Using Concept Mapping to Examine Electronic Cigarette Users’ Attitudes, Beliefs, and Behaviors.

Eric K. Soule

Center for the Study of Tobacco Products
Virginia Commonwealth University, Department of Psychology
Acknowledgements and disclosures.

• Research presented in this presentation was supported by the National Institute on Drug Abuse of the National Institutes of Health under Award Number P50DA036105 and the Center for Tobacco Products of the U.S. Food and Drug Administration. The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIH or the FDA.

• No conflicts to report.

• No off-label medication uses discussed.
Special thanks to those who have contributed to the research presented today:

- Thomas Eissenberg
- Alison Breland
- Caroline Cobb
- Pebbles Fagan
- Mignonne Guy
- Alexa Lopez
- Sarah Maloney
- Aashir Nasim
- Danielle Terrell
Need for electronic cigarette evaluation.

- Increase in electronic cigarette (ECIG) use in the US:
  - 16% current use (past 30-day) among high school students in 2015 (Singh et al., 2016).
  - 3.7% current use (every day or some days) among adults in 2014 (Shoenborn & Gindi, 2015).

- ECIGs are a class of products that are changing constantly with newer products using higher power, more liquid, and delivering more nicotine (Wagener et al., 2016).

- Need for an iterative model to evaluate rapidly changing products and behaviors.
Center for the Study of Tobacco Products.

Pre-market MRTP evaluation

1) Determine how MRTP characteristics influence toxicant yield.
2) Examine MRTP toxicant yield generated with actual user topography.
3) Investigate how unorthodox use behaviors influence toxicant yield.

Human Laboratory (Project 2)
1) Characterize MRTP toxicant exposure and measure actual MRTP user topography.
2) Assess MRTP abuse liability.
3) Determine how unorthodox MRTP use behavior influences user toxicant exposure and effects.

Randomized Controlled Trial (Project 3)
1) Determine MRTP adverse profile under real-world conditions.
2) Explore dose-related effects on biomarkers of exposure and potential biomarkers of risk.
3) Examine the influence of MRTP use on concurrent tobacco use.

Quantitative/Qualitative (Project 4)
1) Explore user attitudes, beliefs and cognitions about MRTPs, as well as MRTP adverse event and other effects.
2) Identify unorthodox MRTP use behaviors.

Post-market MRTP evaluation
Concept mapping method.

- Concept mapping is a mixed method approach that involves participant tasks and analysis used to develop a cluster “map” that describes content related to a topic of interest (ECIG use).
  1. Brainstorming
  2. Sorting
  3. Rating
  4. Analysis
  5. Interpretation
  6. Utilization

- Our team has used this method previously to examine ECIG use (Soule et al., 2016a, 2016b, 2016c, 2017).
Eligibility, recruitment, and payment.

- Study eligibility: past-30 day ECIG users between the ages of 18 and 64.

- Recruitment:
  - Popular ECIG/vape Internet forums
  - Craigslist from US states randomly selected from each of the 4 census tract regions.

- Payment: Participants received e-gift cards for completing each task (brainstorming, sorting, and rating) earning up to $45 for completing all tasks.
Step 1: Brainstorm around a prompt.

Step 2: Sort statements into piles of similar content.

Step 3: Rate each statement on a scale from 1 to 7.

Step 4: Concept Map generated through MDS of sorting data and hierarchical cluster analysis.
A specific positive, enjoyable, or exciting effect that I have experienced WHILE USING or IMMEDIATELY AFTER USING an electronic cigarette device is...
CSTP concept mapping projects.

- Reasons for electronic cigarette use.
  - n = 108, 125 statements, 11 clusters
- Adverse effects of electronic cigarette use.
  - n = 85, 79 statements, 5 clusters
- Reasons for using flavored electronic cigarette liquids.
  - n = 46, 107 statements, 5 clusters
- Positive outcomes associated with electronic cigarette use.
  - n = 63, 123 statements, 7 clusters

- ECIG use for cigarette smoking reduction/switching behaviors (ongoing).
Smoking cessation potential benefits.

- Smoking cessation was identified across all studies as a reason for ECIG use.
- ECIGs are perceived by some as a better option for smoking cessation.

“It is the only smoking cessation that has worked for me.”
“To curb the craving for smoking cigarettes.”
“Because other nicotine replacement products (e.g., patch) haven't worked as well for me.”
Less satisfaction and relapse potential risks.

- ECIGs may not be as satisfying as cigarettes for some.
- ECIG users may continue smoking despite using ECIGs for smoking cessation.

“Psychological effects make me want to smoke.”
“The buzz is not the same as regular cigarettes.”
“It is hard to completely discontinue the use of cigarettes.”
Perceived health effects potential benefits.

- Perceived health benefits may appeal to cigarette smokers looking to quit.
- ECIG users associate positive health effects with ECIG use.

“To purposefully avoid the thousands of chemicals produced from a burning cigarette.”

“I'm no longer hacking (i.e., coughing) in the morning.”

“So I can exercise/do physical activities without getting winded.”
Perceived health effects potential risks.

- Decreased harm perception may cause unanticipated risks to others.
- Some may associate ECIGs with zero harm.

“I feel comfortable vaping around children and not worried about hurting their health.”

“Feel more comfortable vaping around pets.”

“Not harming my body.”
Convenience potential benefits.

- Some people report that ECIGs are more convenient to use so they are better than cigarettes.

“It delights me that I can vape any place and time.”

“Electronic cigarettes are easier to manage. Instead of having a cigarette and lighter, I have an ‘all-in-one.’”

“I can take a drag or two off of my electronic cigarette instead of going out to smoke a whole cigarette.”
Convenience potential risks.

- ECIHG use in prohibited locations.
- ECIHGs may be addition, rather than replacement for cigarettes (dual use).

“I can take a puff in a location I'm not supposed to without anyone knowing.”

“I use electronic cigarettes to fill in time between morning, afternoon, and evening cigarettes.”

“I use them in places where I cannot smoke a cigarette.”
Flavors potential benefits.

- May make them more appealing and could attract cigarette smokers.
- Perceived benefits of not smelling like cigarette smoke.

“The variety of flavors goes beyond those that can be put in cigarettes.”

“The taste is more pleasant than tasting cigarettes.”

“Does not make my clothes, hair, and body smell like smoke.”
Flavors potential risks.

- Flavors may increase abuse potential of ECIGs.
- ECIGs may be used for other reasons beyond smoking cessation.

“Flavors make it a pleasant experience rather than something to get through for the nicotine.”

“Because they allow me to feel satisfied faster than unflavored liquids.”

“I use e-liquid to curb my eating habits.”
LOSE WEIGHT WITH E-CIGS?

It's old information that nicotine is an appetit suppressant, well if you didn't know already – it is! It helps you lose weight. Scientists believe that nicotine stimulates part of the brain that controls appetite, so when nicotine is ingested you eat less, fact! Nicotine decreases appetite by activating the POMC neurons in the brain.

75958||
Vaping to lose weight: Predictors of adult e-cigarette use for weight loss or control
Meghan E. Morean, Amelia V. Wedel

http://dx.doi.org.proxy.library.vcu.edu/10.1016/j.addbeh.2016.10.022

Highlights
• 13.5% of a sample of adult e-cigarette users reported vaping to lose/control weight.
• These adults were heavier vapers, overweight, and reported restricting calories.
• These adults also preferred coffee or vanilla-flavored e-cigarettes.
• These adults also reported poor impulse control.
Cluster comparisons.

- Cluster mean subgroup comparisons:
  - Dual users vs. ECIG only users
  - Women vs. men
  - Cigalikes vs. 2\textsuperscript{nd} and 3\textsuperscript{rd} generation ECIGs
Cluster comparisons.

- **Dual users of ECIGs and cigarettes** rated Convenience and Social Impacts clusters higher than **non-Past 30 day cigarette smokers**.
- **Non-daily ECIG users** rated the High/Euphoria cluster higher than **Daily ECIG users**.
- **ECIG users who reported “dripping”** rated the adverse Physical Effects cluster higher than **“non-dripping” ECIG users**.
- Regarding flavored ECIGs, **ECIG users <30 YO** rated Increased Satisfaction and Enjoyment, Variety and Customization, and Food Craving Suppression clusters higher than **ECIG users >30 YO**.
Context of study findings.

• ECIGs may produce potential positive and negative population and individual level effects that depend on many factors including:
  - Population
  - Behaviors

• Device characteristics may influence the risk spectrum. In some cases, the same ECIG characteristic may represent a potential benefit for one population and a risk for another population.
Context of findings.

Highest potential for negative effect:
- ECIG use among youth never tobacco users

Dual use of cigarettes and ECIGs

Highest potential for positive effect:
- ECIG use for complete smoking cessation among established smokers

- ECIG characteristics can affect harm potential in potentially positive and negative ways:
  - Flavors may attract cigarette smokers as well as youth.
  - High powered devices may deliver more nicotine but also more toxicants.
Conclusions.

• Concept mapping, a mixed-method approach, can be used to examine electronic cigarette users’ attitudes, beliefs, and behaviors that can be used in combination with other data on abuse liability and toxicity.

• Electronic cigarette use may result in potential positive and negative effects to individual users as well as at the population level.

• Some characteristics of electronic cigarettes may represent benefits as well and risks depending on the population and circumstances.

• Regulations should take into account both the potential positive and negative impacts of electronic cigarette use.