



Published in final edited form as:

Prev Sci. 2018 July ; 19(5): 642–651. doi:10.1007/s11121-018-0863-z.

The closing digital divide: Delivery modality and family attendance in the Pathways for African American Success (PAAS) program

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Abstract

Although family-focused, evidence-based programs (EBPs) have the potential to reduce disparities in health and behavioral outcomes for youth, access to such programs is severely limited in the most affected areas, including African American communities in the rural South. As expanding the reach of EBPs is the primary goal of translational research, interest is growing in the potential of technology as a viable platform to disseminate services to areas with limited resources. To test whether African American families in the rural South would be willing to engage in a technology-based family-focused EBP to prevent adolescent risk behavior, we examined attendance using data from two arms of a three-arm community-based trial of the Pathways for African American Success (PAAS) program. In the overall study, sixth graders (N=412) and their primary caregivers were randomly assigned to the following conditions: (a) in-person, small group sessions led by facilitators, (b) self-directed, technology-based sessions, or (c) a literature control with home-mailed educational materials. Results indicated that attendance was higher in the technology condition than in the small group condition. Parental age, education, and SES did not limit attendance in the technology condition. We conclude from these results that the use of technology can be an acceptable strategy for disseminating parenting EBPs to African American families in the rural South.

Keywords

Family-Based Prevention; Adolescence; Program Attendance; African Americans; Rural Technology; Delivery Modalities

It has been well established that adolescent behavioral health concerns (e.g., substance use, sexual risk behavior, mental health, conduct problems, violence, and academic achievement)

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Conflict of Interest: Murry is the developer of PAAS. Berkel and Liu declare they have no conflict of interest.

Ethical Approval: All procedures performed in this study were approved by the Vanderbilt University IRB and were in accordance with the ethical standards of the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent was obtained from all individual participants included in the study.

cluster together and have similar underlying risk and protective factors (Flay, 2002). A growing body of literature has also linked engagement in risk behaviors among African American youths to the profound effects of chronic economic stress, racism, and other negative environmental factors to which they are exposed on a regular basis (e.g., Berkel et al., 2009). It is noteworthy, however, that despite the challenging conditions, risk behaviors can be prevented through evidence-based programs (EBPs) for families (Fishbein, 2000). While several EBPs have demonstrated the capacity to prevent risk behaviors and reduce disparities (Donenberg, Paikoff, & Pequegnat, 2006; Murry, Berkel, Pantin, & Prado, 2012), access to such programs is severely limited, especially in the most affected areas, such as in the rural South (Centers for Disease Control and Prevention, 2016). Further, there is concern that even when programs are available, family engagement is low (Kao, Gibbs, Clemen-Stone, & Duffy, 2013).

Engagement, sometimes referred to as participant responsiveness, is a multifaceted construct that includes both subjective and behavioral indicators of how much families like a program, actively participate, and incorporate the material into their daily lives (Schoenfelder et al., 2012). Participant attendance is one of the most commonly studied aspects of engagement (Durlak & DuPre, 2008). It is the first step in cascading process in which carefully designed programs are translated into family outcomes; unless families show up, they will not be exposed to the curriculum or be able to practice program content (Berkel, Murry, Roulston, & Brody, 2013; Berkel et al., 2016). Attendance can be an indicator of how relevant and useful the material appears to participants (Barrera, Berkel, & Castro, 2017), although logistical barriers are also an issue. Finally, attendance itself can be broken down into multiple components (McCurdy & Daro, 2001); distinguishing factors such as enrollment, drop out, and retention may provide useful insight in efforts to engage families (Baker, Arnold, & Meagher, 2011). For example, enrollment, or whether a family ever attends, is largely driven by expectations about what a program may be like, whereas dropout after one session may indicate a failure to meet expectations. Retention across the program is an important consideration for the likely effects on targeted outcomes. Each of these operations of attendance may be uniquely related to predictors and targeted through different strategies. These issues are of particular concern in economically disadvantaged rural areas where barriers to program attendance are manifold. From our own work, even when strategies are employed to reduce barriers, such as providing meals, transportation, and childcare, and hosting the program in convenient and family friendly locations, such as a local church, attendance can still be hampered by barriers such as shift wage work schedules (Murry & Brody, 2004). Thus, a critical issue for translational research is to identify effective strategies to overcome barriers to participation in EBPs, especially for those in the greatest need (Spoth et al., 2013).

Interest is growing in the potential use of technology as a possible solution to attendance barriers. The “whenever-whenever” approach allows families to access sessions at their convenience and own pace. Further, technology-based programs may be easily tailored to fit families’ cultural backgrounds, enhancing their potential effectiveness (Allen et al., 2016). A growing line of research has demonstrated that technology-based prevention programs can greatly affect behavioral outcomes (e.g., Hansen, Bishop, & Bryant, 2009; Lightfoot, Comulada, & Stover, 2007; Schwinn, Schinke, & Di Noia, 2010; Van Voorhees et al., 2009;

Vogl et al., 2009), however, to a large extent these programs have targeted youth rather than families. Exceptions include Schinke and Fang's (Fang & Schinke, 2013; Schinke, Fang, Cole, & Cohen-Cutler, 2011) digital program for mother-daughter dyads, which has been shown to increase parenting quality and reduce substance use for adolescent girls, and a hybrid technology/in-person version of Familias Unidas (Perrino et al., 2016). These programs have begun to dispel commonly held stereotypes that technology is inaccessible for older individuals, those with lower education, and members of racial/ethnic minorities (Mitzner et al., 2010). Another implicit assumption limiting the use of technology to deliver family-centered EBPs is that the group modality is, in itself, an active component (Coatsworth, Duncan, Pantin, & Szapocznik, 2006). A group of parents led by a skilled facilitator can positively reinforce attendance and internalization of program content. However, studies have shown that technology-based programs can be highly engaging and motivating for both youth and adults, and across racial groups (Bellis, Grimley, & Alexander, 2002; Huen et al., 2016; Keller & Brown, 2002).

The current study seeks to advance the field's understanding of the potential of technology to improve attendance in family-centered EBPs. First, we describe how family-centered EBP for rural African American families was adapted to a technology format to overcome barriers to attendance. An overview of the Pathways for African American Success (PAAS) program, including the theoretical foundation and intervention methods, is provided. Using data from a three-arm randomized community-based trial of PAAS, we examined attendance in the trial's two intervention conditions: 1) a traditional in-person, facilitator-led small group-based program (the "group" condition) and 2) a self-directed, technology-based program (the "technology" condition). Second, we describe program attendance in PAAS, operationalized in several ways: enrollment (i.e., ever attended), total number of sessions attended, retention for at least half of the program sessions, retention for all program sessions, and dropout (i.e., attended only one session). Third, we examined the impact of demographics that are thought to limit parents' experience with technology, including parent age, education, and SES on attendance for group vs. technology-based delivery.

METHODS

The Pathways for African American Success (PAAS) Program

PAAS was informed by theories linking African American parenting and youths' racial identity and self-esteem to decreased risk behaviors (e.g., McAdoo, 1997); self-efficacy and control theories (Bandura, 1997); and prototype models of risk behavior (Gibbons & Gerrard, 1997). PAAS also was informed by decades of longitudinal research with African American communities in the rural South (e.g., Murry, Berkel, Simons, Simons, & Gibbons, 2014; Murry & Brody, 1999). Parent sessions (see Table 1) were designed to target universally adaptive parenting practices (e.g., monitoring, parent-child sexual communication, and the establishment of clear expectations about alcohol/substance use and sexual risk) and racial socialization, which teaches children to cope with racism through fostering a sense of pride in their history and community (Murry, Berkel, Brody, Gerrard, & Gibbons, 2007; Murry et al., 2011). Similarly, youth sessions target mediators that are important across racial groups, such as risk resistance strategies, and racially-specific

content, including how to proactively respond to racism. After separate youth and parent sessions, family members come together to reinforce what each learned in their respective sessions. Both modalities have the same parent and youth intervention-targets and provide similar program content.

The translation to technology-based delivery was informed by traditional learning theories, including cognitionism, constructionism, and behaviorism. Learning and behavioral change occurs through the presentation of interactive problem solving opportunities. Development of the *PAAS* technology modality began with Murry and her subject matter team developing 18 sets of storyboards (i.e., a set of Parent, Youth, and Family storyboards for each of the 6 sessions), reflecting a series of illustrations displayed in a flow chart of what will appear on each screen. After drafting the storyboards, the technology team (*Symbolene Systems, Inc.*) designed prototypes with a set of functionality specifications that included non-interactive and interactive virtual elements and animations. To enhance the acceptance of the technology-based delivery modality of PAAS, careful consideration was given to ensuring the cultural relevance of graphics of animated characters (avatars), interaction scripts, and interactive activities, especially with respect to the within-group diversity of African Americans, including diverse phenotypic physical characteristics. Rural African American community members acted out the scripted scenes for each session. Images and text simulated real world experiences of African American families. Activities facilitated problem solving and skill development by allowing parents and youths to explore different pathways for achieving desired outcomes. The program also allows the avatars and users to “interact,” with opportunities where users can endorse or disagree with avatars and avatars respond to the user, based on a menu of pre-programmed responses. The inclusion of this feature was to simulate dyadic interactions that occur in small group, facilitator-led formats, and create opportunities for users to process and internalize program content.

The development of conjoint family sessions addresses a major gap in prevention science, ways to integrate the use of technology in family-based preventive interventions (Brown et al., 2013; Kumpfer, Alvarado, & Whiteside, 2003). To implement this process, the conjoint family session brings the youth and parent together in which they interact with program content on a *single computer*, and complete activities to facilitate family-level behavioral change. Another program feature of the conjoint family sessions is the opportunity for parent and youth users to observe avatar parent and youth modeling targeted behaviors. As an example, in one session, parents and youth are instructed to draw a card from one of two decks, a parent deck and a youth deck. Two images of decks of cards appear on the screen, one labeled “youth questions” and one labeled “parent questions.” Parent and youth take turns using the mouse to select cards. A question appears on screen and is read aloud. The family receives instruction to spend three minutes discussing the question posed on the selected card. A clock appears on the screen and another card can be selected only after the time for discussion has elapsed. For each of the family sessions, if there is a delay in parents and youths beginning the activity, the virtual avatar educator appears on the screen and asks the family, “Would you like to listen in on another family’s discussion?” If the family selects “yes,” they can watch avatar parent/youth dyads completing the activity and modeling the discussion, after which the participant family is given time to complete assigned interactive activities.

Finally, a visual image of a highway is presented throughout each of the youth, parent, and conjoint family sessions to guide family members through the *PAAS Highway to Success*. It includes road signs to reflect challenges associated with transitioning from middle childhood to late adolescence and roadmaps (i.e., PAAS curriculum topics) to guide parents and youths to health promoting behaviors. The PAAS highway appears in the introduction of each session. To illustrate associations between choices and consequences, side streets or on and off ramps are situated along the *PAAS Highway to Success*, emphasizing pathways on the highway that can lead to either positive or negative outcomes. These visual images are presented as posters during the in-person, facilitator led sessions to parallel information presented in the technology-arm.

Program Delivery

Although the goal for the future is to have the PAAS technology version available for families to use at any time, the purpose of the trial was to establish acceptability and effectiveness, so the technology condition was conducted in a community setting with two rural African American community members serving as onsite technology intervention assistants (TIAs). TIAs received 6 hours of training on program content, procedures for setting up and managing weekly computer interactive sessions, and instructions on how to identify and solve on-site computer-related issues. The technology version was conducted in 13 technology groups across the five counties. Families attended weekly sessions and a member of the research staff sent a schedule to families informing them of the dates and times over the course of six weeks, when the PAAS program would be available in their community. Each family received a follow-up call by the research team to confirm attendance. In preparation for the sessions, laptops from the research center were set up by TIA at designated community centers, such as churches, youth centers, and libraries. In each site, a three-hour time block was allocated for each session. When families arrived on site, the TIAs led the parent and the youth to available laptops, provided technical assistance as needed, and remained present to oversee session completion. To ensure privacy, reduce distractions, and dissuade interactions among attendees, each laptop was placed inside tri-fold partition. After youth and parent completed respective individual sessions, a TIA escorted the youth to the parent to complete the conjoint family session. Each parent/youth concurrent session and conjoint family session lasted 45 minutes on average, resulting in 1.5 hours per week, and 9 hours of total dosage.

In the traditional group-based condition, teams of three rural African American community members served as facilitators (one for parent and two for youth sessions). Prior to implementing the program, facilitators received a total of 36 hours of training over the course of six days. A total of 12 groups of roughly 12 families met weekly. Facilitators presented the PAAS curriculum, organized role-playing activities, guided discussions among group members, and addressed participants' questions. Each parent/youth concurrent session and family session lasted one hour on average, resulting in 2 hours per session, and 12 hours of total dosage.

Upon completion of each session, for both conditions, each family received a \$25 financial incentive. Murry's prior work shows monetary incentives yield high compliance in

assessment completion, retention, and program attendance, which was necessary for establishing the effects of the program with a relatively small sample (Murry et al., 2007). Importance of monetary incentives also has been noted by other researchers (Guyll, Spoth, & Redmond, 2003) and is used in community agencies that deliver programs to low income, rural families. Because both conditions received the same incentives, it is unlikely that these incentives had differential impact across condition.

In programs delivered via traditional, in-person program formats, implementation can vary widely and depends both on facilitator delivery and the participant responsiveness (Berkel, Mauricio, Schoenfelder, & Sandler, 2011). In the group condition, sessions were videotaped to assess fidelity. For each group, two parent, two youth, and two family sessions were selected randomly and scored for fidelity to the prevention curriculum. Reliability checks were conducted on 23% of the fidelity assessments and interrater reliability exceeded 80% for parent, youth, and conjoint family sessions. Fidelity to the curriculum exceeded 80%. An advantage of technology is the ability to standardize facilitator delivery, thus removing the costs of behavioral observations. Nonetheless, it is still important to examine how participants engage with the program. This study focuses primarily on attendance, however, we also assessed satisfaction to the technology condition via a brief questionnaire administered to parents and youths to evaluate their perception of ease of completing and understanding the core elements of each session, including interactive activities. Average parent and youth satisfaction ratings exceeded 90%.

Participants and Setting

PAAS is the first developmentally and culturally tailored technology-based program developed specifically for rural African American families. To test the acceptability and effectiveness of a technology-based prevention program in this context, a three-arm randomized control trial was conducted with 412 sixth graders ($M=11.4$ years of age) and their primary caregivers (primarily female, 84.3%). Families were recruited from five rural counties in the western region of Tennessee (TN) and randomized into three conditions at the community level. Criteria for county selection was based on rurality, proportion of African American residents, and evidence of high rates of teen pregnancy, and negative overall health indicators. Counties selected met the following characteristics:

1. rurality index scores greater than 11 (scale of 0–16, with higher scores indicating higher rurality),
2. over 30% African American residents,
3. over 600 African American teens in the targeted age range,
4. teen pregnancy rates of 69%, which is 13% higher than the average for TN (Tennessee General Assembly Health Equity Commission, 2009), and
5. state health indicators reflecting poor health determinant outcomes in the state of TN, which include healthcare, health behaviors, socioeconomic factors related to health, and physical environment (U.S. Census Bureau, 2013).

Primary caregivers were, on average, 40 years old and 87% had completed high school. Half were single parents, 37% were married, and the remaining were grandmother-headed

households. On average, there were 2.7 children in the household (54% female). The majority of primary caregivers (63%) were employed and worked approximately 40 hours per week; 50% owned their own home; 56% reported that their income was adequate income to meet their needs; and 14% received public assistance.

Data Collection Procedures

Middle schools in five rural counties in TN provided lists of 6th grade African American students (see Figure 1). These lists were numbered and their order was permuted randomly to contact families for eligibility screening and recruitment. To recruit families, a letter was mailed to all parents/guardians informing them about the study. A community liaison (well-known local community leaders) either contacted families by phone or visited families' homes to provide information about the study. Eligible families were invited to participate, with active consent obtained from primary caregivers and assent from youth. Of the number of families contacted, 78% consented to participate.

To enhance rapport and cultural understanding, African American community members served as data collectors, after receiving 27 hours of training. Study instruments and procedures were developed and refined with the help of a focus group of 40 African American community members who were representative of the population from which the sample was drawn. Both the focus groups and the community liaisons are part of a partnership process between our research center and the communities in which our studies are conducted. This process has been described in detail elsewhere (Murry & Brody, 2004).

In family homes, self-report questionnaires were administered to parents and target youth in an interview format, using Computer Assisted Interviewing (CAI) technology on laptop computers. This procedure consisted of interviewers reading each question displayed on the computer screen and entering participant selections directly into the computer system, which eliminates literacy concerns. To maintain confidentiality for sensitive topics such as substance use and sexual behavior, questions were read via computer using the Audio Computer Assisted Self Interview (ACASI) program and participants entered responses with a remote keypad. All families were administered pre-test assessments prior to randomization, each interview lasted approximately two hours. The 412 families who completed the pretest were randomly assigned to one of three conditions: group (N= 137), technology (N = 138), and literature control (N = 137). To reimburse families for data collection, parents received \$100 and youth received \$50.

Measures

Condition was coded as a dummy variable (technology vs. group). Because the focus of the current study is on attendance, the control group was not included.

Attendance variables were assessed using subject participation payment reports. Caregivers signed in a hard-copy signup sheet before each session to receive reimbursement. In the current study, we recoded attendance in multiple ways: 1) enrollment (i.e., whether or not parents ever attended), 2) count of sessions attended, 3) retention in at least half of the sessions, 4) retention across all of the sessions, and 5) drop out after only one session.

Baseline demographics included parents' age, education (years of school completion), and receipt of public assistance (annual amount) from the Pretest interview.

RESULTS

Across the conditions, 64% of families enrolled. They attended an average of 3.1 sessions ($SD=2.6$), just over half of the total six weekly sessions, 56% attended at least half of the sessions, and 34% attended all six sessions. Only 4% dropped out after one session. Next, we examined differences in attendance across the two program conditions using simple regression for number of sessions attended and logistic regression for the four categorical variables (see Table 2). Attendance was significantly higher in the technology condition than in the group condition for all of the indicators. On average, parents assigned to the technology condition were more likely to enroll (71% vs. 57%). They attended a higher number of sessions [$M(SD)=4(3)$ vs. $M(SD)=2(2)$]. They were also more likely to be retained for at least half of the sessions (67% vs. 45%) and retained for all sessions (52% vs. 16%). Finally, they were less likely to drop out after one session (1% vs. 7%).

We used Interaction software (Soper, 2006–2011) to test the assumption that higher age and lower education and SES would be associated with lower levels of attendance, particularly in the technology condition (see Table 3). This software centers the independent and moderator variables prior to creating an interaction term, then enters all three variables as predictors of the dependent variable in the regression analysis. It uses listwise deletion for missing data and conducts analyses for categorical, continuous, or dichotomous variables. Results supported the above finding that attendance was higher in the technology condition. Parent age was associated with most of the attendance indicators, but education and SES did not predict any of the attendance indicators. Further, these results were not moderated by intervention condition. The finding that older parents were more likely to attend was unexpected. Unfortunately, with only 12 grandparents in the study, we lacked power to sufficiently test whether the attendance of grandparents was driving this effect.

Descriptively, however, we found that in the technology condition, grandparents attended 150% more sessions than parents on average (i.e., 5.6 compared to 3.8 sessions), but in the group condition, they attended only 60% as many (i.e., 1.4 compared to 2.4 sessions).

DISCUSSION

African American adolescents face disproportionate risk related to HIV and other STDs, teen pregnancy, and substance use. While evidence-based programs (EBPs) for African American families can prevent adolescent substance use and sexual risk behavior (e.g., Murry, et al., 2007; Murry, et al., 2011), rural communities lack a prevention infrastructure. Further, we have found that primarily due to unpredictable shift work schedules, it is extremely difficult for families to regularly attend programs that could support them. Pathways to African American Success (PAAS) was designed to address these barriers through a technology-based delivery platform. Common stereotypes suggest that rural African Americans would be resistant to programs delivered via computer because of SES and generational disparities in technology use. A three-arm randomized control trial was conducted to test PAAS with a sample of 412 rural African American parents and their

middle school age child. The study's randomized design and its results address critical questions and hold promise for closing gaps in prevention science and translational research with respect to expanding the reach of EBPs (Spoth, et al., 2013). The current study specifically focused on the extent to which rural African American families would be willing to engage with a technology based program. In the next sections, we will summarize the contributions of the study, point out limitations, and discuss future directions.

Despite a growing number of evidence-based prevention programs, adolescents and families living in resource-poor rural communities confront many challenges that limit their ability to benefit from such programs. We learned from our previous work that despite extensive efforts to promote family attendance, African American parents face inconsistent wage work schedules, which makes attendance in a regularly scheduled, weekly program extremely challenging. Looking for alternative options, we conducted ethnographic research in rural African American communities and found that families have access to and make use of computers; if not in their own homes, then in libraries, churches, and other community centers. While this indicated potential feasibility and acceptability of using technology as a delivery platform, some skepticism remained about whether parents would be willing to engage in a program delivered via computer. This skepticism was reflected in the literature where most technology-based programs have been designed for and tested with youth only (e.g., Hansen, et al., 2009; Lightfoot, et al., 2007; Schwinn, et al., 2010; Van Voorhees, et al., 2009; Vogl, et al., 2009)). Second, based on our observational data (Berkel, et al., 2013) and results of other studies (e.g., Coatsworth, et al., 2006; Dillman Carpentier et al., 2007), we know that group cohesion is an important factor motivating participant retention, particularly among members of racial/ethnic groups with collectivistic orientations. Questions also remained about whether parents with less experience with technology, such as older adults or those with fewer educational or economic resources, would be willing to engage.

The need to identify methods for expanding access for rural African American families outweighs reservations about possible resistance to attendance. We attempted to address some of the concerns through the design of the program. Local actors and within group heterogeneity was included to convey the message that, "this program is for families like mine." Opportunities to react or respond to program avatars replicated the social interactions that are thought to support retention in group-based programs. The PAAS roadmap framework capitalized on the reinforcing nature of gaming through goal attainment (Huen, et al., 2016). Remaining uncertainties about attendance were addressed as empirical questions in our three-arm trial of the PAAS program. Following the work of McCurdy and Daro (2001) and Baker and colleagues (2011), we recognized the importance of breaking attendance into multiple informative components: would rural families refuse to ever attend, would they attend and drop out, or would they engage throughout the entire program?

Findings from our study may hold promise for the advancement in the use of technology to address access and program attendance. Contrary to reservations about rural families' willingness to engage in a family-centered EBPs delivered via technology, participants who were randomly assigned to the *PAAS* technology condition were more likely to enroll, were less likely to drop out, and were retained for more sessions than families assigned to the traditional, small groups led by a facilitator. For comparison purposes, attendance for the

traditional, in-person, facilitator-led group condition was similar to the mean attendance (on average two sessions) for a previous efficacy trial conducted in similar communities (Brody, Murry, Chen, Kogan, & Brown, 2006). It appears that family members' perceptions about technology-based program were sufficiently favorable to encourage them to enroll. Further confirmation that the technology-based program was sufficiently acceptable for families is reflected in their retention patterns. Once enrolled those assigned to PAAS technology were less likely to drop out of the program.

While it has been conjectured that families with less experience with technology, due to age, education, or SES, might be less willing to engage in programs delivered via technology, our findings refuted this notion. We found that neither education nor SES predicted any of the attendance indicators, nor did they make a difference in families' apparent preference for the technology-based modality. Moreover, an unexpected finding was that parent age was a significant and positive predictor of program retention in the technology condition. Descriptive probing indicated that grandparents had higher rates of participation in the technology condition, relative to mothers or fathers, but not in the group condition. Reasons for this finding are unclear, unfortunately, with only 12 grandparents in the study, we lacked power to sufficiently test whether the attendance of grandparents was driving this effect. That age was a significant predictor for increased attendance in the technology condition suggest the need to offer plausible explanations for future study. First, it appears that the graphical user interfaces (GUIs) of PAAS may have enabled older caregivers to go through the program with ease even those with low levels of computer skills and literacy to navigate interactive environments (Turk & Robertson, 2000). Next, the infrastructure for PAAS technology was specifically designed to allow for time flexibility, such that families did not have to arrange their schedules to be "on-time," rather they could come anytime for an hour and a half during the three-hour time block. The family context for grandparents raising grandchildren may be especially demanding or chaotic because of the circumstances leading to their taking custody of children. Finally, our efforts ensure privacy, reduce distractions, and dissuade interactions among attendees may have unintentionally facilitated attendance. That is, because of sensitive circumstances surrounding custody, grandparents may have been more receptive to delivery modality that did not require sharing personal information for concerns about other group members' perceptions of their own children and grandchildren. Researchers examining group disclosure in-group settings contend that people are often reluctant to disclose information to dissimilar individuals (Frey & Tropp, 2006). Each of these explanations warrants further investigation due to the frequency with which grandparents are involved with raising grandchildren (Minkler & Fuller-Thomson, 2005).

This study does have limitations that are worth noting. First, we, as well as others, have found that reimbursement for session attendance is necessary to overcome some of the barriers to participation for rural African American families. We are aware that many community-based organizations do encourage participation via incentives, such as meals, bus passes, bags of groceries, and points for purchasing necessities such as diapers and formula. Further, as the technology and group conditions received the same reimbursement, differences in attendance by condition cannot be attributable to this reimbursement. Second, the goal of the three-arm trial of PAAS was to determine the acceptability and effectiveness

of a technology-based program. Consequently, we structured the delivery of the program to ensure these aims could be achieved, specifically setting up computers in community locations with technology assistants available to support families as necessary. In future research, we seek to determine the feasibility of reducing the level of support provided as efforts are undertaken to scale-up PAAS for widespread dissemination. We maintain that requiring families to come to specific locations at specific times is a barrier to attendance and therefore that this study is a particularly conservative test of whether families would be willing to engage in EBPs delivered via technology.

Despite these limitations, findings from our study offer some resolution for an ongoing debate related to the potential of digital strategies for engaging rural African American families in EBPs. To our knowledge, the PAAS trial is the first family-based program to attempt to increase access for rural African American families using technology. To reiterate, this effort is critical given: 1) the disparities African American youth face with respect to HIV and other STDs, as well as teen pregnancy (Centers for Disease Control and Prevention, 2016), 2) the potential of EBPs to mitigate this risk (Donenberg, et al., 2006; Murry, et al., 2012), and 3) the lack of access among the most effected groups (Kao, et al., 2013). The results of this study indicate that providing technology-based services with flexible scheduling is superior in engaging rural African Americans families compared to small group, facilitator led format. Parent age, education, and SES do not appear to be limiting factors in engaging in technology-based programs. Nonetheless, it may be that groups and technology have different strengths for different contexts and situations. We hope the present study will facilitate the continued exploration of the use of technology to increase family access to EBPs and to ascertain for whom and under what context programs may be most engaging and effective.

Acknowledgments

Support was provided by MH063043 (PI: Murry). The authors gratefully thank Eryn Block and Misha Innis-Thompson for editorial assistance, and Susan Paul and her technology team, *Symbolene Systems, Inc.*, community research staff, families, and community partners who have assisted with and participated in the study.

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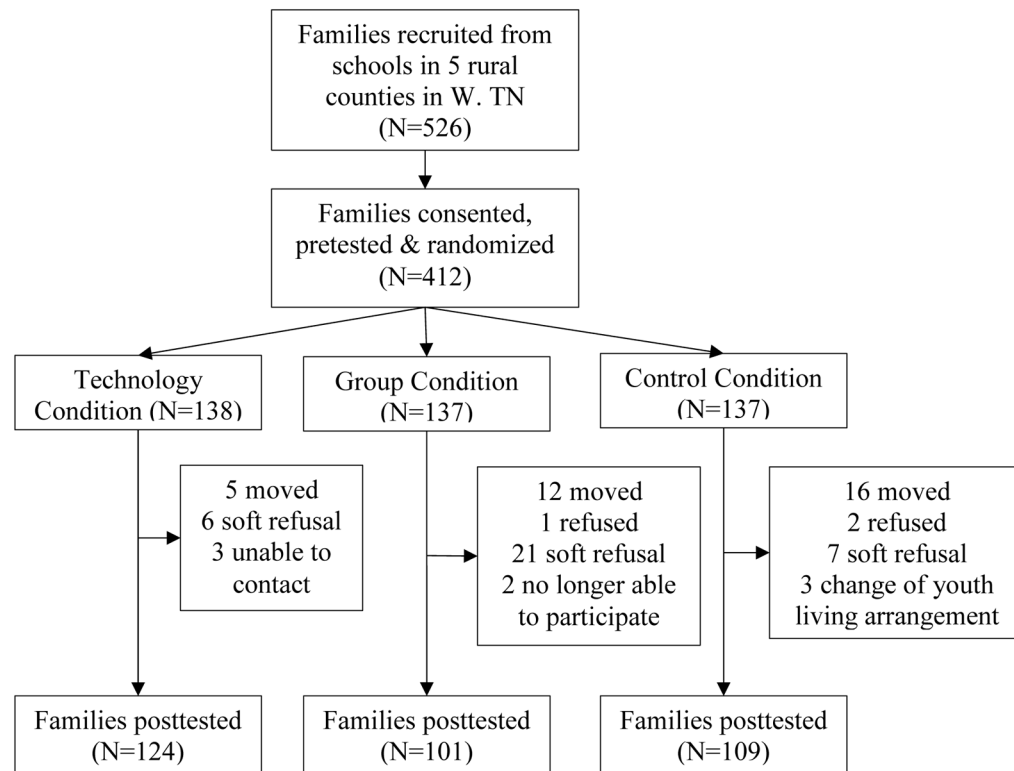


Figure 1.
PAAS Trial CONSORT Diagram

Table 1

Overview of Session Content in the PAAS Program

Session	Parent Program Component	Parent-Targeted Behaviors	Youth Program Component	Youth-Targeted Behavior	Family Program Component	Family-Targeted Behavior
1	Supportive Parenting	Importance of supportive parenting for youth development Normative developmental patterns of pre- adolescent and adolescent; Parental goals and expectations Effective ways to support youth goals and dreams	Future Orientation	Identify and visualize goals and dreams	Supporting our youth	Build nurturing, supportive relationships; Enhance parental involvement
2	Establishing Family Rules and Routines Nurturing Involved Parenting	Understand the values of having specific house rules; appropriate and effective punishment for misbehavior	Self- discovery & Autonomy	Identify positive self- qualities and capacities; Clarifying values and social norms; Importance of youth family involvement; Association between being responsible and autonomy and privilege-granting by parents	Family values	Share family rules and chores; Discuss family values; Create a family shield of values
3	Adaptive Racial Socialization and Encouraging Racial Pride	Identifying and managing racial discrimination Preparation for racial bias and promoting racial pride	Dealing with unfair situations	Identifying and clarifying reasons for differential treatment; Active coping strategies to manage unfair and difficult situations in various settings	Encouraging racial pride	Learn strategies of handling difficult situations; Identify special strengths of African American families
4	Linking school and academic performance to goals, dreams to youths' future orientation	Understand the importance of success in school; Learn ways to help youth succeed in school; Learn effective ways to be an advocate for your child in school settings	Being cool & smart	Understanding the differences between passive, aggressive, and assertive behaviors; Adaptive responses, that are smart and cool	Positive, affectionate family relations	Identify each other's stressors; Reinforce ways to help each other to reach family goals and relieve stress
5	Protecting against dangerous behavior	Understand risk prevalence, overall, and for your community; Importance of being an "Askable" parent	Resisting peer pressure	Identify peer pressure; compare risk engagers from non-risk engagers Dealing with temptation Prosocial peer affiliation	Caregivers and young people working together to protect youth from risk behaviors	Develop family plan for handling peer pressure and temptation; Share expectations and values about risk and friendship
6	Parental protections that reduce high risk behaviors	Learn how to effectively monitor youth; Understand the prevalence of sexual activity among pre-teens; Establish expectations about sex	Dealing with sexual and substance and drug use temptations	Identify reasons young people get involved in sex; identifying and avoiding dangerous situations Connecting risk, temptations, dreams, goals, school, and future orientation	Our family plan and pledge for positive youth development	Share expectations, dreams, and hopes; Discuss and identify family strengths; Establish a family creed that reflects strength, growth, and competence

Table 2

Intervention Condition on Attendance Indicators

	R	R ²	Model	B	SE	B	SE	Lower	Odds Ratio	Upper
Sessions Attended	.30	.09	F(1,277)=27.00***							
Constant				5.43***	.48					
Condition				1.58***	.30	.30				
Pseudo R ²										
Cox & Snell Nagelkerke Model										
Enrollment	.02	.03	X ² (1)=6.08**							
Constant				0.26	.17					
Condition				0.62**	.25	1.13	1.86	1.86	3.05	
Drop Out	.02	.07	X ² (1)=6.18**							
Constant				-2.55***	.33					
Condition				-1.69*	.78	0.04	0.19	0.19	0.86	
Attended Half	.05	.07	X ² (1)=14.05***							
Constant				-0.20	.17					
Condition				0.92***	.25	1.54	2.51	2.51	4.08	
Attended All	.14	.20	X ² (1)=42.14***							
Constant				-1.66***	.23					
Condition				1.75***	.29	3.27	5.75	5.75	10.09	

Note:

*** p .001;

** p .01;

* p .05;

+ p .1

Table 3

Demographic Predictors of Engagement by Intervention Condition

	Unstandardized Coefficients			
	F (df=3)	Predictor	Condition	Interaction
Parent age				
-Enrollment	3.1 *	0.01 †	-0.13 *	-0.01
-Number Attended	11.6 ***	0.07 **	-1.60 **	-0.04
-Attended Half	7.1 ***	0.01 *	-0.22 ***	-0.01
-Attended All	18.4 ***	0.01 **	-0.37 ***	-0.01 †
-Drop Out	4.4 **	0.00	-0.07 **	-0.00
Parent education				
-Enrollment	3.8 **	0.00	-0.45 *	0.06
-Number Attended	10.5 ***	-0.03	-3.31 **	0.35 †
-Attended Half	7.1 ***	0.00	-0.58 **	0.07 †
-Attended All	15.5 ***	-0.02	-0.53 **	0.03
-Drop Out	2.7 *	0.00	0.05	0.00
Public assistance				
-Enrollment	3.8 **	0.00	-0.14 *	0.00
-Number Attended	9.6 ***	0.00	-1.56 ***	0.00
-Attended Half	5.6 ***	0.00	-0.22 ***	0.00
-Attended All	14.5 ***	0.00	-0.35 ***	0.00
-Drop Out	2.6 *	0.00	0.07 **	0.00

Note:

p .001;**
p .01;*
p .05;†
p .1