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Official Title: Integrated Smart Speaker/Mobile Application to Promote Positive Parenting Among Caregivers of Youth with Challenging Behaviors

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STUDY PROTOCOL

FamilyNet Intervention Overview. The FamilyNet (FN) prototype app is an integrated and coordinated smart-speaker/mobile application designed to support families' successful implementation of behavior plans, an empirically supported behavioral parenting strategy to promote positive behavior change in children. Over the course of four weeks, the experience progresses through (1) a monitoring phase, in which caregivers identify a positive behavior they would like for their child to increase, and learn to observe their child's behavior to establish reasonable and reachable goals; (2) construction of a behavior plan, in which, working with research staff, parents and youth align on goals and rewards and build a positively framed, individualized behavior plan within the web/mobile app; and (3) families use of the web-app and integrated smart speaker app to implement their behavior plan, receive reminders, and report and track their progress on the plan. The family's behavior plan is reinforced with a system of rewards that the FamilyNet technology supports with reminders and prompts. FamilyNet features caregiver-facing and youth-facing components: Caregivers interact with the web/mobile app for reporting and tracking their progress and receiving reminders, and youth use the smart speaker for these functions.

Participant Recruitment and Enrollment Procedures. A feasibility trial was conducted to evaluate the FamilyNet program's feasibility, utilization, and user satisfaction in families of at-risk youth. Families of youth ages 10 to 17 exhibiting challenging behaviors were recruited to participate in the feasibility study via distribution of study information through family counseling centers, family service agencies, youth-serving agencies, and targeted advertising on Facebook and LinkedIn. Therapists and practitioners at the family- and youth-serving agencies were encouraged to describe the study and distribute the study materials to their client families who they thought might benefit from the extra support with behavior plans that FamilyNet would provide. LinkedIn advertising also targeted family- and youth-serving therapists who might find

FN helpful for the families they served. Facebook advertising targeted families of youth directly. Interested caregivers who contacted project staff were provided additional information about the study and screened for eligibility; those eligible were sent the informed consent form.

Eligibility Criteria. Eligible families were primary parent/caregivers who had children ages 10 to 17 years old who lived with them at least half the time; had a smartphone (either Android or iOS) and access to email; and spoke English. Families were excluded if the target-age child had a developmental disability severe enough that the child was unable to speak and/or follow simple directions.

Intervention and Assessment Procedures. After caregivers signed the consent and the youths signed the youth assent, primary caregivers completed the pretest (T1) questionnaire (online, on the Qualtrics platform) and then were scheduled for a phone call with research staff. In this phone call, caregivers were guided in downloading the FamilyNet web-app onto their phones and in setting up their smart speakers, and then guided in choosing the positive behavior that they wanted to increase in their target child. They were asked to monitor that behavior on the web-app for three days. After the monitoring phase, a Zoom session was scheduled with caregiver and youth, in which research staff guided the caregiver and youth through a series of psychoeducational slides, and then guided the caregiver and youth in setting goals for behavior change and developing a behavior plan with rewards. Caregivers and youth were asked to engage with the FN program for 4 weeks. Research staff provided prompts during the 4-week period to encourage usage and provide technical support as needed. At 4 weeks after T1, caregivers were administered the posttest (T2) caregiver questionnaire, and youth were administered the T2 youth questionnaire; both T2 questionnaires were administered online on the Qualtrics platform. This design allowed evaluation of T1-T2 change and satisfaction/usability of the FamilyNet prototype. Caregivers received \$25 for completing the T1 assessment, and \$50 for completing the T2 assessment. Youth received \$20 for completing their T2 questionnaire.

Measures. T1 and T2 questionnaires measured (1) primary caregivers' parenting practices (Program-Targeted Parenting Practices (PTPP): Frequency of Engagement and Satisfaction with Handling Child's Behavior subscales; Parenting Practices Inventory (PPI): Inconsistent Discipline and Positive Reinforcement subscales); (2) caregivers' self-efficacy (PTPP), (3) family relationships (CASY scale, adapted from Family Environment Scale and Conflict Behavior Questionnaire: Positive Family Relations; Parent-Child Conflict), and (4) youths' behavior (Strengths and Difficulties Questionnaire (SDQ): Emotional Problems, Conduct Problems, Hyperactivity, Peer Problems, Prosocial, and Total Difficulties scores; Parent Daily Report (PDR): Positive Child Behaviors and Negative Child Behaviors; PTPP: Frequency of Child's Positive Behavior and Parent Satisfaction with Child's Behavior). The T2 caregiver and youth questionnaires also contained measures of caregivers' and youths' ratings of (5) satisfaction and acceptability, and (6) usability of the FamilyNet program. Demographics were collected from caregivers at T1. Usage data for the web-app and the Alexa skill were collected to measure families' usage of FN.

Analytic Plan. The evaluation had three main goals: (1) establish the initial efficacy of the FamilyNet program in improving caregivers' parenting practices and self-efficacy, family relationships, and the youths' behavior outcomes; (2) determine the participants' perception of usability, acceptability, and satisfaction regarding the FamilyNet program; and (3) and examine program usage. Paired t-tests were used to examine pretest-to-posttest change to determine whether there were meaningful improvements in caregiver and youth outcomes after engaging with the FN program. Cohen's d provided the measure of effect size, with the convention of .20 = small, .50 = medium, and .80 = large. With 15 families with both T1 and T2 data, the study was powered to detect significant change in outcomes associated with large effects ($d > .78$). Thus, in addition to statistical significance, we interpreted effect sizes of Cohen's d of .25 or greater as initial evidence that parenting and child outcomes showed meaningful change after engaging with the FamilyNet program. Examination of descriptive statistics for the user satisfaction and acceptability items at T2 informed on participants' reactions to the program. A descriptive summary of the program usage data provided evaluation of families' use of the FamilyNet program.