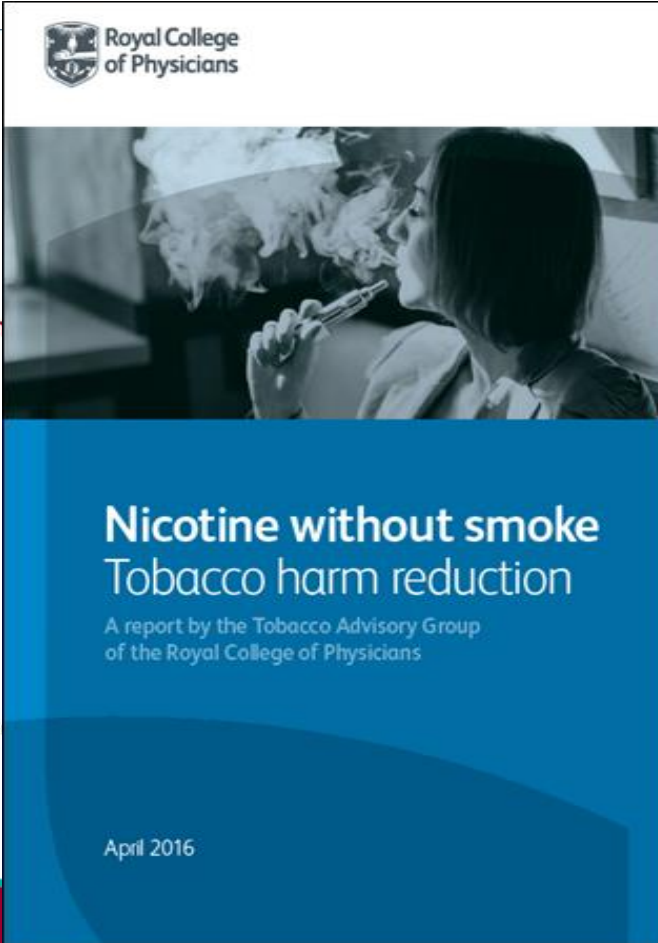


# NASEM CONCLUSION: WHAT WE DO KNOW— VAPING IS LESS HARMFUL THAN SMOKING

- **Conclusive evidence** that completely substituting e-cigarettes for combustible tobacco cigarettes reduces users' exposure to numerous toxicants and carcinogens present in combustible tobacco cigarettes [18-1]
- **Substantial evidence** that completely switching from regular use of combustible tobacco cigarettes to e-cigarettes results in reduced short-term adverse health outcomes in several organ systems [18-2]
- **Consistent with the UK: Public Health England 2018 (95% LESS HARMFUL); Royal College of Physicians**
- **Consistent with the strongest and most recent publications and content specific reviews and synthesis papers, FDA statement also echo this synthesis and consensus (Gottlieb and Zeller, 2017 NEJM)**



# NASEM CONCLUSION: WHAT WE DO KNOW— VAPING IS LESS HARMFUL THAN SMOKING



**Public Health England**  
Protecting and improving the nation's health

**Evidence review of e-cigarettes and heated tobacco products 2018**  
A report commissioned by Public Health England

**Nicotine without smoke**  
Tobacco harm reduction

A report by the Tobacco Advisory Group  
of the Royal College of Physicians

Authors:  
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<sup>2</sup> UK Centre for Tobacco & Alcohol Studies  
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<sup>4</sup> Cancer Research UK

April 2016

## USA, NASEM PRESENT CONCLUSIVE EVIDENCE:

e-Cigarettes are less harmful than cigarettes (no CO<sub>2</sub>, far fewer chemicals, and tobacco is present at lower levels, or in trace amounts).


Long-term effects are unknown, but key biomarkers, metals, etc. are LOWER/TRACE vs. toxic smoke and inhalation.

# THE FDA GOT IT RIGHT: THERE ARE *RELATIVE* AND *ABSOLUTE* HARMS

- This is even more true today, with stronger science supporting it.
- Quotes from FDA Leadership:
  - “...the availability of potentially **less harmful** tobacco products could reduce risk **while delivering satisfying levels of nicotine for adults who still need or want it...**”
  - “Nicotine, though not benign, is not directly responsible for the tobacco-caused **cancer, lung disease, and heart disease** that kill hundreds of thousands of Americans...[each year]”

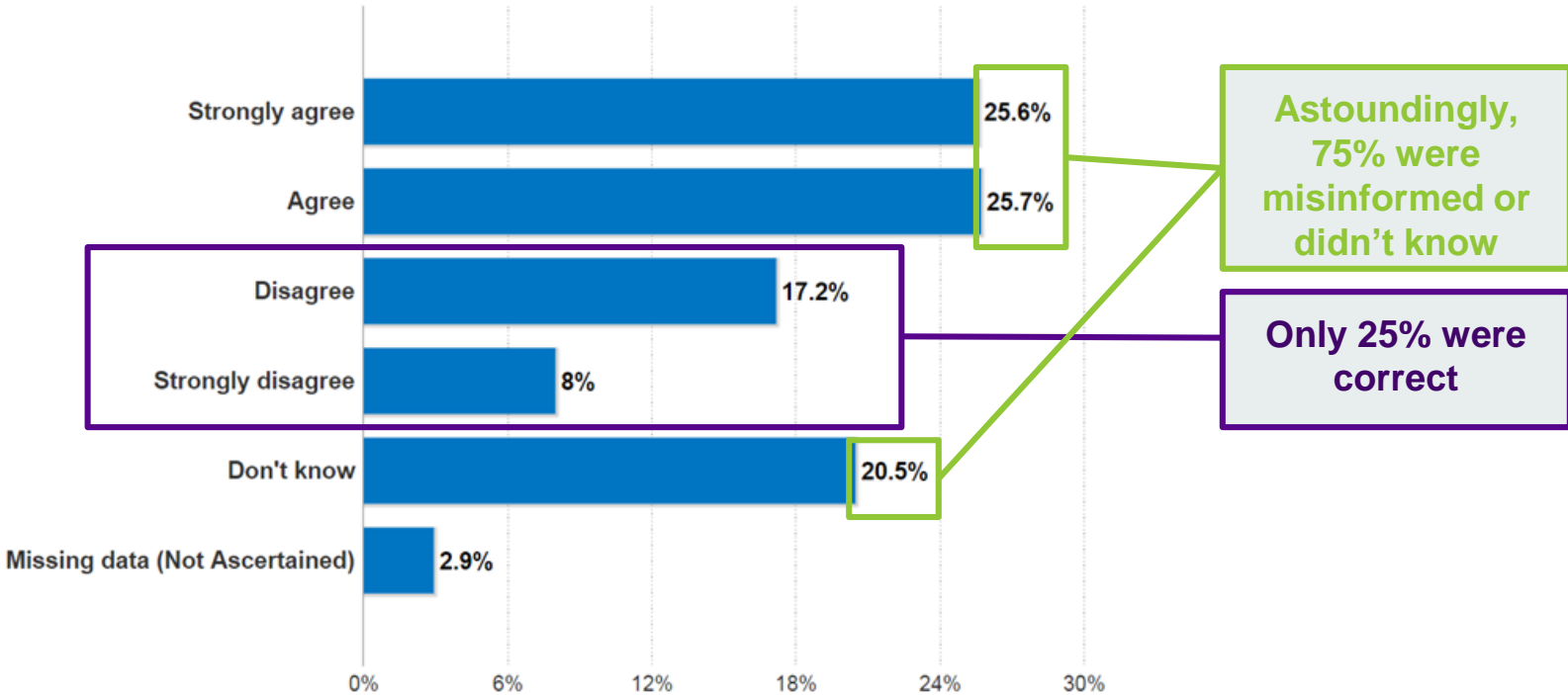


# TWO MAIN MISPERCEPTIONS OF COMMUNICATION

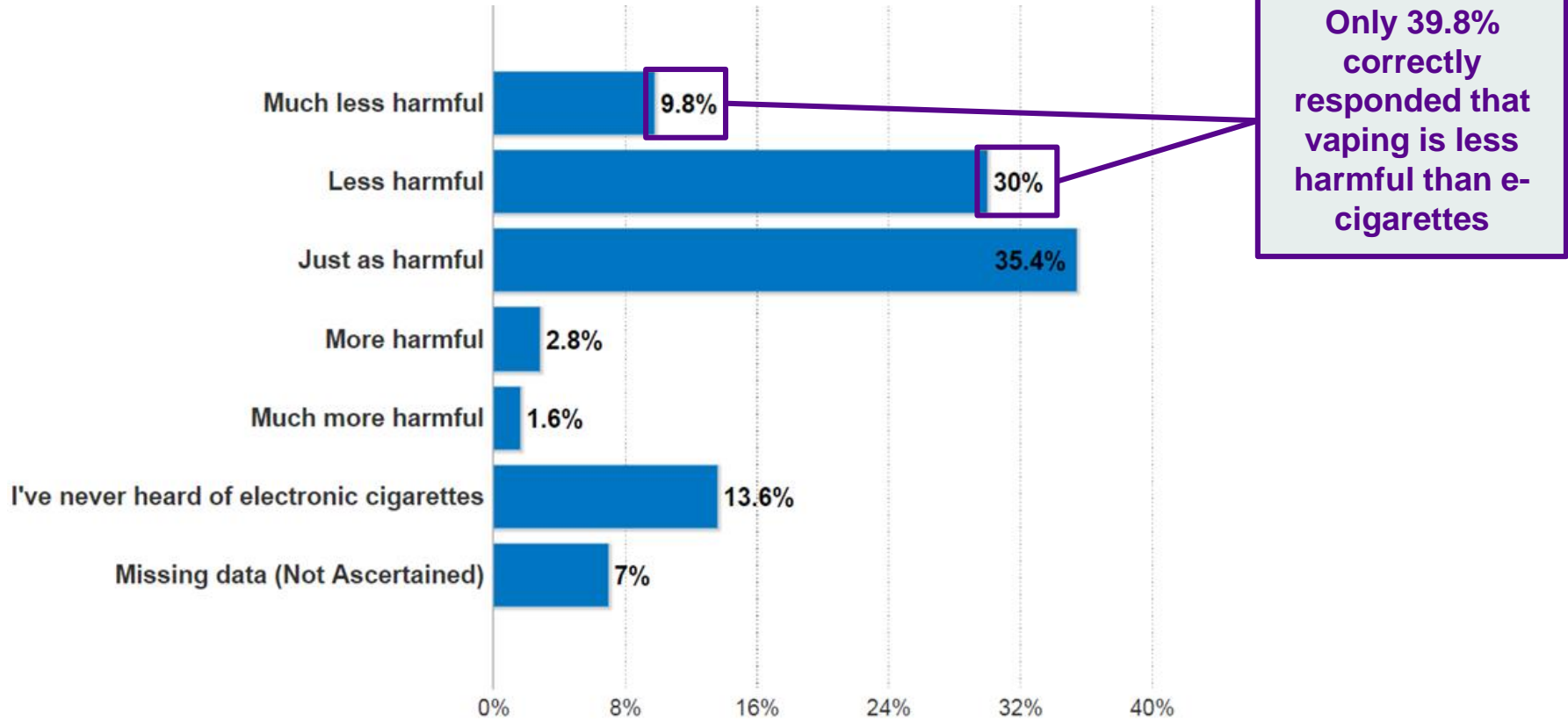
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1. Of the harms of nicotine vaping in general versus smoking (relative harms along the continuum of harms) and the misbeliefs that **nicotine per se** causes cancer or heart attacks (it does not); and
  1. Misperceptions have gone the wrong way from 2013 to the latest data surveys by NCI.

# NICOTINE MISPERCEPTIONS: NICOTINE CAUSES CANCER

“How much do you agree or disagree that the nicotine in cigarettes is the substance that causes most of the cancer caused by smoking?”



# VAPING MISCONCEPTIONS IN 2013



# IN 2018, THIS MISINFORMATION GETS EVEN WORSE

| Response                          | ESTIMATED US ADULT POPULATION |             | SURVEY RESPONDENTS |             |
|-----------------------------------|-------------------------------|-------------|--------------------|-------------|
|                                   | Number                        | Percentage  | Responses          | Percentage  |
| 1 Much less harmful               | 6,340,817                     | 2.6         | 82                 | 2.3         |
| 2 Less harmful                    | 35,809,731                    | 14.4        | 412                | 11.8        |
| 3 Just as harmful                 | 90,631,012                    | 36.5        | 1194               | 34.2        |
| 4 More harmful                    | 9,344,142                     | 3.8         | 128                | 3.7         |
| 5 Much more harmful               | 7,294,544                     | 2.9         | 115                | 3.3         |
| 7 I don't know                    | 93,405,749                    | 37.6        | 1466               | 41.9        |
| -9 Missing data (Not Ascertained) | 5,787,595                     | 2.3         | 98                 | 2.8         |
| <b>Total</b>                      | -                             | <b>100%</b> | <b>3,495</b>       | <b>100%</b> |

Only 2.6% were fully correct. 14.4% were partially correct, 17% less than 39.8% in 2013

Sadly, more than 80% were astoundingly misinformed / didn't know



**THANK YOU**

# **The impact of e-cigarette health warnings on motivation to vape and smoke**

Marissa G. Hall, PhD



# Funding and acknowledgements

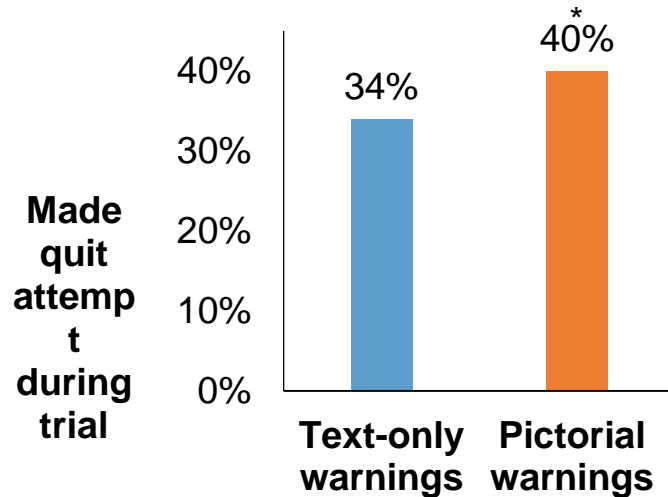
Research reported in this publication was supported by grant number P50CA180907 from the National Cancer Institute and FDA Center for Tobacco Products (CTP). The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIH or the Food and Drug Administration.

## **Collaborators**

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- Kurt Ribisl, PhD
- Seth Noar, PhD
- Jennifer Mendel, MPH
- Allison Lazard, PhD

# Pictorial cigarette pack warnings work

## 1. Improve public health



Brewer, Hall, et al., 2016, *JAMA IM*

\* $p < .05$

PWs would reduce smoking prevalence by 5% in next 50 years  
(Levy, Mays, et al., 2017, *Tob Control*)

## 2. Promote public understanding

Attention

Objective knowledge

Learning something new

Thinking about the risks

Social interactions

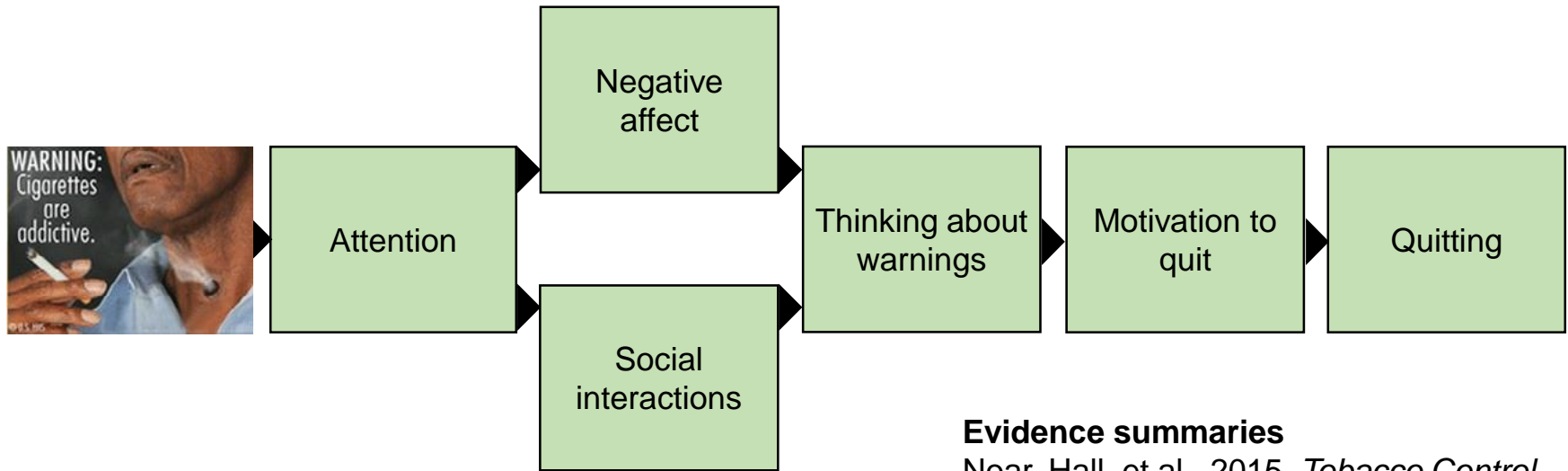
Do not change perceived likelihood or perceived severity  
(Noar 2019, *HCR*)



Hall, Brewer, Noar, 2019 public comment on FDA-2019-N-3065



# Tobacco Warnings Model



## Evidence summaries

Noar, Hall, et al., 2015, *Tobacco Control*

Brewer, Hall, et al., 2016, *JAMA IM*

Noar, Francis, et al., 2016, *SSM*

## Model

Brewer, Parada, et al., 2018, *Ann Behav Med*

# E-cigarette warnings

**FDA requires** e-cigarette packages and advertisements to carry a **single, text-only warning about nicotine addiction**

1. Does the FDA warning change key predictors of behavior?
2. How can we improve the efficacy of the FDA warning?



## Warning type

### Warning topic

#### Text

#### Pictorial

Nicotine addiction

This product contains nicotine.

This product contains nicotine. Nicotine is an addictive chemical.

Nicotine is an addictive chemical.



This product contains nicotine.



This product contains nicotine. Nicotine is an addictive chemical.



Nicotine is an addictive chemical.

Hazard

E-liquids contain harmful chemicals.

E-cigarette vapor can contain formaldehyde.

E-cigarettes can explode.



E-liquids contain harmful chemicals.



E-cigarette vapor can contain formaldehyde.



E-cigarettes can explode.

Hazard+ Harm

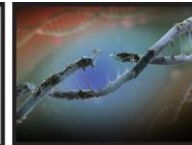
E-liquids contain harmful chemicals. Poisonous if swallowed.

E-cigarette vapor can contain formaldehyde. This causes DNA damage.

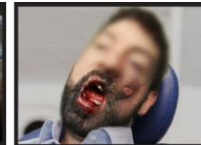
E-cigarettes can explode and cause burns.



E-liquids contain harmful chemicals. Poisonous if swallowed.



E-cigarette vapor can contain formaldehyde. This causes DNA damage.



E-cigarettes can explode and cause burns.

Control

E-cigarette litter requires cleanup. Discard e-cigarette refills properly.

Please refrain from littering e-cigarette refills.

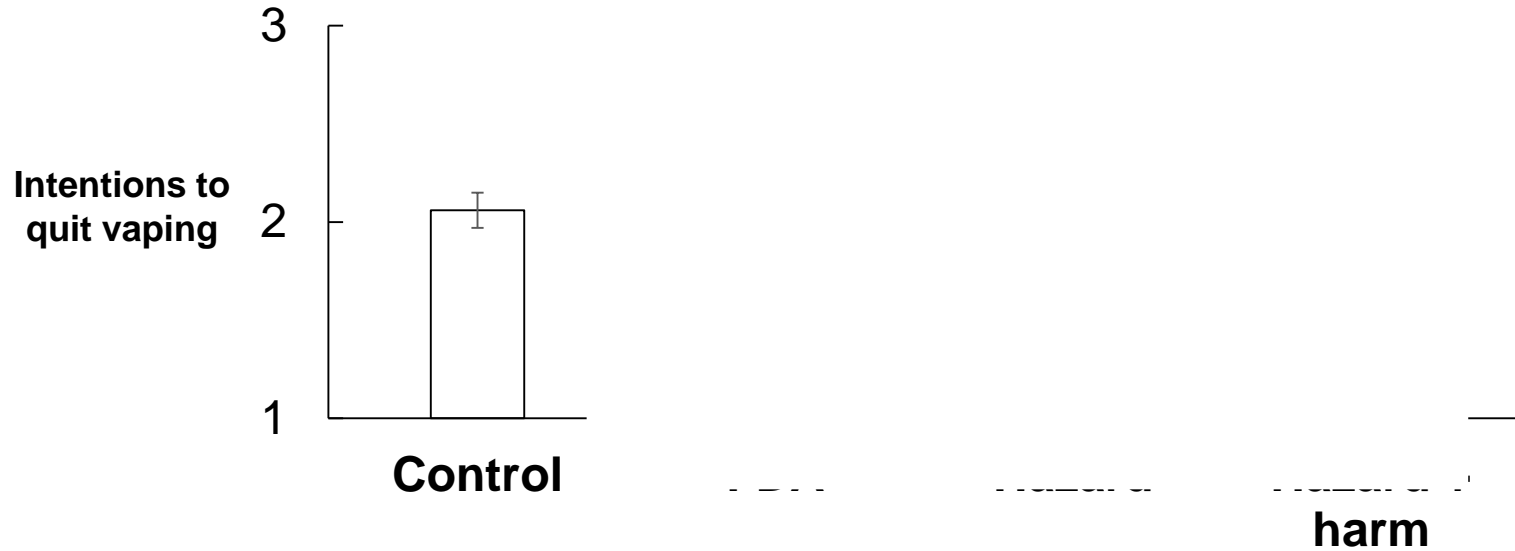
E-cigarette devices don't biodegrade. Please do not litter.

Online sample of 2,218 US adult vapers or smokers

Conclusive or substantial harms from NAS report

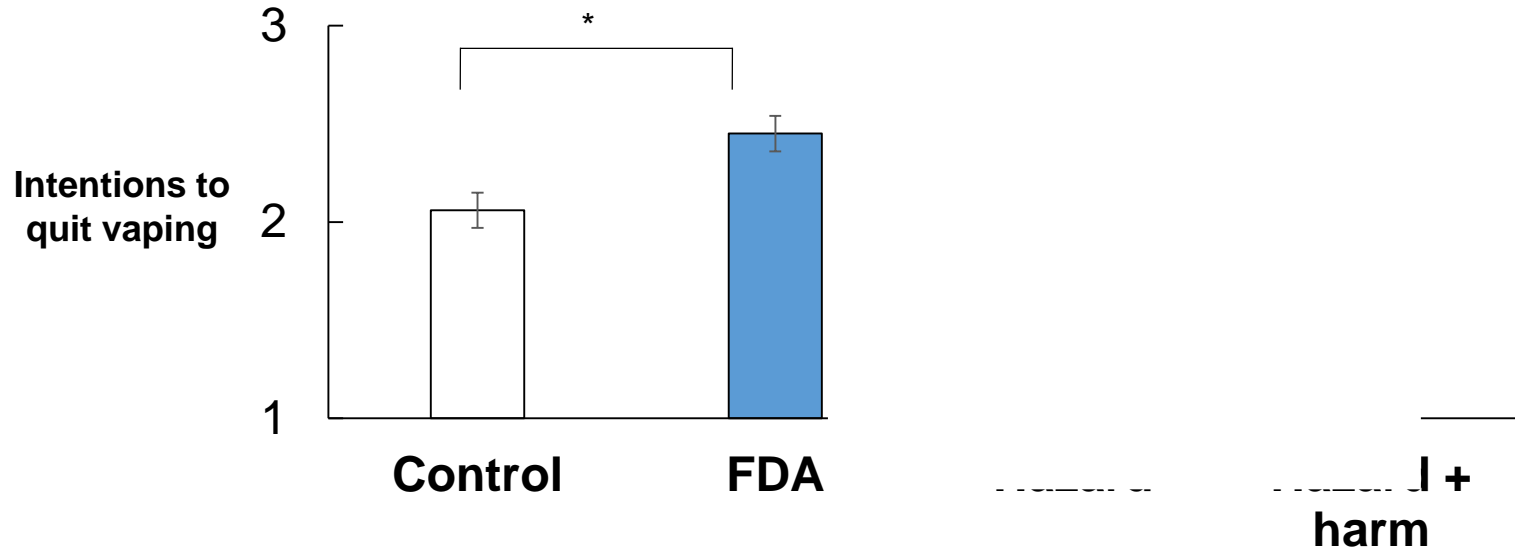
# Impact of warnings on intentions to quit vaping

Primary outcome, among e-cigarette users



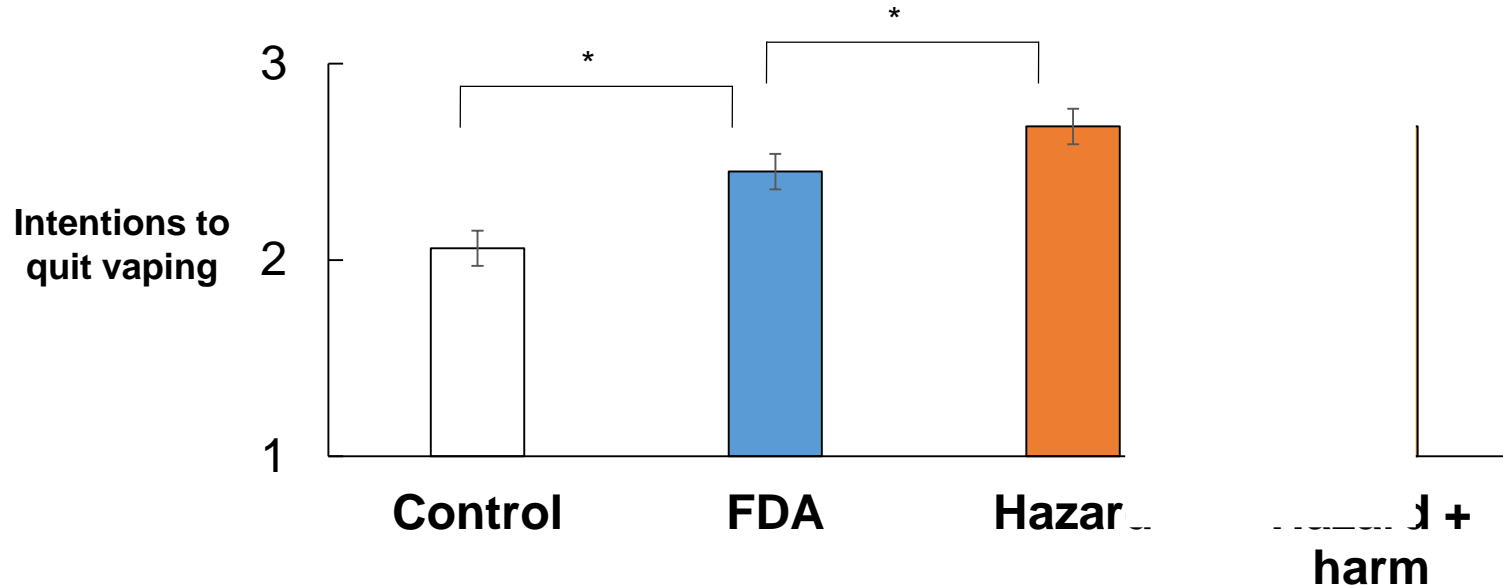
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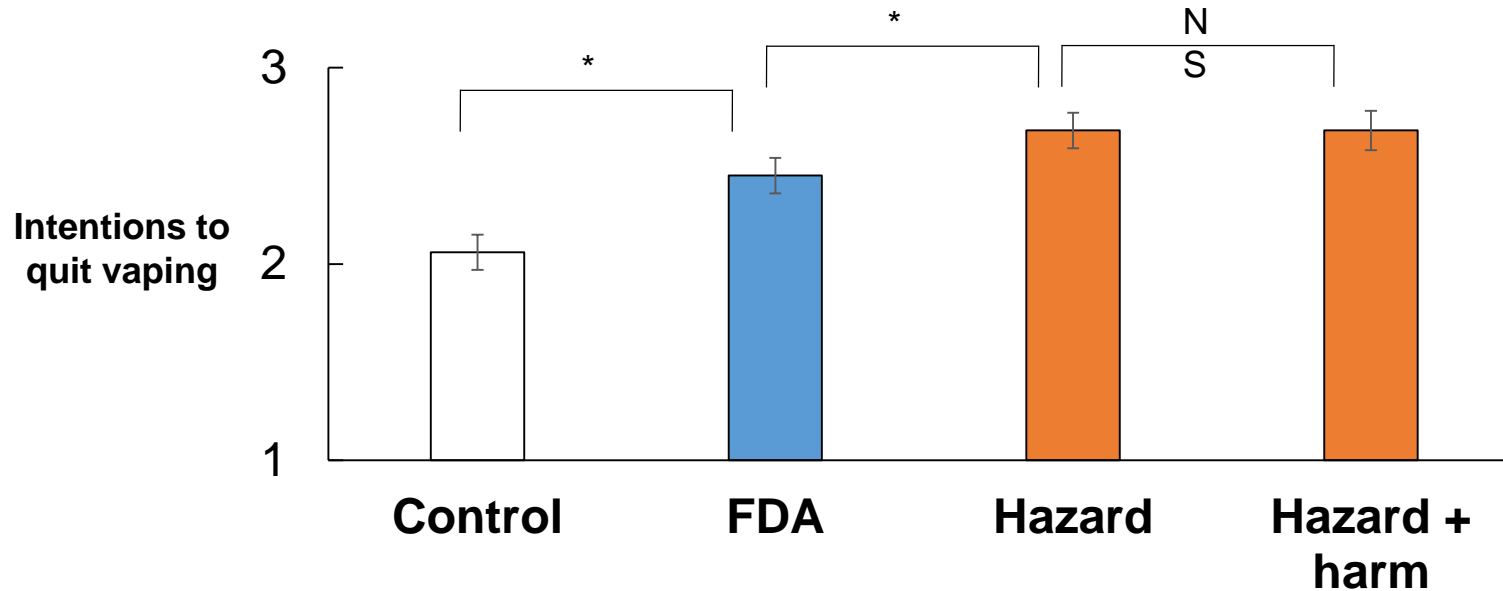
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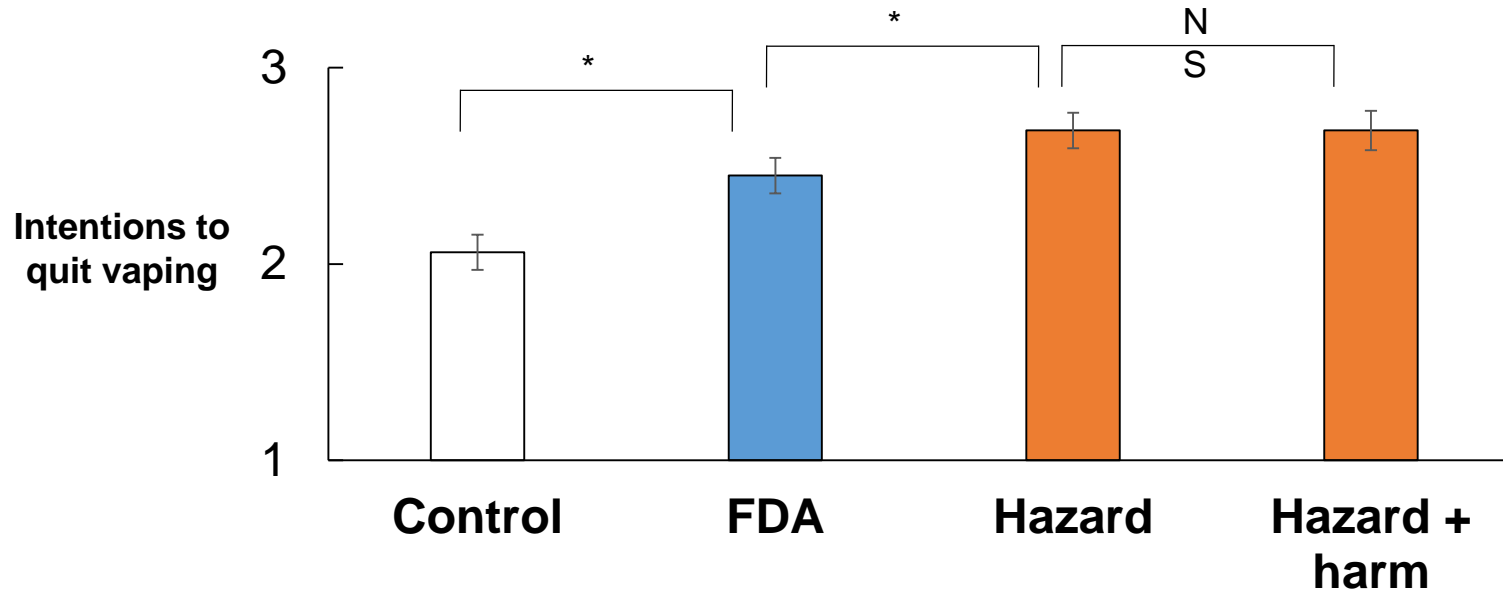
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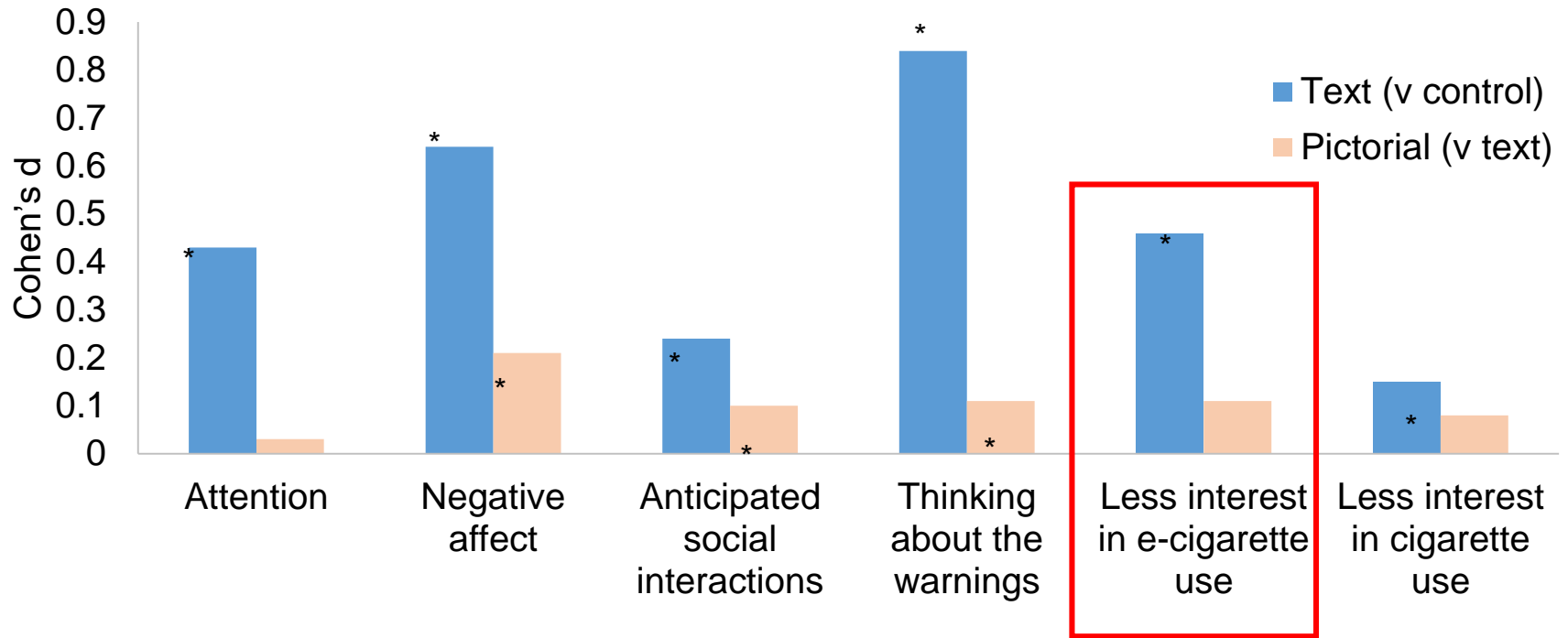
Primary outcome, among e-cigarette users



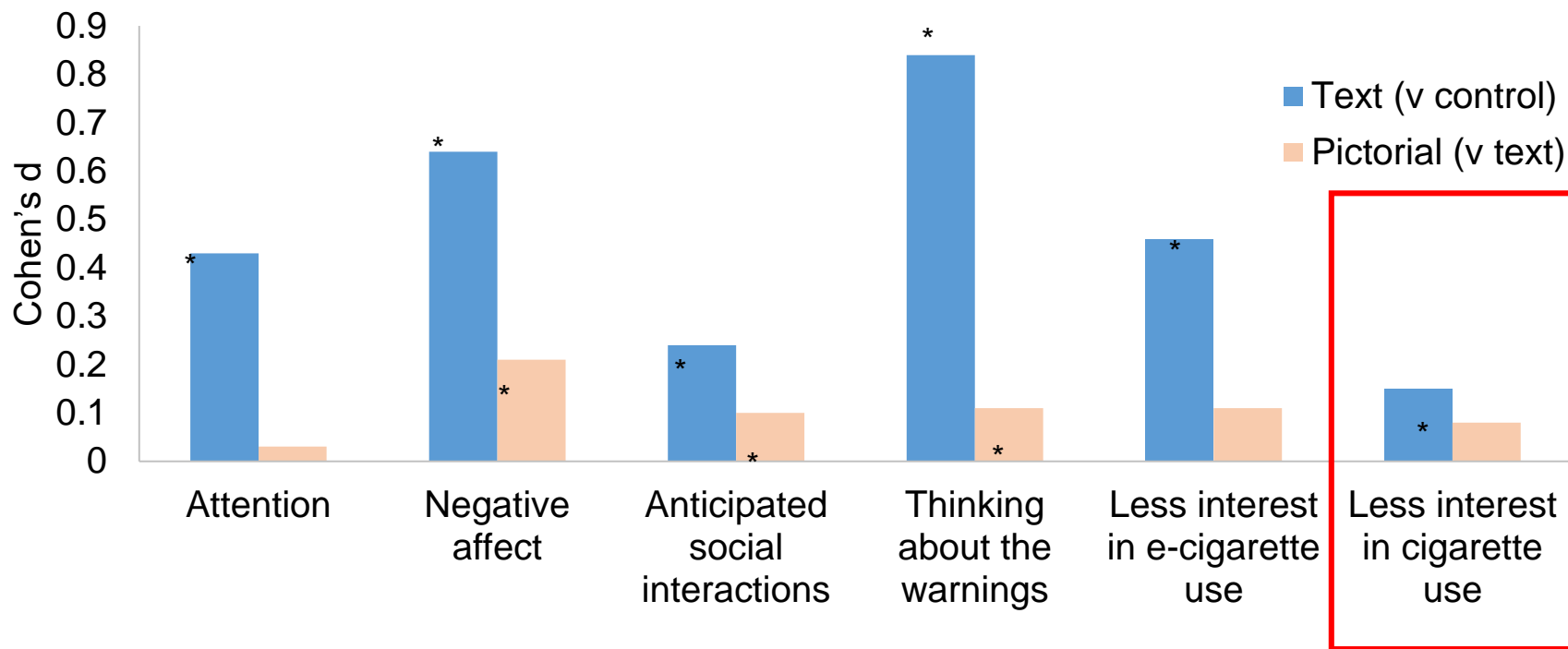
None of the warnings increased interest in **smoking** (all  $p > .05$ ).



# Impact of warning type on TWM constructs



# Impact of warning type on TWM constructs



## 1. FDA > control



Current FDA nicotine addiction warning is likely to be effective

## 2. Other risks > FDA



Including other novel health hazards and harms is a clear next step to increase the impact of text-only warnings and reduce wear-out

### 3. Pictorial > text-only (somewhat)



Pictorial warnings are somewhat more effective

May be strategic to prioritize additional e-cigarette text warnings at this time

### 4. Interest in smoking

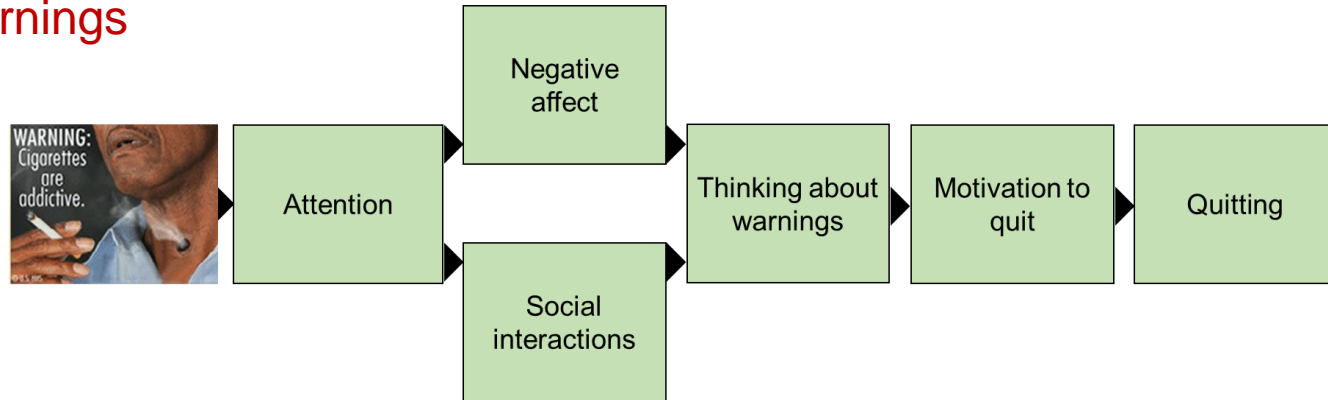


E-cigarette warnings may also reduce interest in smoking

“Tarnishing hypothesis”

# Extending the Tobacco Warnings Model

- Model now works in many contexts
  - Pictorial cigarette pack warnings
  - Cigarette constituent warnings
  - Littering warnings
  - Sugary drink warnings
  - **E-cigarette warnings**



# Thank you

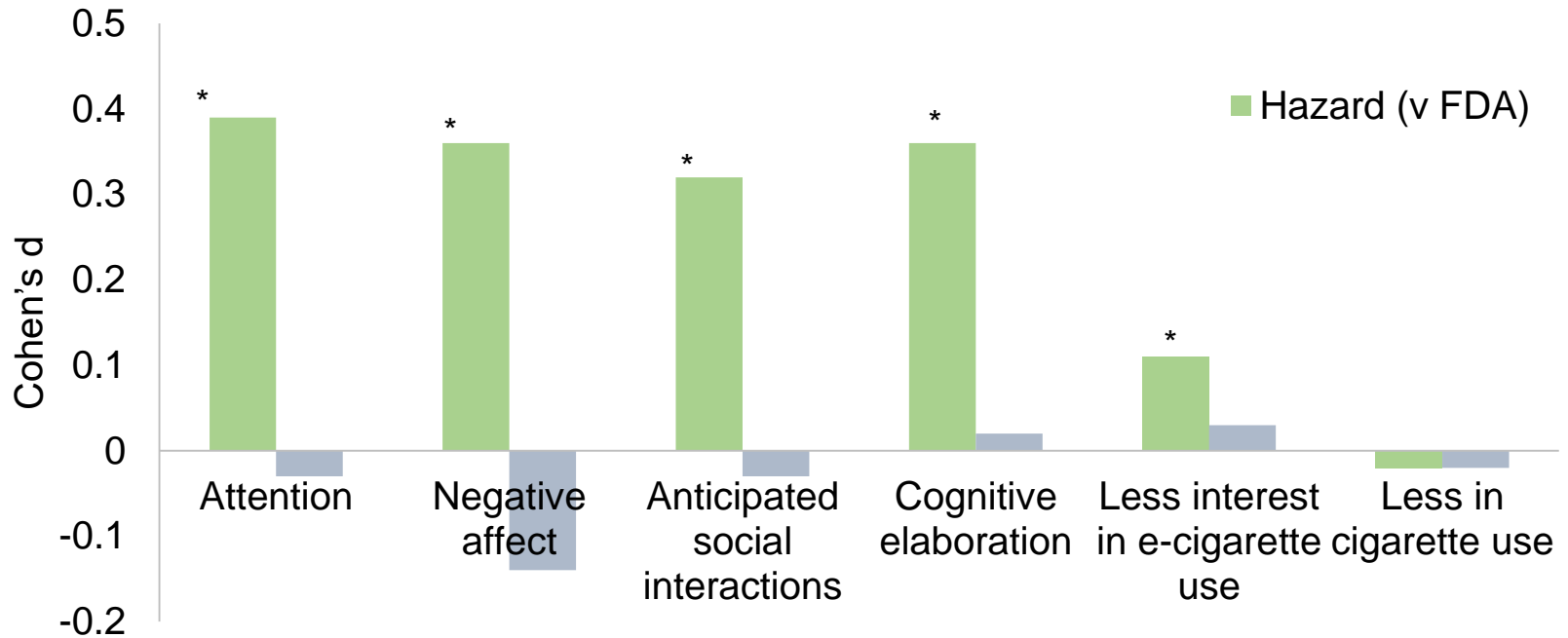
Marissa G. Hall, PhD

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# Impact of warning topic





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