

Technology Enhanced Family-Focused Treatment

Statistical Analysis Plan

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The study hypotheses centered on the evolution from baseline to 9, 18 and 27 weeks of mean PSR depressive symptoms (primary study outcome), and secondarily, SCARED anxiety scores and CGAS functioning scores, calculated for each interval and compared across treatment conditions using linear and generalized linear mixed models (PROC MIXED and GLIMMIX, Statistical Analysis System [SAS], V 9.4). Mixed models, calculated using all available data, account for correlations induced by repeated measurements within subjects and produce unbiased estimates of missing data, assuming observations are missing at random. The models used treatment group (FFT-MCC vs. FFT-Track) and study visit (0, 9 weeks, 18 weeks, and 27 weeks) as fixed effects and participant as a random effect. Sensitivity analyses redefined mixed models to instead covary for baseline scores and to examine the effects of outliers (see online supplement).

Secondary models examined three-way interactions between treatment, study visit (baseline score and 9-, 18- and 27-week scores), and primary mood diagnoses (depressive vs. bipolar spectrum disorder) or comorbid disorders (presence/absence of ADHD or anxiety disorders) on the repeated dependent variables (depression [primary], anxiety, and global functioning [secondary]). Age, sex, parent diagnoses, and baseline parent-rated CALS mood instability scores were included as covariates. For outcomes measured at four time points in 60 study completers, we had 80% power to detect an overall group by study visit interaction corresponding to a treatment effect size of $f^2 = .03$, just above Cohen's threshold for a small effect ($f^2 = .02$). Because of the exploratory nature of the study, we did not correct for multiple comparisons.

In exploratory analyses, we compared treatment groups on app engagement (frequency of adolescents' and parents' weekly app check-ins), using scaled Poisson regression models (PROC GENMOD in SAS) to account for the skewed distribution of check-in counts. Goodness of fit tests indicated no evidence of overdispersion (Pearson χ^2 , $p=0.5$, deviance $p=0.3$). Within the FFT-MCC group, we used Spearman rank-order correlations to examine whether the proportion of weeks in which adolescents reported use of an FFT skill on the app were associated with changes in PSR depression scores over 27 weeks.