



Young adult e-cigarette use outcome expectancies: Validity of a revised scale and a short scale

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HIGHLIGHTS

- The revised youth e-cigarette outcome expectancies measure is valid and reliable.
- Positive ‘smoking’ experience is a major dimension of positive e-cigarette outcome expectancies.
- Higher positive outcome expectancies are associated with higher e-cigarette use dependence.
- The short version of the measure is reliable and valid.
- The short version of the measure may be easily integrated into surveys.

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ABSTRACT

The revised youth e-cigarette outcome expectancies measure adds new items informed by recent qualitative research with young adult e-cigarette users, especially in the domain of positive “smoking” experience. Positive “smoking” experience represents beliefs that use of e-cigarettes provides outcomes associated with a better “smoking” alternative: for example, an alternative that is more socially approved, more suitable for indoor use, and that provides a safer means of enjoying nicotine. In addition, we tested a short, 8-item version of the measure which may be more easily incorporated into surveys. We tested the validity of the revised measure, both long and short versions, in terms of factor structure and associations of the expectancy factors with current e-cigarette use, e-cigarette use susceptibility, and e-cigarette use dependence. Participants were young adults ($N = 470$; 65% women; mean age = 20.9, $SD = 2.1$). Results replicated the findings of the previous study as well as highlighted the importance of the added domain of positive “smoking” experience and the validity of the short scale. Furthermore, results showed that positive outcome expectancies are strongly associated with e-cigarette use dependence. The long and short versions of the revised youth e-cigarette outcome expectancies scale appear to be valid and useful for application not only among cigarette smokers and e-cigarette users but also among never smokers and never e-cigarette users.

1. Introduction

Electronic or e-cigarette use prevalence is increasing rapidly among adolescents and young adults. The Monitoring the Future survey (Johnston, O’Malley, Miech, Bachman, & Schulenberg, 2016) found that past-30-day e-cigarette use prevalence among 8th and 10th graders are twice as high as the prevalence of past-30-day cigarette use. While e-cigarette use prevalence is highest among current or former regular cigarette smokers (Delnevo, Giovenco, Steinberg, et al., 2016; Pearson, Richardson, Niaura, et al., 2012), there are concerns that e-cigarette use is on the rise even among non-tobacco smoking adolescents and young adults (Primack, Soneji, Stoolmiller, Fine, & Sargent, 2015; Wills et al.,

2017).

Outcome expectancies are central to the motivational models of substance use etiology (Brandon, Juliano, & Copeland, 1999; Patel & Formme, 2010). Outcome expectancies refer to the beliefs that certain outcomes can be experienced by engaging in a behavior. Research on e-cigarette use outcome expectancies is burgeoning (Brikmanis, Peterson, & Doran, 2017; Harrell et al., 2017; Hendricks, Cases, Thorne, et al., 2014). However, there is still a relative dearth of empirical research examining various types of positive and negative outcome expectancies associated with e-cigarette use, especially among youth and young adults. This is partly because of a lack of well-validated scales that would be predictive of not only e-cigarette use but also e-cigarette use

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susceptibility and dependence. Very few detailed self-report instruments for e-cigarette outcome expectancies exist that can be administered simultaneously to e-cigarette users, cigarette smokers, and non-users, including never users. In addition, outcome expectancy scales developed primarily for use among adults may not assess dimensions particularly relevant for young people; for example, use of e-cigarettes for social enhancement (Pokhrel, Little, Fagan, Muranaka, & Herzog, 2014).

The previous version of the youth e-cigarette outcome expectancies scale (Pokhrel, Little, Fagan et al., 2014) was developed as a comprehensive measure for application among adolescents and young adults; based on an existing measure of adolescent cigarette smoking expectancies (Hine, Honan, Marks, & Brettschneider, 2007). The measure was also informed by the current science of the time regarding e-cigarette use motives (Etter, 2010; Etter & Bullen, 2011). The factor structure of the scale was established through exploratory and confirmatory factor analyses in separate subsamples of young adult college students and included three positive and four negative outcome expectancy factors. The positive outcome expectancy factors included social enhancement, affect regulation, and positive sensory experience. Social enhancement expectancies referred to beliefs such as use of e-cigarettes will result in popularity among peers and enhanced social image. Affect regulation referred to beliefs that e-cigarette use will help reduce stress or make one feel good. Positive sensory experience expectancies referred to the beliefs that e-cigarette use will allow one to enjoy good taste and smell. We found the positive outcome expectancy factors to be associated with higher likelihood of lifetime and past-30-day e-cigarette use and, among never e-cigarette users, increased e-cigarette use susceptibility.

The four negative outcome expectancy factors were negative health consequences, addiction concern, negative appearance, and negative sensory experience. Addiction concern items assessed beliefs that use of e-cigarettes would lead to nicotine addiction or e-cigarette dependence and may make quitting cigarettes more difficult. Negative appearance referred to beliefs that e-cigarette use would look odd, awkward, or unpleasant. Negative health consequences assessed beliefs that e-cigarette use harmed one's health and body. Lastly, negative sensory experience included beliefs that e-cigarette use resulted in bad smell, breath and taste. In general, we found that the negative expectancy factors were inversely associated with lifetime and past-30-day e-cigarette use and, among never e-cigarette users, lower e-cigarette use susceptibility.

The existing e-cigarette outcome expectancies scale was recently revised based on the findings of a focus group study we conducted with young adult e-cigarette users (Pokhrel, Herzog, Muranaka, & Fagan, 2015). The purpose of the qualitative study was to conduct an in-depth examination of young adults' motives and expectancies associated with e-cigarette use. The study found several reasons for e-cigarette use that were not adequately represented by the existing scale. These included reasons for liking e-cigarettes as a better, more convenient alternative to tobacco cigarettes, and reasons for not liking e-cigarettes because of social disapproval. Thus, we developed new items to represent e-cigarette use motives previously not represented.

The current study has two main objectives. The first is to test the validity and reliability of the revised scale using exploratory and confirmatory factor analysis and regression analysis. The previous scale included 32 items, to which we added 23 new items. We expect to retain the factor structure of the previous study (Pokhrel, Little, Fagan et al., 2014) as well as generate a new factor representing positive “smoking” experience. Part of the validation process involves testing the associations of negative and positive outcome expectancies with current e-cigarette use, e-cigarette use susceptibility among never e-cigarette users, and e-cigarette use dependence among current e-cigarette users. The second objective is to propose and test a short version of the youth e-cigarette use outcome expectancies scale. Because incorporating the long version of the measure may be challenging for

many survey-based studies not focused on e-cigarettes or outcome expectancies exclusively, a short version of the measure may be useful. Thus, we will create and test a short version of the measure based on the findings on the long version.

In summary, this study attempts to extend the previous study by making several new contributions. First, the study will test whether the factor structure of the previous study would replicate in a new sample and whether the factors would show similar patterns of associations with e-cigarette use, use susceptibility, and dependence as in the previous study. Secondly, this study will improve the existing measure by adding a new and important factor to the multidimensional measure as well as improve the reliability and validity of the existing factors by increasing the number of items to assess them. Thirdly, this study will contribute a new, short scale of youth e-cigarette use outcome expectancies that may be conveniently used in survey-based research. Lastly, this study will test the associations between e-cigarette use outcome expectancies and e-cigarette dependence for the first time.

2. Methods

2.1. Participants

Table 1 shows participants' demographic characteristics. Participants were 18–25 year old, undergraduate college students. Approximately 14% of the participants attended 2-year or community colleges. As is common among samples recruited from college campuses (Pokhrel, Little, & Herzog, 2014), the majority of the participants were women. Participants represented the ethnic/racial diversity of Hawaii. A majority (53%) of the participants in the “Other” ethnic category was Native Hawaiian/Pacific Islanders, the rest represented African Americans (10%), Hispanics (23%), and other (14%). Of the never e-cigarette users (n = 197), 2.5% were current cigarette smokers, 19.8% were cigarette experimenters (i.e., those who had smoked < 100 cigarettes in their lifetime and were current non-smokers), and 77.7% were never cigarette smokers. Of the e-cigarette experimenters (n = 155), 14.2% were current cigarette smokers, 58.1% were cigarette experimenters, and 27.7% were never cigarette smokers. Of the current e-cigarette users (n = 115), 46.9% were current cigarette smokers, 43.5% were cigarette experimenters, and 9.6% were cigarette never smokers.

2.2. Procedures

Participants were recruited from two 4-year and four 2-year colleges

Table 1
Participant characteristics (N = 470).

	Mean (SD)	Frequency	Range
Age	20.9 (2.1)		18–25
Gender		Men	34.8%
		Women	65.2%
Ethnicity		White	27.5%
		Asian	38.4%
		Filipino	16.0%
		Other	18.1%
		Other	18.1%
Parental income		0–\$39,999	21.2%
		\$40K–\$59,999	14.4%
		\$60K–\$79,999	16.2%
		\$80K–\$99,999	14.4%
		\$100K–\$119,999	13.5%
		\$120K and over	20.4%
Cigarette smoking status		Never smoker	43.7%
		Experimenter	38.5%
		Current smoker	17.8%
E-cigarette use status		Never user	42.5%
		Experimenter	33.0%
		Current user	24.5%

Note. SD = Standard deviation.

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