Statistical Analysis Plan for

R21DA041531 - Rescuing Cognitive and Emotional Regulatory Processes to Aid Smoking Prevention

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Data Analysis
Analyses for outliers, non-normal distributions, nonlinear relations, and influence statistics will be conducted; data transformation will be considered where appropriate. We will examine missing data patterns and dropout rates and will use pattern mixture modeling to evaluate the influence of missing data on the results.[147] We will use multilevel modeling (MLM) to analyze the data because it is an intent-to-treat analysis that includes all participants (which maximizes power and generalizability). We will use an ANOVA model (performed using MLM) for the repeated measures over time because the change in the DVs over time may not be linear. The 3 treatment conditions will be coded using 2 dummy variables contrasting each active treatment with control. Time will be alternately centered at post-treatment or follow-up so that the dummy variable contrasts will reflect group differences at those time points. All models will include relevant covariates (e.g., parental smoking (dummy coded since it is categorical), peer smoking, and sensation seeking). Since the relation between the covariates and outcome may differ among treatment conditions (e.g., the relation between parental smoking and smoking risk may be lower in WM+ SPII than in C+SPII), interaction terms will allow these relations to vary across treatment conditions. Non-significant interaction terms will be dropped.
1. The feasibility/ acceptability of school- and community-based brief interventions will be assessed by recruitment and attendance rates across the study period; acceptability (attendance of 80% of interventions by 70% of the randomized sample) will be assessed across the 3 conditions.
2. We hypothesize that the WM+SPII and DT+SPII interventions, relative to C+SPII, will lead to higher WM and higher DT, respectively. Further, we expect that WM will be higher in WM+SPII than in DT+SPII, and that DT will be higher in DT+SPII than in WM+SPII. The latter contrast will indicate if the two active treatments differ from each other on WM and/or DT; to perform these latter analyses, we will replace the dummy variable contrasting WM+SPII and C+SPII, with a dummy variable comparing WM+SPII to DT+SPII.
3. To evaluate the impact of cognitive/affective target activation on proximal smoking risk/behavior following intervention, WM and DT will be added as time-varying predictors (TVPs) of outcome in MLM models for each of the 3 measures of smoking risk (susceptibility to smoking, implicit attitudes toward smoking, and delay discounting) and for actual smoking behavior (smoking behavior is dichotomous, so it will be analyzed using a GLMM with a logistic linking function). Because TVPs conflate the between-subjects and within-subjects components of the predictor, we will disaggregate each TVP into the participant's average level of the TVP across assessments, and their deviations from their average level, at each assessment. The regression coefficients for WM and DT predicting outcome in these models will indicate the degree to which each is related to smoking risk. The "deviations' component of the TVP will calculate the relation between both WM and DT with proximal measures of smoking risk within-subjects over time.
Power Analysis.
We used PinT 2.12 (Power in Two-Level Models)148 to calculate the smallest effect size detectable with .80 power for each Aim. We assumed 150 total participants with 33% missing data (MLM and GLMM include all participants regardless of missing data, but the power is affected by number of obtained assessments per participant). We also assumed 6 covariates in each of the models. Alpha was set at .05. Aims 2 and 3: We have greater than .80 power to detect an effect size of d = .29 or larger for the MLM analyses. We have greater than .80 power to detect an effect size ω=.23 or larger (between a small, ω=.10, and a medium, ω=.30) effect size) for the GLMM analysis (actual smoking behavior).