

ENDS Flavors:

Their Role in Initial Liking at Trial, Preference Formation, and Switching

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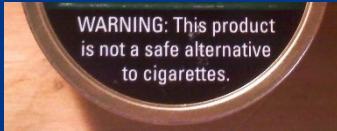


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Tobacco Harm Reduction at Altria

**Communicating
about the health
effects of
tobacco use**



**Help Reduce
Underage
Tobacco Use**



**Supporting
Cessation**



**Developing &
Marketing
Lower-Risk
Tobacco
Products**



We aspire to be the U.S. leader in authorized, non-combustible, reduced-risk products



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Product Platforms

E-Vapor/ENDS

MARKTEN®



Oral Tobacco/ Nicotine Products



Heated Tobacco Products

IQOS®
THIS CHANGES EVERYTHING



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Existing Literature: What do we know?

1. Flavors may play an important role in continued e-vapor use after trial and non-tobacco flavors may play a pivotal role in aiding transitions from smoking to vaping. (e.g. Audrain-McGovern, Strasser, Wileyto 2016; Barbeau, Burba and Siegel 2013; Czoli et al. 2015; Farsalinos et al. 2013; Harrell et al. 2014; Nonnemaker et al. 2015; Pechacek et al. 2016; Shiffman et al. 2015; Simmons et al. 2016; Soule, Rosas, Nasim 2016)
2. PATH data demonstrates significant positive associations between past-year smoking reduction/cessation and use of non-tobacco and non-menthol flavored e-liquids among young adult e-vapor users, age 18-34. (Chen, 2018)
3. A survey of over 20,000 adult, frequent e-vapor users suggests greater popularity of non-tobacco e-liquid flavors among individuals who have switched completely from smoking cigarettes to using e-vapor products. (Russel et al., 2018)

MarkTen® Actual Use Study*

Research Question:

What role, if any, do flavor options play in switching behavior associated with MarkTen®?

- ❑ We conducted an 8-week, 2-phase, actual use study with 614 adult cigarette smokers not planning to quit
- ❑ We characterized MarkTen® (M10) e-vapor use behavior and its influence on other tobacco use behavior
- ❑ We examined the potential role of flavor variety (14 flavors) on behavioral outcomes

*Some info presented elsewhere: Vansickel AR, Cheng H, Lugo E (2018). The role of MarkTen® e-vapor flavor variety in cigarette smoking reduction among adult cigarette smokers not planning to quit smoking: results of a 6-week at-home use study. Poster presented at the Society for Research on Nicotine and Tobacco meeting in Baltimore, MD.



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Key Findings

1. All 14 flavors:
 - were needed to meet participant preferences ^a at trial and
 - were used ^b during the 6-week phase
2. Flavor preferences changed and participants' consideration sets narrowed over time
3. Participants that switched generally used more flavor varieties
4. Greater flavor usage = greater reduction in cigarettes after 6 weeks

a: based on highest rating of liking (initial liking at trial)

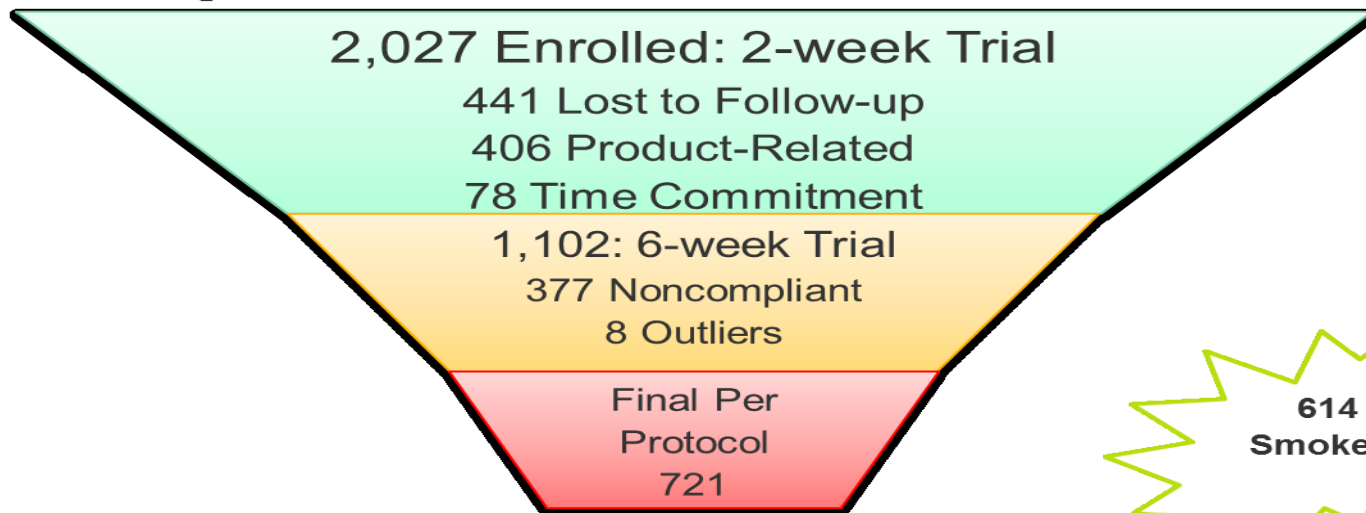
b: used by at least one participant on at least 1-day each week



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Actual Use Study: Sample Disposition

Screening N = 2,065



**614
Smokers**

Adult Cigarette Smokers = 344

Adult Dual E-Vapor/Cigarette Users = 270

Exclusive E-Vapor Users = 107 (not reported here)

Lost to follow up: Did not return, even after re-contact

Product-related: Did not use during trial or did not score ≥ 3 on intentions to use

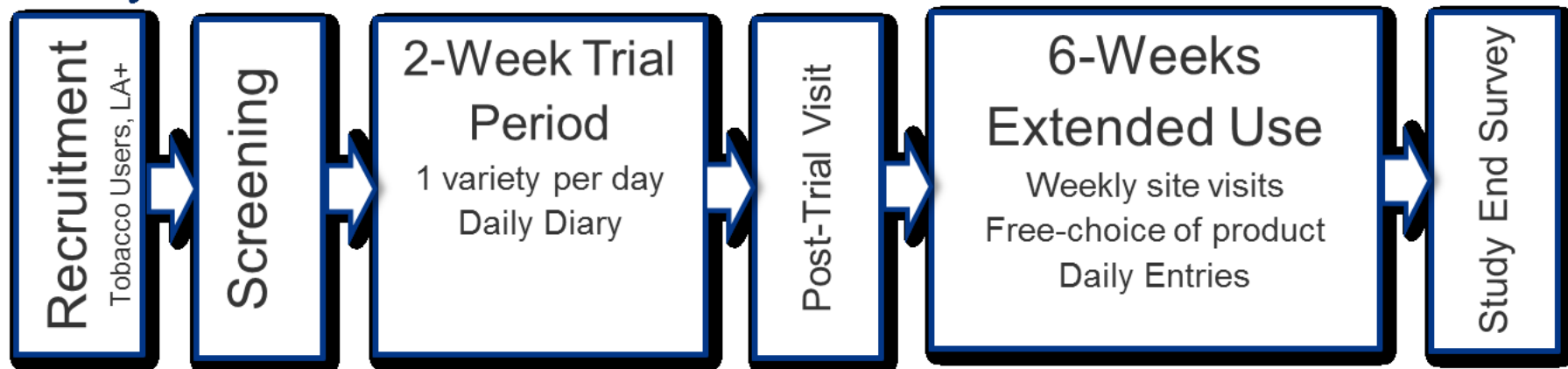
Noncompliant: Missed 5 or more daily surveys in a row or missed > 2 Day 7 surveys



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Actual Use Study: Overview

Study Overview



- ≥ 3 Intentions to Try
- No plans to quit smoking in next 3 months

≥ 3 Intentions to Use



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Actual Use Study: Strengths and Limitations

Strengths:

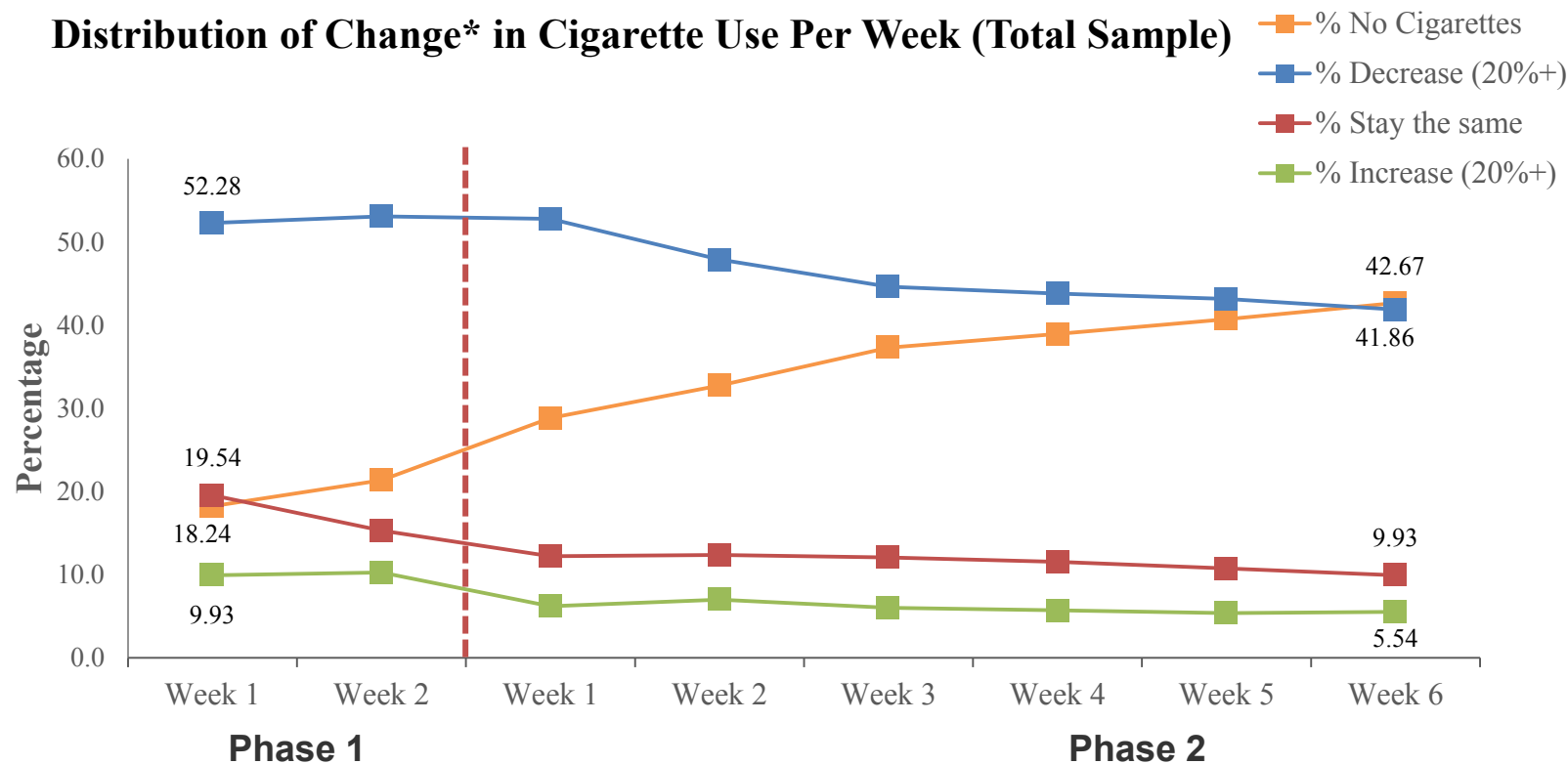
- Near Real World Conditions (inclusion of individuals that would be likely to try and use product in market, open-access to flavor portfolio, at-home use, self-determined usage levels)
- Daily data capture of all tobacco use
- Robust sample

Limitations:

- Non-probability based sample
- Free product
- Exclusion of smokers planning to quit
- Study duration

Participants Reduced Cigarette Smoking Behavior

Distribution of Change* in Cigarette Use Per Week (Total Sample)

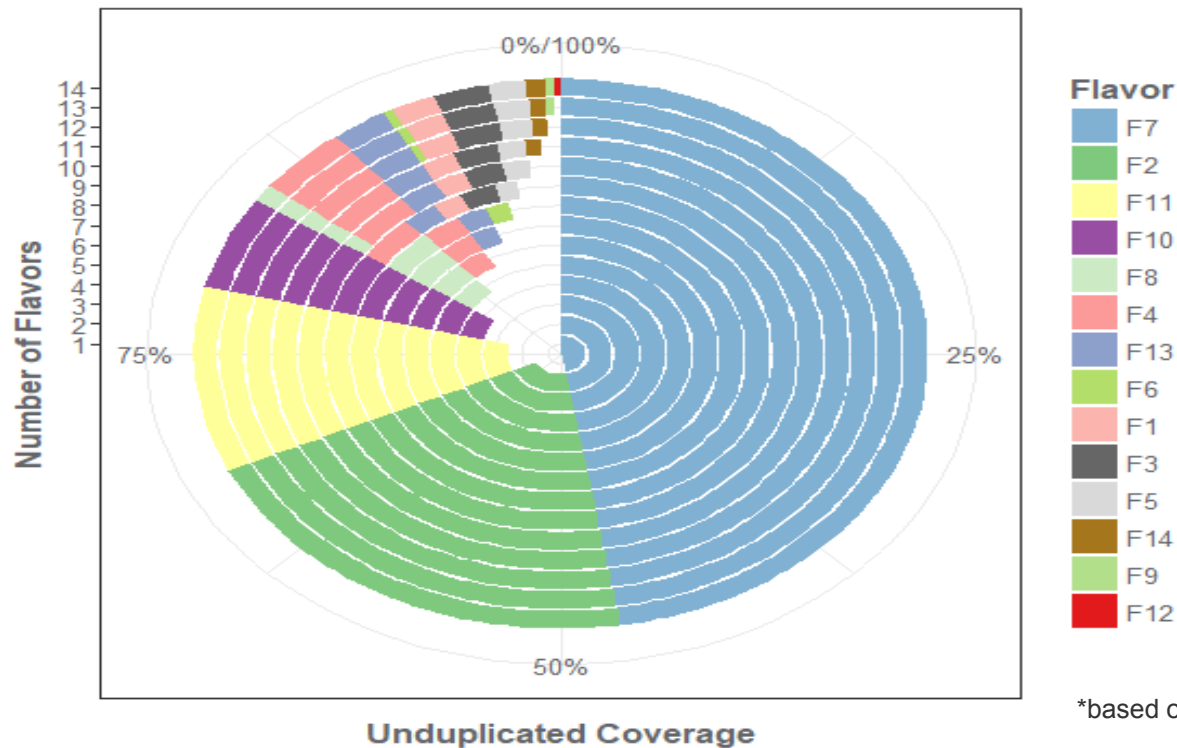


*Change based on number of cigarettes smoked past 7 days at screening

14 Flavors Were Needed to Meet Preferences* During Trial

Total Unduplicated Reach and Frequency Analysis (TURF)

Top Liking Rating (7-point) during Phase 1



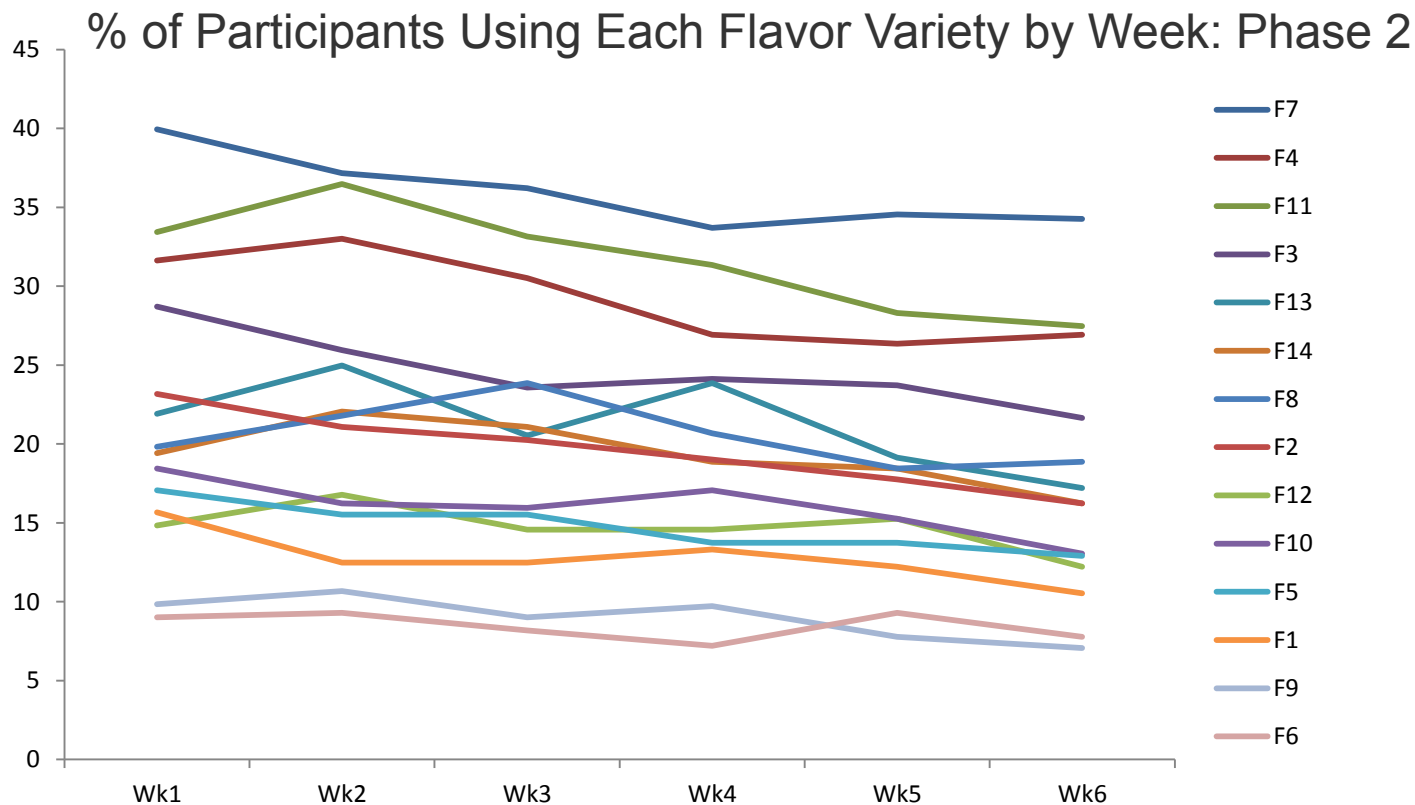
*based on highest rating of liking



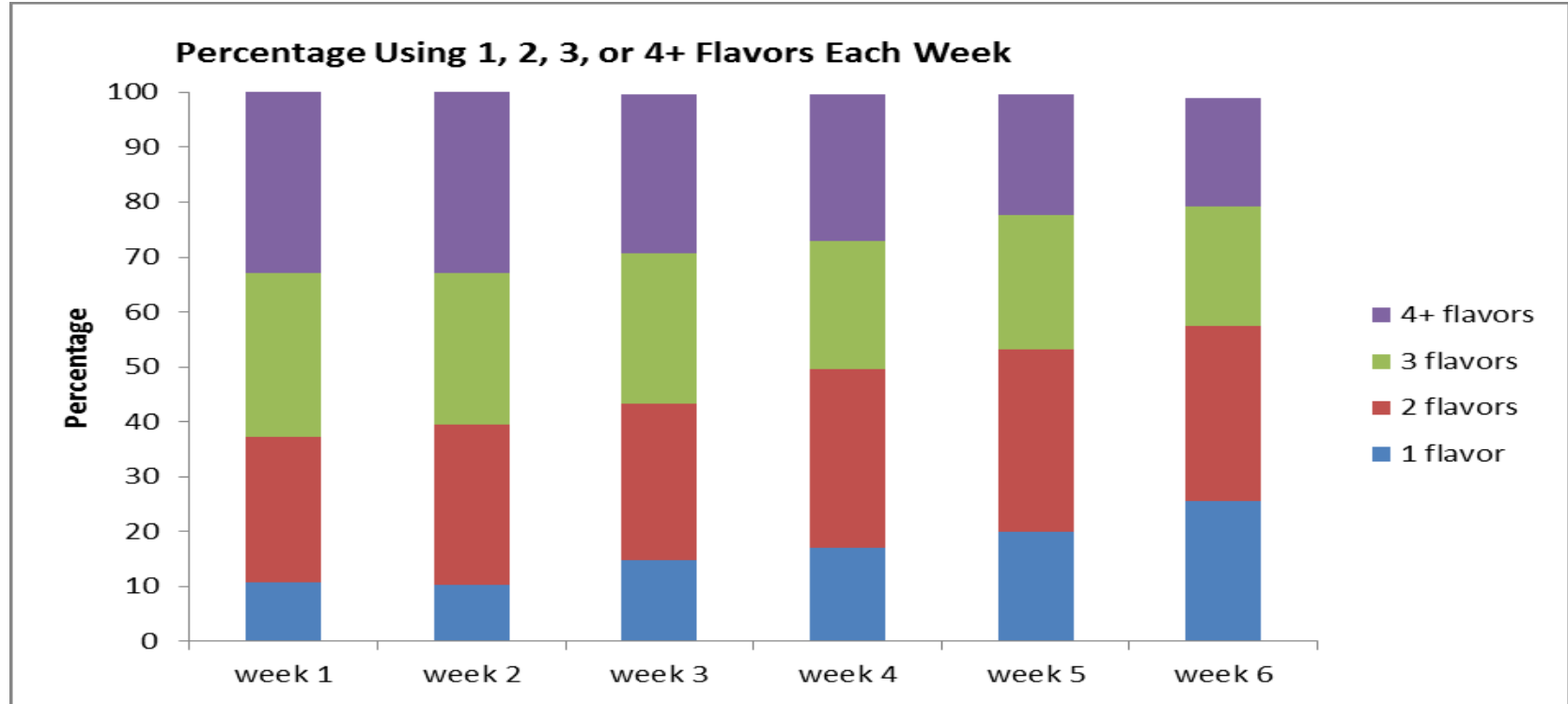
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14 Flavors Were Used during Phase 2

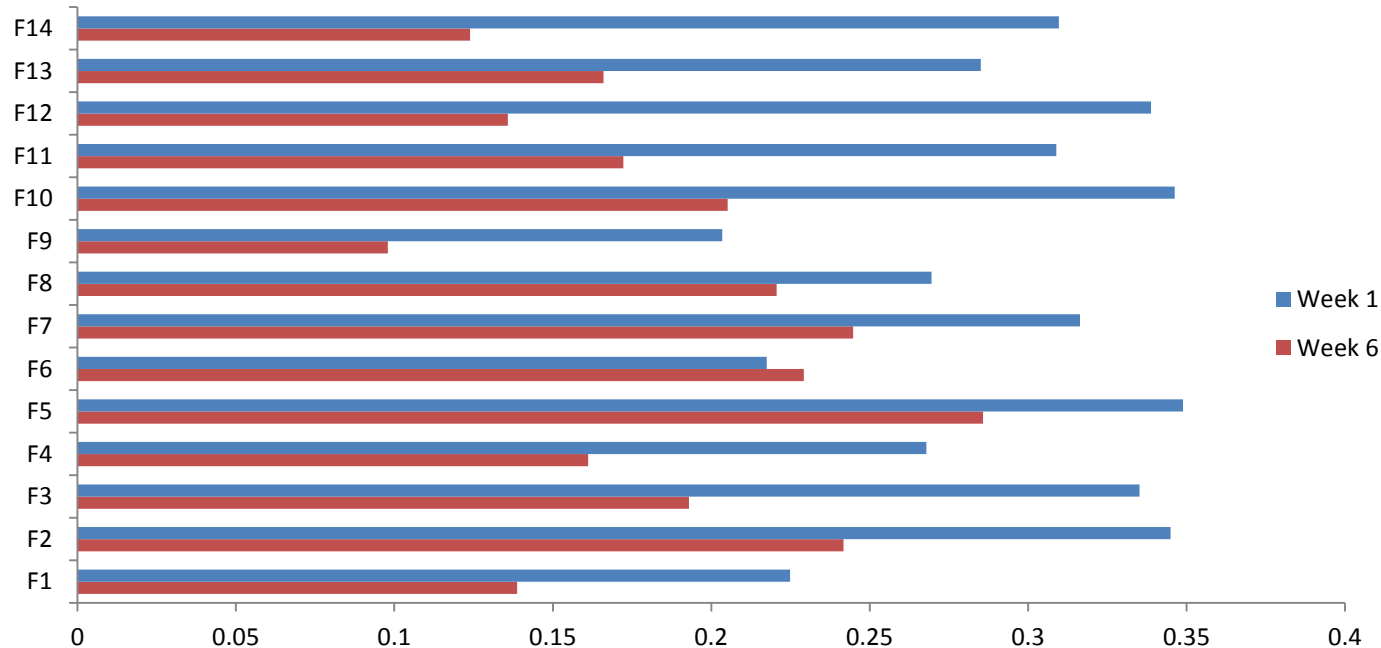


Flavor Consideration Sets Narrowed over Time



Relationships between Initial Liking and Use Occasions Weakened Over Time

Correlation Coefficients for Relative Liking^a and Relative Use Occasion^b



a: Liking scores during trial adjusted for individual ratings overall

b: Use occasions during week 6 adjusted for individual usage levels

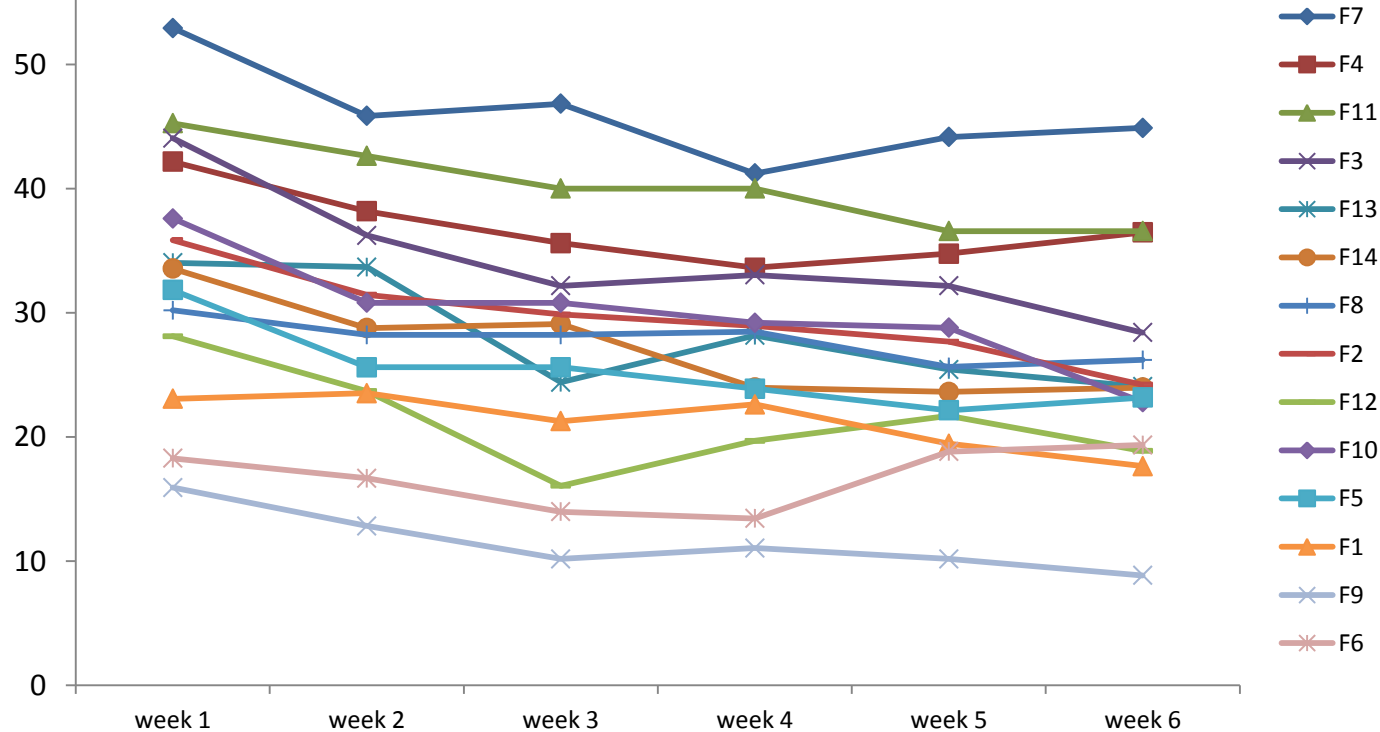


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Flavor Preferences Changed over Time

% Participants Used a Flavor Ranked in Their Top 4 Liking during Trial



Top 4: The four flavors rated highest on the 7-point liking scale during trial (Phase 1)

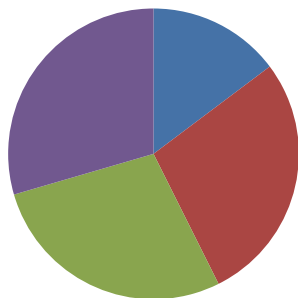


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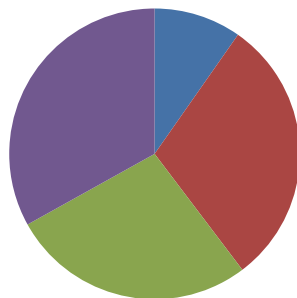
Participants that Switched Used More Flavors

Number of Flavors Used by Behavioral Outcome

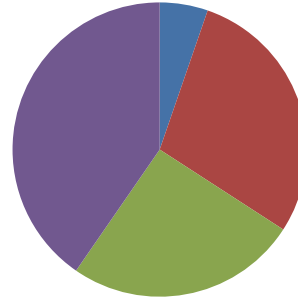
Smoked Same Amount
N = 61



Decreased^a Cigarettes
N = 257



Switched^b to MarkTen[®]
N = 208



- 1 to 2 varieties
- 3 to 4
- 5 to 6
- 7 or more

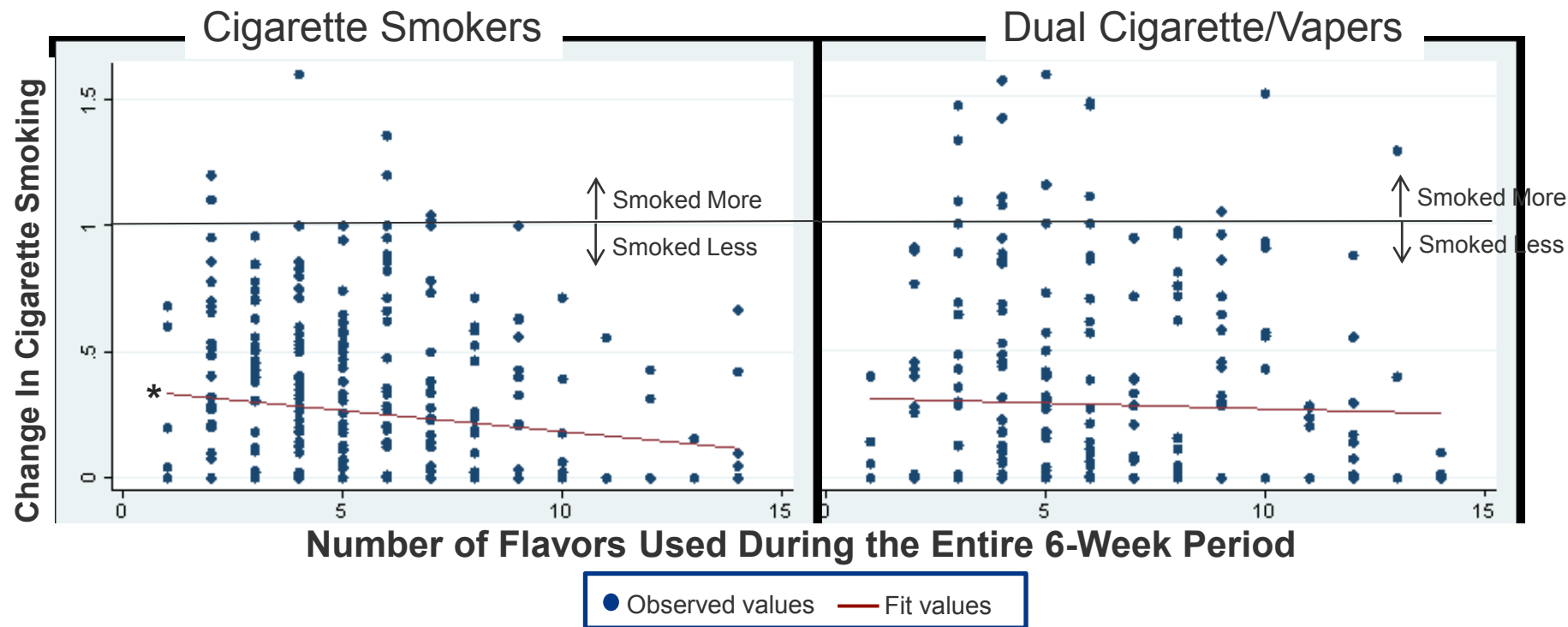
	Same	Decrease	Switched
Mean Number of Flavors	5.48	5.92	6.42
S.E.M	0.70	0.37	0.44

a: Decreased by 20% or greater by week 6 (Phase 2)

b: No cigarettes during week 6 (Phase 2) and still using MarkTen[®]



Number of Flavors Played a Role in Smoking Reduction



*Significant association between #flavors and week 6 #cigs/baseline
N = 6 extreme outliers removed from Dual Cigarette/Vapers



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Overall Conclusions

- MarkTen® products present an opportunity to reduce the harm from cigarette smoking
- Flavor options play a role in adult cigarette smokers' early trial and adoption of MarkTen®
 - A wide variety of flavor options is necessary to capture all adult smokers' preferences
- Flavor usage changes over time and later flavor preferences do not necessarily reflect early liking/preference for flavor options
- Flavor variety appears to play a role in adult cigarette smokers' switching behavior and smoking reduction

Conclusions Continued

- Results align with the growing body of literature¹ suggesting:
 - Flavors may play a critical role in continued ENDS use after trial and
 - in moving adult cigarette smokers toward potentially less harmful tobacco products

1: e.g. Audrain-McGovern, Strasser, Wileyto 2016; Barbeau, Burba and Siegel 2013; Czoli et al. 2015; Farsalinos et al. 2013; Harrell et al. 2014; Nonnemaker et al. 2015; Pechacek et al. 2016; Shiffman et al. 2015; Simmons et al. 2016; Soule, Rosas, Nasim 2016

