User Perceptions of Different Electronic Cigarette Flavors on Social Media: Observational Study

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Introduction

❖ The number of electronic users has been increasing rapidly in recent years, especially among youth and young adults.

❖ More e-cigarette products have become available, including e-liquids with various brands and flavors.

❖ Various e-liquid flavors have been frequently discussed by e-cigarette users on social media.

❖ This study aimed to examine the longitudinal prevalence of mentions of electronic cigarette liquid flavors and user perceptions on social media.

Methods

❖ E-cigarette flavors and brands were collected from various online vape shops.
❖ E-cigarette flavors were manually categorized three layers of classification based on their flavor components.
❖ The major flavor category included 7 categories, which are Fruit, Sweets, Beverage, Tobacco, Menthol/Mint, Mixed and Others.
❖ Twitter and Reddit e-cigarette related posts were collected by searching relevant keywords with several rounds of filtering.
❖ The temporal trend of mentions of e-liquid flavor categories was compiled using Reddit data from January 2013 to April 2019.
❖ Twitter data were analyzed using a sentiment analysis from May to August 2019 to explore the opinions of e-cigarette users toward each flavor category.
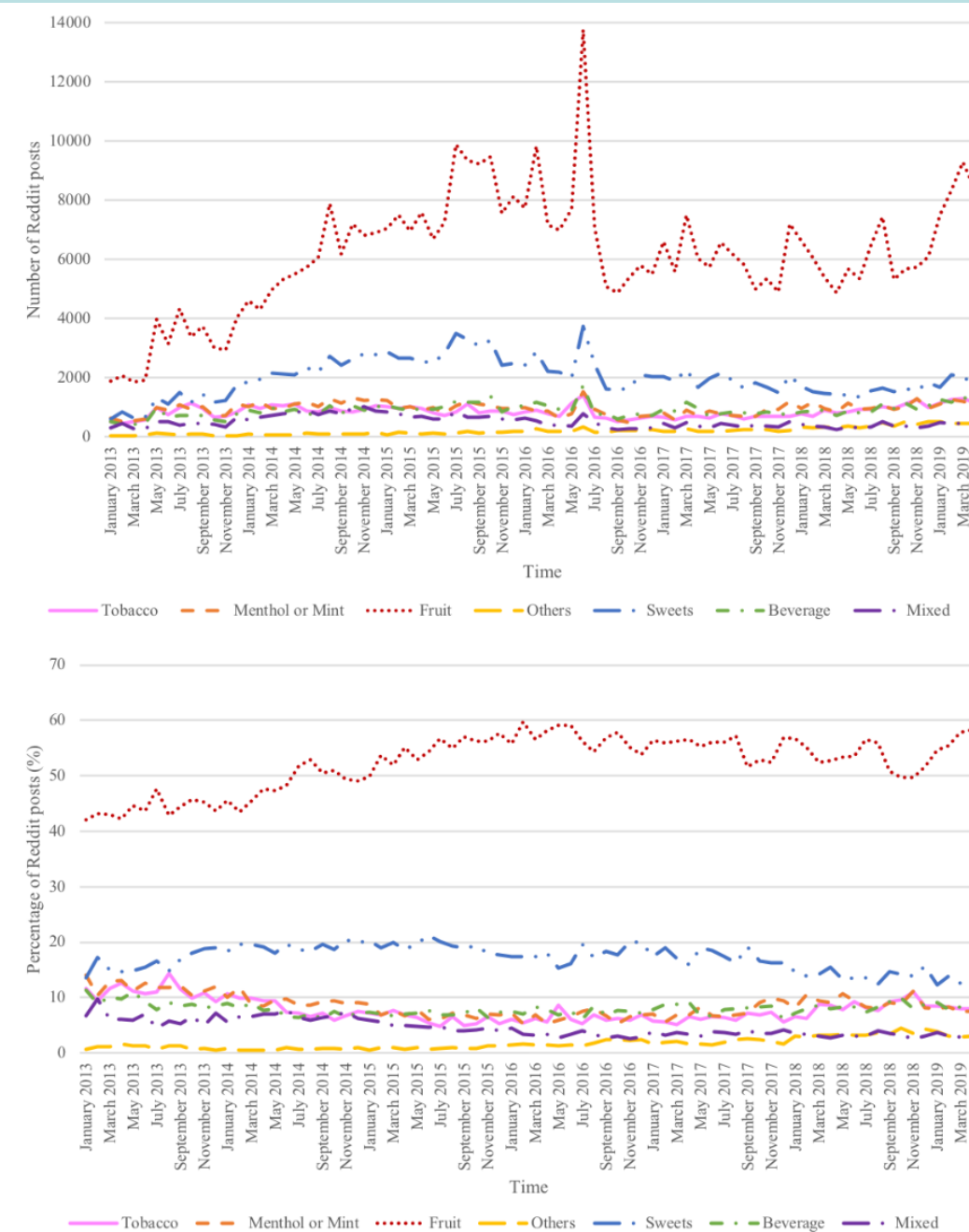
Results

Figure 1: The longitudinal trend of e-liquid flavors mentioned on Reddit, from January 2013 to April 2019.
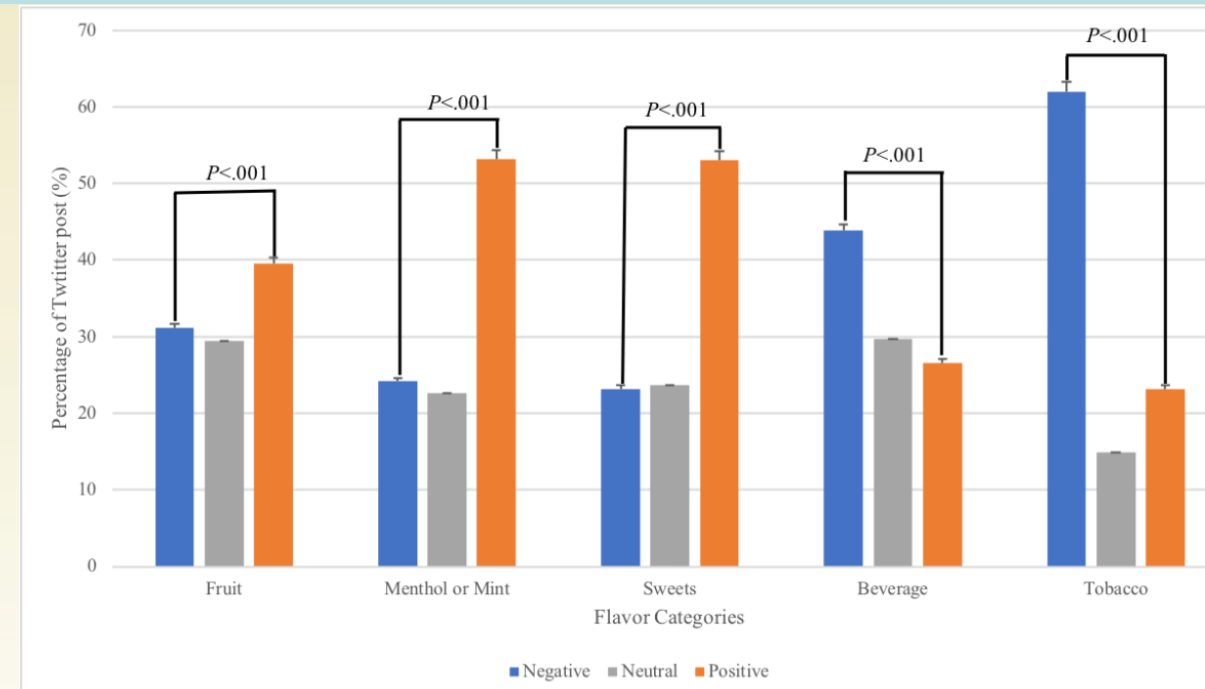

Figure 2: Sentiment analysis of the flavor categories mentioned on Twitter. Error bars represent the estimated SDs.

Table 1: Sentiment analysis of flavor categories on Twitter.

Flavor category	Total post count, N	Average sentiment score, mean (SD)
Fruit	9852	0.074 (0.453)
Menthol or mint	4582	0.128 (0.379)
Sweets	3190	0.156 (0.442)
Beverage	1805	−0.090 (0.451)
Tobacco	1555	−0.134 (0.440)

Table 2: Percentage distribution of e-liquid flavors mentioned on Reddit.

Flavor categories and subcategories	Count, n (%)
Fruit	1,586,926 (58.15)
Berry	727,404 (45.84)
Others	374,886 (23.62)
Tropical	190,639 (12.01)
Melon	138,876 (8.75)
Mixed fruit	102,618 (6.47)
Citrus	52,503 (3.31)
Sweets	400,500 (14.67)
Dessert	189,946 (47.43)
Others	113,688 (28.39)
Candy	96,866 (24.18)
Beverage	277,005 (10.15)
Coffee	118,129 (42.64)
Tea	107,449 (38.80)
Milk	21,764 (7.85)
Juice	21,117 (7.62)
Soft drink	5377 (1.94)
Others	3169 (1.14)
Menthol or mint	229,817 (8.42)
Menthol	173,641 (75.56)
Mint	56,176 (24.44)
Tobacco	163,377 (5.99)
Others	43,922 (1.61)
Mixed	24,769 (0.91)

Discussion

❖ Fruit and sweets flavors were the most popular flavors mentioned on social media, which remained to be the top popular flavors mentioned on social media over time.
❖ The sentiment analysis result showed significant positive attitudes toward fruit and sweets flavor categories.
❖ The perception of e-cigarette flavors on social media positively correlates with their popularity, that is, a positive sentiment correlates with high popularity on social media.

Conclusion

❖ The most updated information about the popular e-liquid flavors mentioned on social media was investigated, which showed that the prevalence of mentions of e-liquid flavors and user perceptions on social media were different.

❖ Fruit was the most frequently discussed flavor category on social media.

❖ Our study provides valuable information for future regulation of flavored e-cigarettes.

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