

ACUTE SUBJECTIVE RESPONSES TO SMOKELESS TOBACCO PRODUCTS

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BACKGROUND/RATIONALE

- The last few decades have witnessed an increase in the use of new smokeless tobacco (ST) products such as snus and dissolvables.
- Rapid characterization of ST products is vital to understanding their popularity, consequences of use, and regulatory needs.
- This trial is 1 in a series of 3 that characterized the likelihood of adoption of several new and traditional ST products.

RESEARCH QUESTION

Based on subjective measures of liking, reduction in craving, and reduction in withdrawal, what is the likelihood of adoption of a variety of commercially available smokeless tobacco products?

PARTICIPANTS

- N=30 smokeless tobacco users (30 males)
- Mean age=22.2 yrs (SD=7.60)
- Mean length of ST use=21.72 mths (SD=15.01)
- Race: 90.0% White

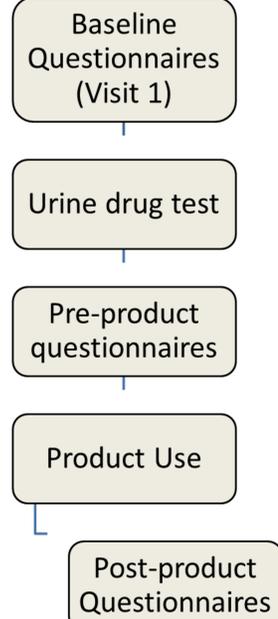
DESIGN

- Within-subjects crossover trial
- 5 laboratory visits; order of visits randomized
- Products: 1. Skoal snuff, 2. Camel snus, 3. Ariva dissolvable tablet, and 4. Verve chewable disc were compared to 5. Nicorette lozenge (medicinal control product w/ low abuse potential)
- Differences between products in self-reported liking, reduced craving, and reduced withdrawal were measured
- Physicochemical characterization of products was conducted
- Outcome measures: change in subjective responses from pre to post-product use

NOTE: Data on change in EEG response, attention (Oddball Task), and salivary HPHC were collected, but are not reported here.

METHODS

Procedures at each of the 5 visits:



MEASURES

MEASURE	Baseline	Pre-product Use	Post-product Use
Demographics and Tobacco Use History	X		
Fagerstrom Test for Nicotine Dependence modified for smokeless tobacco use	X		
Nicotine Dependence Syndrome Scale modified for smokeless tobacco use	X		
Urine drug test	X		
Minnesota Nicotine Withdrawal Scale modified for smokeless tobacco use		X	X
Questionnaire on Smoking Urges (Brief) modified for smokeless tobacco use		X	X
Schuh Stitzer Scale of Tobacco Use Urges modified for smokeless tobacco use		X	X
Duke Sensory Questionnaire modified for smokeless tobacco use		X	X
Cigarette Evaluation Scale modified for smokeless tobacco use		X	X

PRODUCTS

Product unit mass, pH, water, and nicotine content of smokeless products tested.

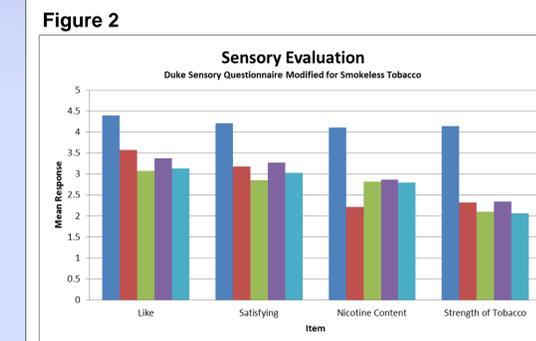
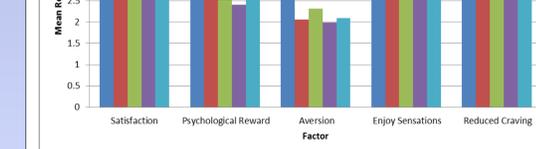
Product	Flavor	Mass (g) per Pouch, Tablet or Disc	Moisture (%)	pH	Total nicotine (mg)	Unprotonated nicotine (mg)
Camel snus	Mellow	0.564	31.7	7.55	4.95	1.25
Ariva dissolvable tablet	Wintergreen	0.290	4.08	6.75	1.30	0.067
Verve chewable disc	Blue Mint	0.491	7.88	7.58	0.90	0.24
Skoal snuff	Classic Straight	1.499	53.5	7.45	15.4	3.27
Nicorette nicotine lozenge	Original	1.208	2.18	9.77	1.73	1.70

Source: Battelle Memorial Institute, Columbus, OH; n=5 replicates/product



RESULTS

- Repeated measures mixed model analysis
- Significant differences between 5 products in aversion ($p < .001$), reduced craving ($p = .002$), and satisfaction factors ($p = .014$), plus overall reinforcement ($p < .001$). *Skoal had significantly higher ratings than each of the other products (see Figure 1).
- Significant differences between 5 products in liking ($p = .014$), satisfaction ($p = .032$), nicotine content ($p < .001$), and strength of tobacco ($p < .001$). *Skoal had significantly higher ratings than each of the other products (see Figure 2).
- No significant differences between products in overall relief of craving or withdrawal (not shown).
- Skoal snuff produced highest ratings of liking, reduced craving, and reduced withdrawal; Camel snus 2nd highest.



CONCLUSIONS

- Diversity exists in the likelihood of adoption of the 5 ST products tested.
- Skoal snuff is the most likely of the 5 products to be used again.
- Total and unprotonated nicotine content and moisture level may contribute to likability; (Skoal and Camel products had greatest nicotine and moisture levels).
- Future studies should explore the roles that nicotine content, flavors, and moisture play in product likeability, initiation, continued use, and exposure to harmful constituents.

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