Development of a Youth PME Measure for Tobacco Prevention Advertisements (#45578)

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Author(s)
Seth Noar (University of North Carolina at Chapel Hill) - noar@unc.edu
Noel Brewer (University of North Carolina at Chapel Hill) - ntb@unc.edu
Marissa Hall (University of North Carolina at Chapel Hill) - mghall@unc.edu
Nisha Gottfredson (University of North Carolina at Chapel Hill) - gottfredson@unc.edu
Jennifer Mendel (University of North Carolina at Chapel Hill) - jrmendel@email.unc.edu

1) Have any data been collected for this study already?
No, no data have been collected for this study yet.

2) What's the main question being asked or hypothesis being tested in this study?
In a factorial experiment, we will test the following hypotheses:

1) The Real Cost tobacco prevention ads will elicit higher perceived message effectiveness (PME) ratings than the control ads (convergent validity)
2) The Real Cost tobacco prevention ads will lead to greater perceived likelihood of harm, more negative attitudes toward smoking/vaping and lower susceptibility to smoke/vape than the control ads
3) Higher PME ratings will be associated with greater attention, negative affect, and cognitive elaboration, and with less reactance (convergent validity)
4) Higher PME ratings will be associated with greater perceived likelihood of harm and with more negative attitudes toward smoking/vaping and lower susceptibility to smoke/vape (criterion validity)

We expect these hypotheses to hold across both cigarette and e-cigarette products.

3) Describe the key dependent variable(s) specifying how they will be measured.
The primary outcome is PME. We will create a PME scale by combining a subset of the best performing individual PME items that emerge from scale development analyses.

The secondary outcomes are:
a) attention
b) negative affect
c) cognitive elaboration
d) reactance
e) perceived likelihood of harm
f) attitudes toward smoking/vaping
g) susceptibility to smoking/vaping

The survey will assess all outcomes (PME and a-g) after each ad.

4) How many and which conditions will participants be assigned to?
This is an experiment with one between-subjects factor (tobacco product type – cigarette or e-cigarette) and one within-subjects factor (ad type – The Real Cost and control). The ad that is viewed first can also be treated as a between-subjects factor. Participants will be randomly assigned to either the cigarette or e-cigarette condition, and will view 2 ads (The Real Cost and control) in a random order.

5) Specify exactly which analyses you will conduct to examine the main question/hypothesis.
All analyses will use alpha= .05 and two-tailed tests.

Scale development. To explore dimensionality of the PME items, we will estimate an EFA model using half the data. We will use maximum likelihood estimation and oblique rotation to evaluate the number of factors required. We will use a cumulative logit link function to account for the ordinal response scales. We will assess model adequacy and fit using CFI, TLI, and RMSEA. These analyses will: 1) determine dimensionality of the items, and 2) identify items with low factor loadings or those that exhibit cross-loadings. Items with local dependence, low factor loadings, or that cross-load will be candidates for elimination. We will then test a CFA model, specifying the number of factors and factor loadings indicated in the best-fitting EFA model. We will use moderated nonlinear factor analysis to assess differential item functioning as a function of prior ad exposure, sex, race, age, sexual preference, parent's education, and cigarette/e-cigarette susceptibility and use.

We will take into account local dependence, patterns of factor loadings, and differential item functioning to identify a subset of items to use for the short PME scale. Once these items are selected, we will use the remaining half of the sample to test a final CFA model using these four items to assess model fit

in the confirmatory sample.

H1. To assess convergent validity of the PME scale, we will examine PME differences by ad and product type. We will use a structural equation modeling (SEM) framework, with the between-subjects product type factor crossed with the within-subjects ad factor. Repeated observations within individuals will be accounted for using robust standard errors. We will regress latent PME on indicators of product type, ad type, and the interaction between product type and ad type to determine whether the effect of ad type varies by product type. If the interaction is significant, we will use linear contrasts to evaluate post-hoc pairwise comparisons.

H2. To assess whether perceived likelihood of harm, attitudes, and susceptibility vary by ad type, we will regress attitudes toward smoking/vaping and susceptibility to smoking/vaping on first ad exposure, product type, and their interaction. If the interaction is statistically significant, we will use linear contrasts to evaluate post-hoc pairwise comparisons.

H3. To further assess the convergent validity of the PME scale, we will test a SEM with the latent factor of PME using the scale to predict attention, negative affect, cognitive elaboration, and reactance.

H4. To assess the criterion validity of the PME scale, we will test a SEM with the latent factor of PME using the scale to predict perceived likelihood of harm, attitudes toward smoking/vaping, and susceptibility to smoking/vaping.

6) Describe exactly how outliers will be defined and handled, and your precise rule(s) for excluding observations.
We do not anticipate any outliers because our response scales have restricted ranges. Analyses of the primary outcome will include data from participants who provided answers to at least half of the PME items in the final scale.

7) How many observations will be collected or what will determine sample size? No need to justify decision, but be precise about exactly how the number will be determined.
We will collect approximately 600 survey responses. We are including all participants from a nationally representative panel of adolescents, which is estimated at 600 adolescents aged 13-17.

8) Anything else you would like to pre-register? (e.g., secondary analyses, variables collected for exploratory purposes, unusual analyses planned?)
None