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Measuring Perceptions Related to E-Cigarettes: Important Principles and Next Steps to Enhance Study Validity

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Abstract

Measuring perceptions associated with e-cigarette use can provide valuable information to help explain why youth and adults initiate and continue to use e-cigarettes. However, given the complexity of e-cigarette devices and their continuing evolution, measures of perceptions of this product have varied greatly. Our goal, as members of the working group on e-cigarette measurement within the Tobacco Centers of Regulatory Science (TCORS) network, is to provide guidance to researchers developing surveys concerning e-cigarette perceptions. We surveyed the

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Contributors

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Conflict of Interest

The authors report no actual or potential conflict of interest.

14 TCORS sites and received and reviewed 371 e-cigarette perception items from seven sites. We categorized the items based on types of perceptions asked, and identified measurement approaches that could enhance data validity and approaches that researchers may consider avoiding. The committee provides suggestions in four areas: (1) perceptions of benefits, (2) harm perceptions, (3) addiction perceptions, and (4) perceptions of social norms. Across these 4 areas, the most appropriate way to assess e-cigarette perceptions depends largely on study aims. The type and number of items used to examine e-cigarette perceptions will also vary depending on respondents' e-cigarette experience (i.e., user vs. non-user), level of experience (e.g., experimental vs. established), type of e-cigarette device (e.g., cig-a-like, mod), and age. Continuous formative work is critical to adequately capture perceptions in response to the rapidly changing e-cigarette landscape. Most important, it is imperative to consider the unique perceptual aspects of e-cigarettes, building on the conventional cigarette literature as appropriate, but not relying on existing conventional cigarette perception items without adjustment.

Keywords

e-cigarette; electronic cigarette; vaping; measurement; perceptions; beliefs

1 Introduction

As of 2016, 30-day prevalence of electronic cigarette use (also known as e-cigarettes, vapes, hookah pens, or vape pens) among U.S. middle and high school students was the highest of all tobacco products (Miech et al., 2017). In contrast, currently the prevalence of e-cigarette use among adults is lower than for conventional cigarettes (Hu et al., 2016), with e-cigarette use concentrated among cigarette smokers and recent quitters (Delnevo et al., 2016; McMillen, Gottlieb, Shaefer, Winickoff, & Klein, 2015). While research on the short-term health effects of e-cigarettes is ongoing, studies conducted to date already suggest some negative health consequences of e-cigarette use, including its impact on lung inflammatory markers (Lerner et al., 2015; Wu, Jiang, Minor, & Chu, 2014), and negative influences on cardiovascular health (Dwyer, McQuown, & Leslie, 2009; Lippi et al., 2014) and fetal development (England, Bunnell, Pechacek, Tong, & McAfee, 2015; U.S. Department of Health and Human Services, 2014). Particular flavorants in e-cigarettes are toxic and can likely cause respiratory disease and respiratory flow resistance (Barrington-Trimis, Samet, & McConnell, 2014; Behar et al., 2014; Farsalinos, Kistler, Gillman, & Voudris, 2015; Wu et al., 2014). Still, cigarette smokers who switch completely to e-cigarettes may experience a health benefit, although more research on such substitution is needed (Glasser et al., 2016; Nutt et al., 2014).

Measuring e-cigarette perceptions can provide valuable information with respect to understanding why youth and adults use e-cigarettes. For the purposes of this study, perceptions include beliefs about the positive and negative consequences of an action including expectancies, social norms regarding using e-cigarettes, and self-efficacy (or perceived behavioral control) concerning the choice of starting or stopping use (Fishbein & Ajzen, 2010). Perceptions are the building blocks of attitudes and are important components of many theories of health behavior and decision-making (e.g., Social Cognitive Theory

(Bandura, 1986), the Health Belief Model (Rosenstock, 1990), the Theory of Reasoned Action (Fishbein & Ajzen, 2010), the Theory of Planned Behavior (Ajzen, 1985), Self-Regulation Theory (Kanfer, 1970), and Subjective Culture and Interpersonal Relations Theory (Triandis, 1977)). These theories posit that judgments about the consequences of one's actions and perceptions of vulnerability to those consequences play a key role in predicting behavior, with judgments of low risk and high benefit being responsible for, in part, one's engagement in risky behaviors (Kahneman & Tversky, 1979). Smokers perceive fewer health and social risks, and greater benefits of smoking than do non-smokers (e.g., Halpern-Felsher, Biehl, Kropp, & Rubinstein, 2004; Rodriguez, Romer, & Audrain-McGovern, 2007; Song et al., 2009). Adult smokers with unfavorable perceptions of conventional cigarettes are more likely to quit (e.g., Cengelli, O'Loughlin, Lauzon, & Cornuz, 2012; Costello, Logel, Fong, Zanna, & McDonald, 2012; Romer & Jamieson, 2001).

Cross-sectional studies of youth find that favorable e-cigarette perceptions (e.g., they are "not addictive" or users "look cool") are associated with youth e-cigarette use (Ambrose et al., 2014; Chaffee et al., 2015; Cooper et al., 2016; Gorukanti, Delucchi, Ling, Fisher-Travis, & Halpern-Felsher, 2016) and intentions (Chaffee et al., 2015). Among youth, favorable perceptions of e-cigarettes are particularly concerning because nicotine may affect adolescent brain development (Dwyer et al., 2009; England et al., 2015; U.S. Department of Health and Human Services [HHS], 2016). Additionally, a meta-analysis of longitudinal research suggests that prior youth e-cigarette use is associated with subsequent trial of cigarettes (Soneji et al., 2017). By measuring the association between young people's perceptions of e-cigarettes and e-cigarette use, researchers can gain insights into the leverage points for changing young people's behavior (Hornik & Woolf, 1999), including where to focus educational campaigns and how to regulate the e-cigarette marketing environment.

Cross-sectional studies of adult smokers find that favorable e-cigarette perceptions (e.g., they are "not at all" harmful) are associated with e-cigarette use among adult smokers (Blake et al., 2015). These findings were confirmed in a longitudinal study of British smokers and former smokers who were more likely to use e-cigarettes one year later if they perceived them to be less harmful than cigarettes at baseline (Brose, Brown, Hitchman, & McNeill, 2015). Similar to youth, measuring e-cigarette perceptions can help researchers better understand the mechanisms through which adult smokers and former smokers become e-cigarette users. For adult e-cigarette users, perceptions of e-cigarettes relative to FDA-approved pharmacotherapy (e.g., nicotine replacement therapies; NRTs) could also provide information as to why people may be motivated to use one product over another.

In contrast to the long history of measuring the perceptions of conventional cigarettes, e-cigarettes are an emerging product category and thus studies of the perceptions of risks and benefits are nascent. However, there are already at least 188 studies on e-cigarette perceptions (Glasser et al., 2016). With such a rapid rise in the assessment of e-cigarette perceptions, there is little consensus on which attitudes and perceptions to ask about, and only moderate consensus on how to specifically assess such perceptions. Additionally, e-cigarette device characteristics vary and continue to evolve in their ability to deliver nicotine to the user, making measurements of perceptions complicated and comparison across studies

difficult. Greater measurement consistency would decrease confusion in the literature, allow for merging datasets, and focus research on reliable and validated measures, leading to a stronger evidence base.

To better understand existing measurement items, we collected, reviewed, and categorized 371 survey items on e-cigarette perceptions from across seven of the fourteen Tobacco Centers of Regulatory Science (TCORS) sites funded by a partnership between the National Institutes of Health and the U.S. Food and Drug Administration (Camenga, Kong, Cavallo, & Krishnan-Sarin, 2016; Chaffee et al., 2015; Cooper et al., 2016; Cooper, Loukas, Harrell, & Perry, 2017; Gorukanti et al., 2016; Harrell et al., 2017; Majeed et al., 2016; Pechacek, Nayak, Gregory, Weaver, & Eriksen, 2016; Roditis, Delucchi, Cash, & Halpern-Felsher, 2016; Soule, Lopez, Guy, & Cobb, 2016; Soule, Maloney, Guy, Eissenberg, & Fagan, 2017; Soule, Nasim, & Rosas, 2016; Soule, Rosas, & Nasim, 2016; Yang, Liu, Lochbuehler, & Hornik, in press). As members of the TCORS Measurement Workgroup, we considered the varied ways to measure e-cigarette perceptions and identified strategies that may enhance measure validity, and strategies that researchers may consider avoiding. We chose to focus on strategies, rather than specific items, because (a) the psychometric research comparing items has not been done and (b) research designs vary widely, necessitating different measurement items. Our guiding principles and strategies are presented next, organized by type of perception: benefits, harms, addiction, and social norms.

2 Categories of E-cigarette Perceptions

Although e-cigarettes and conventional cigarettes appear to be quite alike in terms of user inhalation, e-cigarettes constitute a broad class of products, varying by device type (e.g., cig-alike, mods), e-liquids, and flavors. Consumers have different reasons for using, and varied expectations regarding the perceived benefits and risks of e-cigarettes in general, by product type, and in comparison to conventional cigarettes (Ambrose et al., 2014; Brose et al., 2015; Chaffee et al., 2015; Cooper et al., 2016; Gorukanti et al., 2016; Roditis, Delucchi, et al., 2016). Therefore, researchers should not simply substitute “e-cigarette” or “vaping” into existing cigarette perception measures. Instead, based on the existing literature on e-cigarette perceptions and a review of the TCORS measures, there are specific considerations for each area of perception. Examples of items in the TCORS surveys for each of the four defined categories of e-cigarette perceptions are shown in Table 1. Items fitting in these categories are included in an online supplementary table.

2.1 Perceptions of Benefits

For decades, measures about the benefits of conventional cigarettes have been focused on appearance benefits such as looking “cool” or mature, the perceived experiential benefits of enjoyment, reducing stress, improving concentration, or relieving cravings (Brandon & Baker, 1991; Copeland, Brandon, & Quinn, 1995; Wetter et al., 1994). E-cigarettes have these and additional types of appeal. Many adult smokers see the main benefit of e-cigarettes as relieving cravings when trying to quit smoking cigarettes (Glasser et al., 2016). Daily e-cigarette users even report the same or greater satisfaction with e-cigarettes than cigarettes (Kozlowski, Homish, & Homish, 2017). Most users also find the enjoyment of use (Pratt,

Sargent, Daniels, Santos, & Brunette, 2016; Saddleson et al., 2016), plethora of pleasing flavors and equally pleasing aromas beneficial (Patrick et al., 2016). Some of the devices appeal greatly to individuals interested in technology who want to personalize and modify their products (Brown & Cheng, 2014). Further, e-cigarette users may see benefit in supporting online or independent shops since the majority of e-cigarette purchases are made there, rather than from convenience, food, drug, or big-box stores (HHS, 2016). Measuring these other potential benefits of e-cigarettes can provide additional insight into the key drivers of use.

2.2 Harm Perceptions

Harm perceptions are subjective judgments about the potential health risks associated with tobacco product use. Measures of harm perceptions include absolute harm, which assesses the perceived likelihood that use of a tobacco product will lead to a negative outcome, and comparative harm, which assesses if one tobacco product is more or less likely to lead to a negative outcome than a different tobacco product (Kaufman, Suls, & Klein, 2016). Both absolute and comparative e-cigarette harm perceptions can be valuable in understanding users' motivations and behaviors. Absolute harm perception ratings for two different products can be compared to determine which product is perceived as more harmful. Researchers have suggested that assessments of comparative harm may fall prey to social desirability bias, and that absolute assessments will reduce bias (Czoli, Fong, Mays, & Hammond, 2016). Studies comparing alternative tobacco products to conventional cigarettes show that participants report a greater difference in perceived risk for the alternative product when asked using the absolute approach, than when asked comparatively (Popova & Ling, 2013; Wackowski, Bover Manderski, & Delnevo, 2016). A recent study confirms this, showing a 1.7-fold difference in harm perception between absolute and comparative measures for e-cigarettes relative to conventional cigarettes using national data (Persoskie, Nguyen, Kaufman, & Tworek, 2017). However, comparative measures showed higher criterion validity than absolute measures (Persoskie et al., 2017).

Conventional cigarettes became widely used around the world early in the 20th century, and their health hazards have now been studied for many decades (Parascandola, 2001; U.S. Public Health Service Office of the Surgeon General, 1964). Long-term epidemiologic studies have not been conducted with e-cigarettes, thus long-term health consequences have not yet been determined. However, it can be useful to measure risks typically assessed for cigarettes (e.g., lung cancer, respiratory disease), risks linked to nicotine (e.g., respiratory and cardiovascular disease (Dwyer et al., 2009; Lerner et al., 2015; Lippi et al., 2014; Wu et al., 2014) and effects on the developing adolescent brain (England et al., 2015)), and new risks specific to e-cigarettes (e.g., carcinogens present in e-cigarette aerosols (Glasser et al., 2016; HHS, 2016), batteries exploding (Glasser et al., 2016; HHS, 2016), and potentially harmful flavorings like butter (diacetyl; Barrington-Trimis et al., 2014) or cinnamon (cinnamaldehyde; Lerner et al., 2015)). Conventional cigarettes may be the most appropriate comparison for new users and smokers, but for smokers who are trying to quit, the more appropriate comparison product may be NRT.

2.3 Addiction Perceptions

Like harm perceptions, addiction perceptions may also be asked absolutely, or in comparison to other tobacco products. There are three potential challenges to measuring e-cigarette addiction perceptions. First, e-cigarette products vary in the amount of nicotine delivered depending on the concentration of nicotine in the e-cigarette liquid, e-cigarette device characteristics, and user behavior. Therefore, we expect addiction perceptions to vary too. Secondly, studies suggest that many non-users, and even users, do not always understand that nicotine is the addictive component of tobacco products (Roditis, Lee, & Halpern-Felsher, 2016), so their perceptions of addiction may be ill-informed. Finally, dual/poly use of e-cigarettes and cigarettes is very common (HHS, 2016) and since both products can contain nicotine, dual users may find it difficult to identify their perceptions of addiction to e-cigarettes as distinct from their perceptions about cigarettes.

2.4 Perceptions of Social Norms

Measuring perceived norms for e-cigarette use is generally done very similarly to measuring perceived norms for conventional cigarette use (see Table 1). As with all measurements of social norms, contextualizing the question is important for ensuring valid answers. For example, users may not disapprove of using e-cigarettes outdoors but may be less accepting of using them indoors (Gorukanti et al., 2016), in part because of widespread smoke-free policies and some evidence that secondhand aerosol from e-cigarettes exposes non-users to nicotine and other toxicants (Glasser et al., 2016; HHS, 2016). As with all e-cigarette perception measurements, responses may vary by product type, whether or not the product contains nicotine or flavors, and how frequently people are using it.

3 Primary Considerations

When measuring perceptions of e-cigarettes, especially of their addictive nature, the most rigorous assessment strategy would be to specify the amount of nicotine, the strength of the device to turn e-liquid into aerosol, and the frequency and duration of use. Another simpler option would be to start by asking respondents' perceptions of whether e-cigarettes have nicotine, and then follow-up with perception items. Finally, as with all good measurements, assessments of perceptions are more reliable when asked with multiple items (Diamantopoulos, Sarstedt, Fuchs, Wilczynski, & Kaiser, 2012). For example, participants might not perceive e-cigarettes as "addictive" per se, whereas they may agree with an additional item asking whether e-cigarettes could trigger cravings. Additionally, conducting focus groups of the target audience to uncover what they see as relevant comparators for harm and addiction perceptions can help researchers design appropriate measures.

The optimal way to assess e-cigarette perceptions depends in large part on the aims of the study. In large surveys assessing constructs about multiple addictive behaviors, there may only be space for one or two questions on general perceived harm of e-cigarettes. When investigating e-cigarettes more specifically, researchers can use greater detail to examine multiple aspects of e-cigarette perceptions. General research design elements, including study setting and mode of administration, are other considerations that affect flexibility and

ultimate capacity for the number and types of items (Bradburn, Sudman, & Wansink, 2004; Dillman, Smyth, & Christian, 2014).

The type and number of items used to examine e-cigarette perceptions will also vary according to factors such as respondents' use experience (i.e., user vs. non-user), level of experience (e.g., experimental vs. established use), and age. For example, as shown in the cigarette literature (Brennan, Gibson, Kybert-Momjian, Liu, & Hornik, 2017), long-term health consequences might not be salient for youth, while short-term negative consequences and benefits (such as the "cool" factor, flavors, and smoke tricks) may be more salient (Fishbein & Ajzen, 2010). Alternatively, perceptions of reduced long-term harm compared to cigarette smoking may be more salient for adult smokers. Furthermore, e-cigarette users have access to information that is quite different from non-users because they draw on their personal experience with the product. One's research goals will dictate the appropriate sample and the best survey questions to use with that sample.

4 Other Considerations

In almost all cases it is more accurate for people to report their own perceptions of personal consequences of using e-cigarettes (even if hypothetical), rather than reporting their perceptions of what other people think (Fishbein & Ajzen, 2010). For example, "If I vape or use e-cigarettes every day, I will be controlled by them" is likely to lead to more accurate reports of self-perception than a more general item asking: "People who vape or use e-cigarettes every day are controlled by them." First-person versus third-person question wordings have particular trade-offs to consider when measuring the perceptions of non-users who must either predict what they would feel or predict what others do feel. Also to the extent that the objective benefits and risks are currently unknown or uncertain, a response option of "Don't know" is imperative to allow respondents to answer unbiasedly (Hay, Orom, Kiviniemi, & Waters, 2015; Waters et al., 2011; Waters, Hay, Orom, Kiviniemi, & Drake, 2013; Waters, Kiviniemi, Orom, & Hay, 2016).

Perceptions of a category of e-cigarette products are also more accurate when it is clear which products are included in the category. Since e-cigarettes come in various sizes and shapes, it is best to show pictures of the products to ensure that respondents are thinking of the same product being assessed, when feasible, depending on the survey administration mode (Breland et al., 2016). When interested in users' personal products, requesting that the user send a picture is useful. When survey modalities do not allow for the presentation of pictures (e.g., phone surveys), researchers can use a brief preamble describing all of the products to be considered. Developing a brief, but memorable, all-inclusive term referring generally to e-cigarettes to use throughout the survey is critical for maintaining the validity of perception questions. However, researchers need to be aware of the typical interpretation of the term they choose among their target audience. For example, the term "e-cigarette" may not bring to mind the newer, tank-style products for all individuals. Further, given their novelty, the lay-terms used to describe e-cigarettes are continually evolving (e.g., "vape pens," "e-hookahs," "mods," "vapes"). Formative investigations, particularly cognitive interviews and other forms of qualitative research, are very important in this changing landscape to ensure that researchers develop the best measures to accurately assess e-

cigarette perceptions. For example, in a formative study of young adult e-cigarette use, cognitive interviewing revealed the importance of including pictures when asking about use and additional benefits of particular e-cigarette brands (Hinds et al., 2016).

5 Conclusion

Quality measurement of e-cigarette perceptions relies on having well-defined survey goals, describing clearly the type of e-cigarette use under consideration, and asking about reasonable perceptions of that use. Continuous formative work using focus groups and individual interviews is critical to adequately capture perceptions in response to the rapidly changing landscape. While this fluctuation presents challenges, there are unique opportunities to understand how these contextual factors shape and influence individuals' perceptions. The diversity in product device categories, features, and technology that affects the use experience can all be expected to continue to evolve and influence perceptions and behavior. When measuring a new, rapidly evolving product category such as e-cigarettes, researchers need to continue an open dialogue with the target audience and remain flexible with their survey items, while keeping them sufficiently consistent with prior research to establish trends. It is imperative to carefully consider the unique aspects of e-cigarettes, building on the conventional cigarette literature as appropriate, but not relying on conventional cigarette perception items without careful consideration and adjustment.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Highlights

- Measuring e-cigarette perceptions should to be flexible as the product evolves.
- Formative work is valuable for researchers to be responsive to changes.
- This paper summarizes 371 e-cigarette perception items from seven research groups.
- This paper provides key considerations for e-cigarette perceptions measurement.
- E-cigarettes are distinct from cigarettes, thus necessitating distinct measures.

Table 1

Summary of E-cigarette Perceptions Assessed across the Tobacco Centers of Regulatory Science

Construct	Summary of Measures	Examples of questions and response options
<i>Perceptions of Benefits</i>	<u>Use for Cessation</u> ^{a-f} Six studies (youth and adults) ask about e-cigarettes and smoking cessation.	<u>Use for Cessation</u> : Most questions ask whether e-cigarettes can help smokers quit smoking cigarettes. Response options are on Likert scales.
	<u>Appearance</u> ^{c-d,f} These questions probe the respondent to think of how e-cigarettes will alter appearance	<u>Appearance</u> : These questions ask about maturity, looking cool/fitting in, or slimness. Response options are either a Likert Scale ^{d,f} or on a 0–100% chance scale. ^c The question stem for one study asks students to consider different scenarios of use (e.g., length of time used and frequency of use).
	<u>Experience</u> ^{a,c,d,f} These questions probe the respondent to think about the experience of using an e-cigarette device.	<u>Experience</u> : The questions ask whether use would help with relaxation, stress relief, concentration, energy levels, or if the products would give a buzz/high feeling or provide satisfaction. Also specific e-cigarette questions ask about the ability to modify the device, available flavor options, and where the product can be used. Most often these questions are on a Likert scale ^{a,c,f} ; however, one study asks about the chance of the experience happening on a scale of 0–100 ^d based on different scenarios of use (e.g., length of time used and frequency of use).
<i>Harm Perceptions</i>	<u>Absolute Harm</u> ^{a, c, e-h} Assesses the harm of e-cigarettes independent of other products.	<u>Absolute Harm</u> : The response options are often on a Likert scale, and the questions ask how harmful these products are to health. Three of the studies that ask this question are among youth ^{c,e,g} , and one is among young adults ^f .
	<u>Comparative Harm</u> ^{a-f,i} Assesses the harm of e-cigarettes by directly comparing them to another product, most often conventional cigarettes.	<u>Comparative Harm</u> : Questions may ask whether e-cigarettes are safer than cigarettes; less harmful than cigarettes; cleaner than cigarettes; or if using an e-cigarette exposes a person to less chemicals than smoking cigarettes. The response options are on a Likert scale, and at least one study utilizes an “I don’t know” answer choice.
	<u>Health Effects</u> ^{a,c,d,f} These questions ask about specific health effects, which may be short-term or long-term.	<u>Health Effects</u> : Short-term effects include feeling jittery or having a scratchy throat. Long-term effects include cancer or heart disease. The response options for these vary. One study of youth asks the respondent to answer the question based on a scale of 0–100 ^c , what is the chance that... Other studies use Likert scales ^{a,d,f} . [See Streiner et al.(Streiner, Norman, & Cairney, 2015) for a discussion of scale choice.] One youth and one adult study asks the respondent to imagine specific scenarios of use; how many times per day and how long one uses the product. One study ^a of adults asks about the risk of flavors in e-cigarettes to one’s health. One question asks whether flavor additives are safe; a second question asks if flavors are risky to one’s health.
	<u>Harm to Others</u> ^{a-d,f} Most often questions regarding harm to others ask about the risk of secondhand exposure or environmental risks.	<u>Harm to Others</u> : Some questions ask about secondhand exposure (e.g., breathing vapor from other people’s e-cigarettes); other questions ask whether it is acceptable to use these products around children; less harmful to people around them than smoking cigarettes; or the harm to the environment. Response options for these questions are generally a Likert scale.
<i>Addiction Perceptions</i>	<u>General Addiction</u> ^{a-d, f, g} Most studies of youth and adults ask about the addictive qualities of e-cigarettes.	<u>General Addiction</u> : These questions ask about the “absolute addiction” ^{a-d, f, g} of e-cigarettes (e.g., do you think people can become addicted to e-cigarettes) Most of the questions have Likert response options ^{a,b,d,g} ; one study asks about varying scenarios of use (e.g., frequency of use and length of use) and the chance of becoming addicted ^c .
<i>Perceptions of Social Norms</i>	<u>Injunctive Norms</u> ^{b-d,f,g,i} These questions focus on social acceptability.	<u>Injunctive Norms</u> : Questions include “is it okay for people your age to use these products,” and may be specific to a population (e.g., whether your friends think it’s okay to use the product). Response options were mostly on a Likert scale. ^{b,c,d,f} One study asks respondents to respond on a scale of 0–100% how upset their friends would be if they used e-cigarettes ^c .

Construct	Summary of Measures	Examples of questions and response options
	<i>Descriptive Norms</i> ^{b,c,f,g,i} These questions focus on the perceived prevalence of use.	<i>Descriptive Norms</i> : Some questions ask about close friends while others ask about “people your age.” Four studies has a Likert scale of response options ^{b,f,g,i} . One study asks respondents to give a number out of 100 of people their age, gender, and race/ethnic who use the product ^c .

Note: Each TCORS site contributed survey items to be reviewed and categorized. The TCORS surveys that contributed items to each topic area, and the sample used in the study, are denoted by the superscripts below.

^aGeorgia State University, Adults (Majeed et al., 2016; Pechacek et al., 2016)

^bUniversity of Pennsylvania, Youth and Young Adults (Yang et al., in press)

^cUniversity of California San Francisco, Youth and Young Adults (Chaffee et al., 2015; Gorukanti et al., 2016; Roditis, Delucchi, et al., 2016)

^dVirginia Commonwealth University, Adults (Soule, Lopez, et al., 2016; Soule et al., 2017; Soule, Nasim, et al., 2016; Soule, Rosas, et al., 2016)

^eYale University, Youth (Camenga et al., 2016)

^fUniversity of Texas, Young Adults (Cooper et al., 2017; Harrell et al., 2017)

^gUniversity of Texas, Youth (Cooper et al., 2016; Harrell et al., 2017)

^hUniversity of North Carolina School of Public Health, Youth

ⁱUniversity of North Carolina School of Public Health, Youth and Young Adults