

Comparisons of dependence on cigarettes and e-cigarettes: Data from the PATH study



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Background and Objective

- Dependence on nicotine products typically drives persistent use and difficulty quitting.¹
- Use of e-cigarettes, which deliver nicotine – sometimes at rates similar to cigarettes – is increasing.
- Studies suggest there may be less dependence on e-cigarettes than on conventional cigarettes.²
- However, validated measures that can compare dependence on e-cigarettes versus cigarettes are lacking.
- Strong et al.³ used data from the Population Assessment of Tobacco And Health (PATH) and Item Response Theory to develop a validated dependence measure comparable across tobacco and nicotine products.
- We used this measure and PATH data to compare dependence on e-cigarettes and cigarettes among various adult populations with differing usage patterns.

Methods

- PATH is a nationally representative FDA-sponsored survey representative.
- PATH Wave 1 included 12,946 adults who smoked cigarettes or used e-cigarettes in the past year.
- Respondents completed a 16-item dependence scale for cigarette smoking and/or e-cigarette use.
- The cigarette assessment was only administered to current established smokers who did not use other tobacco products other than e-cigarettes (n=7,435).
- Established e-cigarette users (n=1,575) were assessed.
- Past-year quitters of cigarettes (n=751) or e-cigarettes (n=509) (hereafter referred to as former users) were queried about residual dependence.
 - This assessment of residual dependence was not validated to the same degree, and ratings of current and residual dependence may not be comparable.
- E-cigarette users who had never smoked cigarettes (n=21) were not included in this analysis.
- Cigarette and e-cigarette experimenters were not consistently assessed.
- N=7,625 adults who smoked cigarettes or used e-cigarettes in the past year were included in these analyses.
- Dependence was scored per Strong et al.³ (items scored on a 1-5 scale across 16 tobacco dependence symptoms⁴).
 - Analyses using PATH weights considered within- or between-subject differences in dependence on cigarettes and e-cigarettes.
- Analyses examined variation by smoking and e-cigarette use status.

References

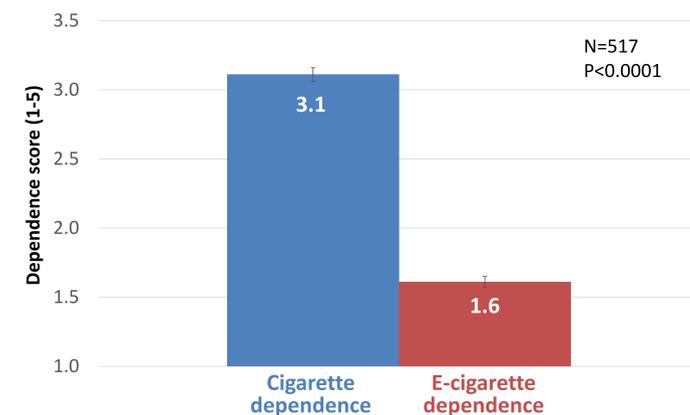
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Results

Users of Both Cigarettes and E-cigarettes

- In within-subject analyses of dual users of cigarettes and e-cigarettes, dependence on e-cigarettes was lower than on cigarettes.

Figure 1. Dependence among current users of cigarettes & e-cigarettes

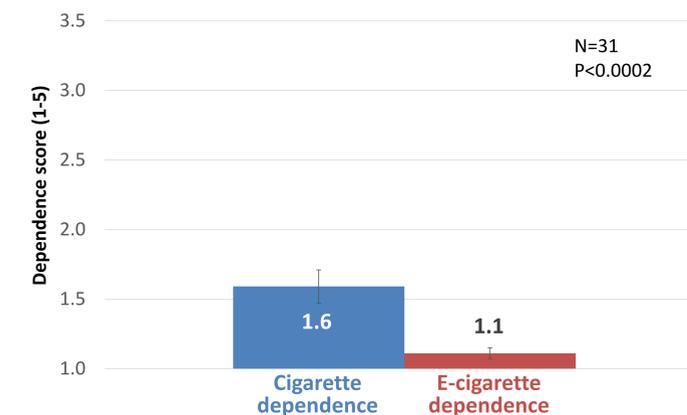


Error bars are standard errors

Former Users of Both Cigarettes and E-cigarettes

- In within-subject analyses of former users of cigarettes and e-cigarettes, dependence on e-cigarettes was lower than on cigarettes.

Figure 2. Dependence among former users of cigarettes & e-cigarettes

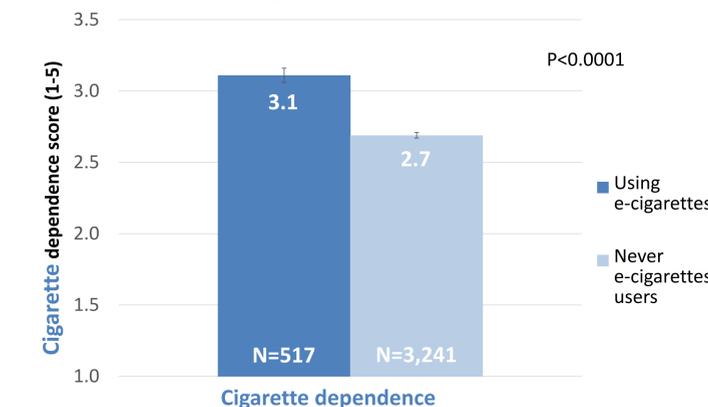


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Cigarette Dependence, Using E-cigarettes or Not

- The smokers who used e-cigarettes were more dependent on cigarettes.

Figure 3. Smokers' cigarette dependence: E-cigarette users & non-users

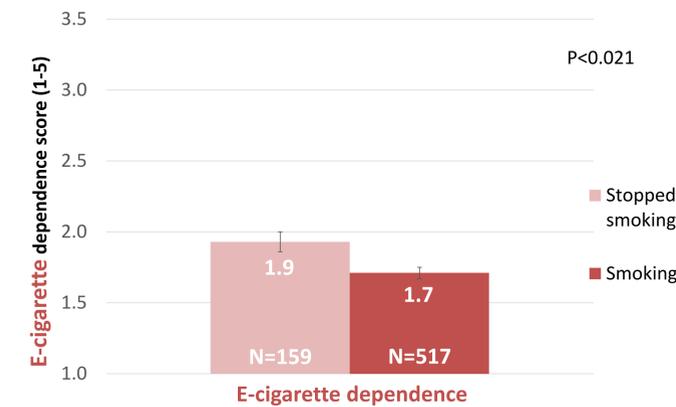


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E-cigarette Dependence: Smoking or Stopped Smoking

- 89% of former smokers used e-cigarettes daily vs. 37% of current smokers (OR=14.2, 95% CI=7.4-27.4).
- The model controls for daily (≥27 days in past 30) vs. non-daily use of e-cigarettes; adjusted means are reported in Figure 4.
- Among daily e-cigarette users, those who had stopped smoking were slightly more dependent on e-cigarettes than those who continued to smoke.

Figure 4. E-cigarette users' e-cigarette dependence: Stopped smoking vs. not

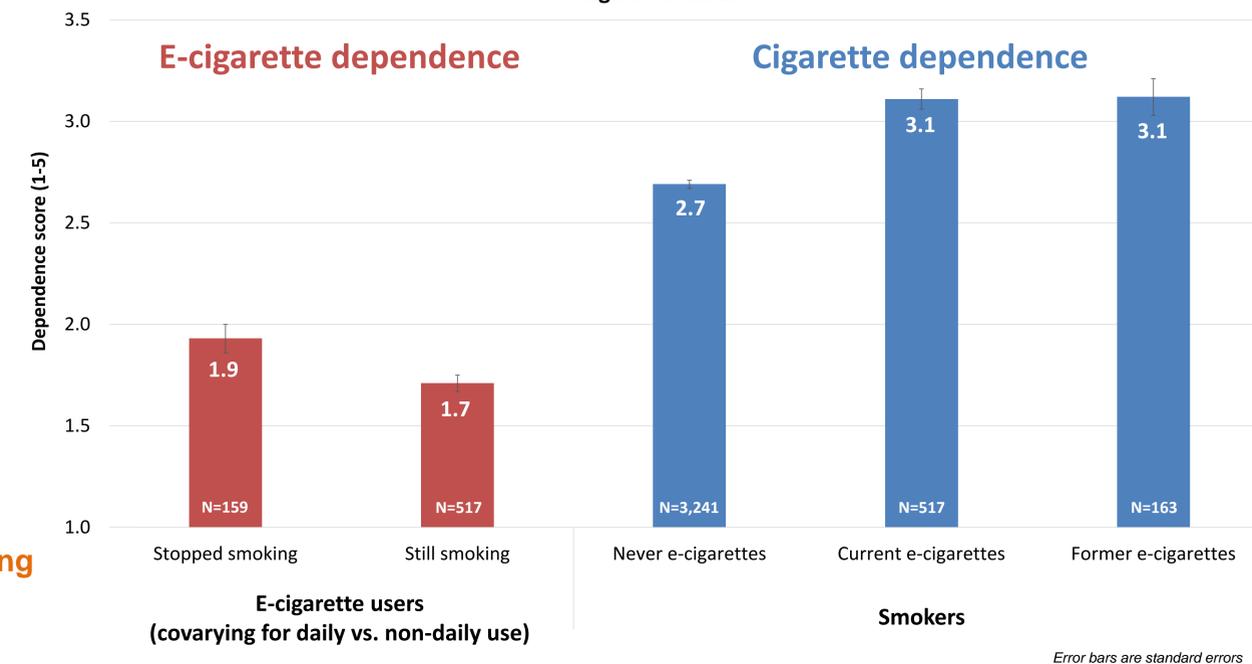


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By Cigarette and E-cigarette Status

- In analyses across cigarette smoking and e-cigarette use categories, dependence on e-cigarettes was consistently and significantly lower than dependence on cigarettes.

Figure 5. E-cigarette dependence (red bars) and cigarette dependence (blue bars), by smoking and e-cigarette status



Error bars are standard errors

Summary/Conclusions

- All analyses showed significantly lower dependence on e-cigarettes than on cigarettes. This was true for:
 - Current users of each product individually
 - Current users of both products ("dual users")
 - Former users of either or both products
- Regardless of use status, dependence on e-cigarettes was always lower than dependence on cigarettes.
- Dependence on e-cigarettes was highest among daily e-cigarette users who had quit smoking in the past year, who may have transferred their dependence from cigarettes to e-cigarettes.
- In the current context, some differences in dependence could be due to duration of use, which is longer for cigarettes than for e-cigarettes; the fact that cigarette smoking and, likely dependence, was typically established before e-cigarette use was initiated may also be a factor.
- These results suggest that e-cigarettes may result in less dependence than cigarettes.

Disclosure

PinneyAssociates, Inc. provides consulting services on tobacco harm minimization (including nicotine replacement therapy and vapor products) to Nicovum USA, Inc., R.J. Reynolds Vapor Company, and RAI Services Company, all of which are subsidiaries of Reynolds American Inc. Dr. Shiffman also owns an interest in intellectual property for a novel nicotine medication that has not been developed. Dr. Kim is employed by RAI Services Company, a wholly owned subsidiary of Reynolds American Inc., whose operating companies market non-combusted tobacco products. This research was sponsored by RAI Services Company.

