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MAKING HIV PREVENTION PROGRAMMING COUNT: IDENTIFYING PREDICTORS OF SUCCESS IN A PARENT-BASED HIV PREVENTION PROGRAM FOR YOUTH

Kim S. Miller, Rex Forehand, Ryan Wiegand, Amy M. Fasula,
Lisa Armistead, Nicholas Long, and Sarah C. Wyckoff

Predictors of change in the number of sexual topics parents discussed and responsiveness during sex communication with their preadolescent after participating in a five-session sexual risk reduction intervention for parents were examined. Data were from 339 African American parents of preadolescents enrolled in the intervention arm of a randomized-controlled trial of the Parents' Matter! Program (PMP). Four categories of predictors of success were examined: time and resource constraints, personal characteristics, the parent-child relationship, and parent perceptions of child readiness for sex communication. There were only sporadic associations between success and time and resource constraints for either outcome. Parent perception of child readiness for sex communication was positively associated with discussions of sex topics ($b = 1.11$, confidence interval [CI]: 0.24-1.97) and parental responsiveness ($b = .68$, CI:0.22-1.15). Although parents face time and resource constraints, most attended at least four sessions, and demographics such as income had limited effects on program success.

In 2006, persons aged 13-29 accounted for the largest number of new HIV infections (Centers for Disease Control and Prevention [CDC], 2008). In addition, an estimated one out of four adolescent girls between the ages of 14 and 19 in the United States is infected with at least one of the most common sexually transmitted infections, or STIs (human papillomavirus [HPV], chlamydia, herpes simplex virus, and trichomo-

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The findings and conclusions in this manuscript are those of the authors and do not necessarily represent the views of the Centers for Disease Control and Prevention.

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niasis) (Forhan et al., 2008). The primary mode of HIV and STI transmission is unprotected sex (CDC, 2009). Given that the presence of certain STIs increases the susceptibility to HIV infection (Fleming & Wasserheit, 1999), taken together, these rates of HIV and other STIs reveal an urgent need to expand our effective sexual health and sexual risk reduction strategies for youth and young adults.

Current sexual risk prevention interventions for youth primarily target older adolescents who are already engaging in high-risk sexual behaviors (Lyles et al., 2007). To complement these efforts, we need effective primary prevention strategies that target the prerisk phase, before youth become sexually active. The prerisk phase may be the perfect time to cast the net wide with sexual health promotion to affect a host of negative sexual health outcomes and set the stage for a lifetime of sexual health, potentially thwarting the next generation in the HIV/AIDS epidemic.

One critical element of prerisk prevention for youth is programs for parents to learn how to effectively communicate with their children about sexual topics and sexual risk. Parent-adolescent communication about sex is associated with decreased sexual risk taking behavior among adolescents (P. J. Dittus, Jaccard, & Gordon, 1999; Dutra, Miller, & Forehand, 1999; Karofsky, Zeng, & Kosorok, 2000; Kotchick, Dorsey, Miller, & Forehand, 1999; Leland & Barth, 1993) and is particularly effective when these discussions occur prior to sexual debut (Miller, Levin, Whitaker, & Xu, 1998).

The Parents Matter! Program (PMP) (P. Dittus, Miller, Kotchick, & Forehand, 2004) is one such program. PMP is a sexual health and risk reduction intervention for parents of preadolescents to promote positive parenting and effective parent-child communication about sexuality and sexual risk reduction. A longitudinal, randomized-controlled study in three US cities found PMP to be efficacious in increasing two key outcome variables: the number of sex topics parents discussed with their preadolescent and parental responsiveness (e.g., knowledge, skill, comfort, and confidence) in parent-child communication about sexuality (Forehand et al., 2007). A substantial literature indicates that both of these factors are related to lower levels of adolescent sexual behavior (Kotchick et al., 1999; Miller, Levin, Whitaker, & Xu, 1998; see Kotchick, Armistead, & Forehand, 2006, for a review).

Unfortunately, the mere availability of empirically validated sexual health and risk reduction programming is not enough. To significantly impact the HIV and STI epidemics, such programs need to be widely adopted and implemented with fidelity for targeted populations. However, resources for the wide-scale dissemination of sexual health and risk reduction programs are limited. Therefore, we need to better understand which parents are most likely to effectively use the skills they learn in parent-based programs. This information can be utilized in at least two ways to increase the impact of programs. First, information on factors related to program effectiveness can be used to refine the target population during dissemination efforts, thus preserving resources for those families most likely to benefit from the program. For example, programs may initially be found to be effective, using group analyses, for a relatively diverse group of families. However, further studies may indicate that the program is primarily effective for families with certain characteristics. Dissemination efforts targeting such families could maximize the program's impact per dollar spent on implementation. A second use for information on factors related to effectiveness is in the area of program modification. Identifying the characteristics of families that are least likely to effectively use the skills they were taught can be helpful in modifying a program to strengthen its effectiveness across a broader range of families.

There are a number of variables that may be important in determining whether parents acquire and use skills from a parenting program. In the current investigation, we categorize variables into four groups and then examine how the variables in these groups are associated with change in the number of sex topics parents discussed with their preadolescent and parental responsiveness from baseline to follow-up with implementation of PMP.

We labeled the first group of variables as “time and resource constraints.” Included in this category are parental educational level, marital status, and employment as well as family income and household size. These variables have traditionally been viewed as family indicators of wellbeing, with higher education, being married, being employed, having a higher family income, and having a smaller household being associated with more effective parenting and child development (for reviews see Kotchick et al., 2001, 2006) and more successful outcomes of parenting intervention programs (see Kazdin, 2008).

We labeled the second category of variables “personal characteristics.” Included in this category are the parent’s gender and the child’s gender and age. Mothers communicate more with their children about sex, particularly their female offspring, than do fathers (e.g., Miller, Kotchick, Dorsey, Forehand, & Ham, 1998), and girls’ sexual behavior is more responsive to engaged parenting than is boys (Coley, Votruba-Drzal & Schindler, 2009), suggesting the importance of gender of both parent and child. Furthermore, older children, particularly as they enter adolescence, are less receptive to parental communication and direction (e.g., Forehand & Wierson, 1993).

We labeled the third category of variables “the parent-child relationship.” Included in this category are two variables: the biological relationship of the adult caregiver to the child (parent vs. other) and the quality of the adult-child relationship. Living with at least one parent appears to be an important protective factor against risky sexual behavior (see Kotchick et al., 2001). Furthermore, the quality of the relationship between a caregiver and a child appears to be protective against risky sexual behavior (Kotchick et al., 2001). Thus, consideration of both the biological relationship between the caregiver and child and the quality of that relationship warrants consideration when examining predictors of parent-child sex communication.

We labeled the final category of variables as “parental perceptions of child readiness for sex communication.” Included in this category are parent perceptions that the child is (a) ready to learn about sex and (b) thinking about having sex. Consistent with the theories of planned behavior (Ajzen, 1985) and readiness to change (Prochaska & DiClemente, 1982), each of the variables should motivate parents to learn and use skills for communicating effectively with their child about sex. Furthermore, communicating with children when they are ready to learn about and before they engage in sex is associated with the greatest impact on sexual risk behavior (Miller et al., 1998).

We do not offer hypotheses about specific variables in the current study. Instead, the study can be viewed as exploratory, as we attempt to identify which variables are associated with parent changes in sex communication and responsiveness as a result of participating in a sexual risk prevention program. However, we do offer hypotheses about categories of variables. Although we expect some variables from each of the four categories to emerge as significant predictors of change in both outcome measures in multivariate analyses, we hypothesize that parents’ perceptions of a child’s readiness for sex communication will emerge as the category of variables most highly related to the two outcome variables. This hypothesis is based on the

notion that a parent's belief that a child is ready to learn about or interested in sex will be sufficiently motivating to overcome barriers imposed by time and resource constraints, personal characteristics (e.g., male offspring, older children), and relationship issues (e.g., poor quality of parent-child relationship).

In order to provide a rigorous test of the hypothesis, we examine the two communication outcome measures at 6 and 12 months following intervention. We control for four variables that may influence the outcome: (a) baseline scores on the two outcome measures so that we are examining *change* from baseline to follow-up; (b) number of sessions attended during the intervention (range from 1 to 5) as our previous work suggests that this variable is associated with some outcomes in PMP (Forehand et al., 2007); (c) site (Athens, GA, Atlanta, GA, Little Rock, AR) where data were collected; and (d) wave of follow-up data (6 or 12 month).

METHODS

OVERVIEW

Data were taken from a randomized-controlled intervention trial of the Parents Matter! Program (PMP), funded by the Centers for Disease Control and Prevention. Participants were randomized into one of three intervention arms: a single-session general health intervention (control); a single-session communication intervention (single session); or the full five-session PMP intervention (enhanced). As Forehand et al. (2007) found the full intervention to be most effective, we examine predictors of parental success in this arm of the intervention in the current study.

PARTICIPANTS

A community-based convenience sample of 1,127 parent-child dyads constituted the initial sample. To be eligible to participate, the parent must have been either the biological parent or the legal guardian of the child and have lived continuously with the target child for at least 3 years prior to the baseline assessment. In addition, the target child was required to be in the 4th or 5th grade at the time of baseline assessment and between the ages of 9 and 12. The parent had to self-identify as being African American, and both parent and child had to be fluent in English.

From the original 1,127 participants, 12 were excluded because they failed to meet the eligibility criteria. Of the remaining 1,115, there were 378 assigned to the enhanced intervention arm, and a total of 39 dyads were eliminated because they did not attend any of the intervention sessions. Thus, the sample of parent-child dyads was 339.

RECRUITMENT ACROSS SITES

Parent-preadolescent dyads were recruited at three study sites between 2001 and 2004 in the southern United States (Athens, GA; Atlanta, GA; and Little Rock, AK), each of which obtained institutional review board approval. The CDC also received institutional review board approval. Relationships were developed between the community liaison at each site and individuals and agencies that offered potential avenues for recruitment (e.g., housing authorities, recreation programs, schools, churches). Participants were recruited through these avenues and through flyers, referrals, and community events (e.g., health fairs and parent-teacher association meetings) (for more information on recruitment methods, see Ball, Pelton, Forehand, Long, & Wallace, 2004; Secrest, Lassiter, Armistead, et al., 2004). Parents

were told that the study consisted of three programs to support their efforts to promote preadolescents' health, and they would be randomly assigned to one of three of the programs: two focusing on sexual-risk reduction (either a one-session brief intervention or a five-session full intervention), and one on general health. As noted, only the full intervention is examined in this study.

INTERVENTION

PMP was delivered in five 2.5-hour group sessions over a 5-week period. There were a total of 43 groups of parents receiving the five-session intervention and the average number of parents per group was 7.6.

The first two sessions consisted of two preliminary components on risk awareness: raising parents' awareness of adolescent sexual risk behavior and teaching parents how they can help their preadolescents avoid such risks. These sessions also focused on parenting practices known to reduce sexual risk behavior among adolescents, including the use of positive reinforcement, monitoring, and effective parent-preadolescent communication. Sex communication—focused on increasing parents' communication about sexual topics and their knowledge, comfort, skills, and confidence (referred to as responsiveness) in communicating with their preadolescents about sexual behavior—was delivered in Sessions 3 through 5. The intervention used multiple teaching strategies, including structured learning experiences, discussion, videotapes, overhead projections, modeling, role-playing, group exercises, and homework assignments. Preadolescents attended part of the fifth session so that parents could practice and receive feedback on their communication skills.

PROCEDURES

Potential participants were screened to determine eligibility. If the dyad met eligibility criteria and agreed to participate, they completed the baseline assessment. One parent and one preadolescent per family were included. If there was more than one eligible preadolescent per family, the older one was selected for participation. After baseline assessment, dyads were randomly assigned to an intervention arm.

Parents and preadolescents were assessed at preintervention and at 6-month and 12-month postintervention. Assessments and intervention groups were typically held in the participants' community (e.g., a school, community center, campus of a children's hospital). All assessments were conducted via audio computer-assisted structured interviews (Turner et al., 1998). Parents and preadolescents were situated at computers in different areas to ensure confidentiality. Questions were delivered audibly by a computerized voice over headphones and visually on the computer screen. Preadolescent assessments took approximately 30 minutes to complete; parent assessments took approximately 45 minutes to complete. After completion of each assessment and intervention session, the dyad was given \$25 for any expenses incurred (e.g., child care or transportation).

MEASURES

Control Variables. Site of data collection, (Athens, GA, Atlanta, GA, Little Rock, AR), wave of follow-up (6 and 12 month), and number of sessions attended (1-5 sessions) data were provided by key personnel at each site. For the fourth control variable, baseline scores for the dependent variable, see the outcome measures.

Time and Resource Constraints. Parents provided data on their baseline time and resource constraints. *Education level:* Parents were asked, "How far did you

go in school?" Seven response categories were collapsed into four categories (No high school degree; high school degree; some college or a technical degree; a college, graduate school, or professional degree). *Parental marital status*: Four questions were combined to create the parental marital status variable: Parents were asked, "Are you currently married?" (no/yes); if "yes," parents were asked, "Is your current spouse your child's biological father/mother?" (no/yes). Those who reported not being currently married were asked, "Do you have a steady partner that you have been with for at least 3 months?" (no/yes); if "yes," "Do you live with this person?" (no/yes). These questions were combined to create a four category variable (single; living with a partner; married, but not to other parent; married to other parent). *Employment*: Parents reported their current employment status. Seven response categories were collapsed into three categories (full-time, part time, other). *Family income*: Parents were asked, "What is your total family income per month? (include earnings from all the people in your household)." Response categories were (\$0-199; \$200-499; \$500-999; \$1,000-1,999; \$2,000-2,999; \$3,000-3,999; \$4,000 or more). *Household size*: Parents were asked to provide a number for the following question: "Including you, how many people currently live in your household?"

Personal Characteristics. Parents reported their gender, their child's gender, and the age of their child at baseline.

The Parent-Child Relationship. Parents reported baseline information about their relationship with their preadolescent. *Biological relationship to the child*: Parents were asked "What is your relationship to [target child]?" Seven response categories were collapsed into a dichotomous variable: biological or adoptive parent/other. *Quality of the parent-child relationship*: A 12-item scale was constructed based on items adapted from previous research (Jaccard, Dittus, & Gordon, 2000) and reworded for the current population (e.g., "[Target child] and I have good talks"; "[Target child] responds to discipline well"; "I am happy with how [target child] and I get along"; "I accept [target child] as s/he is"). All items were scored on a 3-point response scale ranging from "not at all true" to "very true" and summed, with higher scores indicating better parent-child relationship quality (Cronbach's alpha = .88).

Parent Perceptions of Child Readiness for Sex Communication. Parents reported baseline perceptions about their preadolescent. *Parent perceptions that their child is thinking about sex*: Parents were asked, "Do you think your child is thinking about becoming sexually active?" (no/yes). *Parent perceptions that their child is ready to learn about sex*: Parents were asked to rate the following statement as not at all true, a little true, or very true: "[Target child] is ready to begin learning about sex topics." Response categories were collapsed into a dichotomous variable (not at all true/a little or very true).

Outcome Measures. Data from parents' baseline, 6-month, and 12-month assessments were used for each outcome measure. *Sex communication topics*: A nine-item scale was constructed based on parents' responses to questions about the number of times they discussed different sexual topics (e.g., "How many times have you ever talked to [target child] about puberty or physical development? Puberty is how [target child's] body will change when s/he gets older." "How many times have you talked to [target child] about what sex is?" "How many times have you ever talked

TABLE 1. Sample Characteristics, Participants Enrolled in the Parents Matter! Program: Athens, GA, Atlanta, GA, Little Rock, AR, 2001-2004 ($N = 678$, number of participants = 339).

Category	Variable	Mean (SE)	Frequency	%	
Controls	<u>Number of Sessions Attended</u>				
			14	(4)	
			9	(3)	
			23	(7)	
			66	(19)	
			227	(67)	
		<u>Site of data collection</u>			
		Athens, GA		95	(28)
		Atlanta, GA		95	(28)
		Little Rock, AR		149	(44)
Time and resource constraints	<u>Parent education</u>				
			73	(22)	
			105	(31)	
			114	(34)	
			47	(14)	
		<u>Parent marital status</u>			
			76	(22)	
			60	(18)	
			41	(12)	
			162	(48)	
		<u>Employment</u>			
			173	(51)	
			36	(11)	
			129	(38)	
		<u>Family income per month</u>			
			21	(6)	
			57	(17)	
			63	(19)	
			101	(30)	
			50	(15)	
		28	(8)		
		14	(4)		
	Household size	4.37 (.09)			
Personal characteristics	<u>Parent gender</u>				
			327	(96)	
			12	(4)	
		<u>Child gender</u>			
			189	(56)	
			150	(44)	
		Child age (years)	10.02 (.04)		
The parent-child relationship	<u>Biological relationship</u>				
			311	(92)	
			28	(8)	
		Quality of Relation	32.15 (.22)		
Parent perceptions of child readiness for sex communication	<u>Child thinking about sex</u>				
			315	(93)	
			23	(7)	
		<u>Child ready to learn about sex</u>			
			74	(22)	
			262	(78)	

Outcome measures

<u>Number of sex communication topics</u>	
Baseline	10.05 (.28)
6-month follow-up	12.82 (.25)
12-month follow-up	13.18 (.26)
<u>Responsiveness</u>	
Baseline	11.49 (.15)
6-month follow-up	12.52 (.13)
12-month follow-up	12.57 (.14)

to [target child] about condoms?”). Each item was completed on a 3-point scale (0 = never, 1 = once or twice, and 2 = lots of times). The alpha coefficient was .88 for the current sample. *Sex communication responsiveness*: The parent’s responsiveness in communicating with his or her preadolescent about sex was assessed by five items reported by the parent (e.g., “I feel prepared to talk with my child about sexual topics as s/he gets older”). Each item was completed on a 3-point response scale (1 = not at all true, 2 = a little true, and 3 = very true). The alpha coefficient was .78.

STATISTICAL ANALYSES

In preparation for multivariable analyses, we used factor analysis as a data reduction tool to search for predictors with high levels of intercorrelation. No potential predictors were found to be highly intercorrelated using a threshold of .70, meaning all predictors were included in the multivariable model.

A linear mixed model (Laird & Ware, 1982) with a random intercept for each participant was used to analyze both outcomes. The baseline score was used as a covariate in each model as recommended when measuring change (Vickers & Altman, 2001). Furthermore, we controlled for number of sessions attended, site where data were collected, and the wave of data collection. We assessed the potential for correlation within randomized groups receiving the intervention together (i.e., do parents who attend a group together have more similar outcomes than parents in different groups?). For this, we calculated the variance inflation factors (VIFs; see Fleiss, Levin, & Paik, 2003) for each outcome at the follow-ups. The average randomized group size was 7.6 parents and VIFs for the two follow-up waves were negligibly different from 1.00. Hence, we proceeded without controlling for randomized groups.

We used multiple imputations (Rubin, 1987) to impute missing baseline predictor values and outcomes at visits where participants were lost to follow-up. Binary predictors were imputed using adaptive rounding (Bernaards, Belin & Schafer, 2007). The models were fit using PROC MIXED in SAS, Version 9.1.3, software with a Kenward-Roger degrees of freedom adjustment to estimate the effective degrees of freedom (Kenward & Roger, 1997). Results were then aggregated in PROC MIANALYZE. Residual plots and influence statistics were used to assess each model’s fit.

RESULTS

Table 1 summarizes the descriptive data for each predictor and outcome variable. For the time and resource constraints, most parents were high school graduates or attended some college or a technical school; 22% were presently married to the

TABLE 2. Mixed Model with Multiple Imputation for Predictors of Sex Communication Topics, Participants Enrolled in the Parents Matter! Program: Athens, GA, Atlanta, GA, Little Rock, AK, 2001-2004 (N = 678; 339 participants)

Predictor	Category	Coefficient Estimates						P
		b	Lower Control Limit	Upper Control Limit	DF	t		
Controls	Baseline	0.50	0.42	0.57	1679.69	12.79	< .001	
	Wave	0.40	0.10	0.69	614.11	2.66	.008	
	Site	-0.41	-1.29	0.47	2281.94	-0.92	.358	
	Atlanta, GA ^b	-0.05	-0.96	0.85	2408.61	-0.11	.911	
	Number of sessions	0.09	-2.68	2.86	1289.87	0.06	.951	
	2 ^c	1.19	-1.24	3.63	279.48	0.97	.335	
	3 ^c	0.51	-1.61	2.62	291.63	0.47	.637	
	4 ^c	1.05	-0.98	3.08	217.00	1.02	.309	
	5 ^c	-0.20	-1.24	0.84	1233.05	-0.37	.709	
Time and resource constraints	Parent education							
	No high school degree ^d	0.22	-0.65	1.10	5460.87	0.50	.619	
	Some College/tech degree ^d	0.00	-1.23	1.23	2078.99	0.00	.998	
	Colleges + ^d	0.19	-0.79	1.16	2426.97	0.37	.710	
	Parental marital status							
	Married, other parent ^e	0.76	-0.30	1.83	2432.58	1.41	.159	
	Married, not other parent ^e	1.14	-0.01	2.28	8057.03	1.95	.052	

Employment	Part time ^f	0.02	-1.15	1.20	15009.29	0.04	.968
	Other ^f	-0.18	-1.02	0.67	2793.89	-0.41	.683
Family income	\$0-199 ^g	-0.40	-2.09	1.29	611.01	-0.47	.640
	\$200-499 ^g	-0.42	-1.67	0.84	574.40	-0.65	.514
	\$500-999 ^g	0.38	-0.68	1.43	1961.05	0.70	.482
	\$2,000-2999 ^g	-0.63	-1.72	0.46	7009.15	-1.14	.255
	\$3,000-3999 ^g	0.81	-0.55	2.16	10971.04	1.17	.244
	\$4,000+ ^g	-0.95	-2.83	0.93	3767.64	-0.99	.321
Household size		0.01	-0.23	0.24	11152.70	0.06	.952
Personal characteristics	Parent gender	0.89	-1.03	2.82	1996.15	0.91	.363
	Female ^h						
	Child gender	1.06	0.35	1.77	3744.22	2.91	.004
	Female ^h						
	Child age	0.04	-0.41	0.49	5669.87	0.18	.855
The parent-child relationship	Parent biological relationship to child	0.18	-1.09	1.44	1925.49	0.27	.786
	Biological ⁱ						
	Relationship Quality	-0.02	-0.33	0.29	4047.16	-0.12	.908
Parent perceptions of child readiness for sex communication	Child thinking about sex	0.51	-0.99	2.00	1542.48	0.67	.504
	Yes ^j						
Child ready to learn about sex	Some or very true ^k	1.11	0.24	1.97	3525.08	2.52	.012

^aReference category: 6 months. ^bReference category: Little Rock, AK. ^cReference category: 1 session. ^dReference category: high school degree. ^eReference category: full time. ^fReference category: \$1000-1999. ^gReference category: male. ^hReference category: adoptive/other. ⁱReference category: no. ^jReference category: not at all true. ^kReference category: single. ^lReference category: full

child's other biological parent, approximately one half held full-time employment, and approximately two thirds of the families, which averaged over four members, had monthly incomes between \$500 and \$2,999. For personal characteristics, the vast majority of parents were female and 56% of children, who averaged 10 years of age, were female. For the parent-child relationship, the participating parent was the biological parent of the child over 90% of the time and quality of the relationship was reported to be very high (i.e., mean of 32 on a 1-36 point scale). For the parent perceptions of child readiness for sex communication, parents perceived over 90% of the children as not thinking about sex, but over three quarters of the parents thought the child was ready to learn about sex. In terms of the two dependent variables, number of sexual topics discussed and for responsiveness during sex communication, parents reported relatively high levels at baseline with increases occurring at each follow-up.

Table 2 summarizes the mixed model results for the sex communication topics outcome. For *control variables*, baseline score for the number of sex communication topics discussed ($b = 0.50$; confidence interval [CI]: 0.42-0.57; $p < .001$) was positively associated with scores on this measure at future assessment points. Also, parents scored higher on the number of sex communication topics discussed at the 12-month assessment than at the 6-month assessment ($b = 0.40$; CI: 0.10-0.69; $p = .008$). For *personal characteristics*, parents of daughters scored higher than parents of sons on the number of sex communication topics discussed ($b = 1.06$; CI: 0.35-1.77; $p = .004$). For *perceptions of child readiness for sex communication*, parents who perceived that their child was ready to learn about sex at baseline, compared with parents who did not, scored higher ($b = 1.11$; CI: 0.24-1.97; $p = .012$). All other predictors in the model were not associated with parent report of number of sex communication topics discussed at the 5% level of significance.

Table 3 summarizes the mixed model results for the sex communication responsiveness outcome. For *control variables*, baseline score for the sex communication responsiveness scale ($b = 0.42$; CI: 0.34-0.49; $p < .001$) was positively associated with scores at future assessment points, and parents attending four ($b = 1.20$, CI: 0.09-2.31; $p = .034$) and five ($b = 1.29$, CI: 0.23-2.34, $p = .017$) sessions, compared with one session, had higher responsiveness scores. For *time and resource constraints*, parents who had some college education or a technical degree, compared with parents who had a high school degree, had higher responsiveness scores ($b = 0.62$; CI: 0.15-1.10; $p = .010$). For *perceptions of child readiness for sex communication*, parents who perceived that their child was ready to learn about sex at baseline, compared with parents who did not, had higher responsiveness scores ($b = 0.68$; CI: 0.22-1.15; $p = .004$). At a significance level of 5%, all other predictors in the model were not associated with parent report of sex communication topics.

DISCUSSION

The purpose of the present study was to examine predictors of parents' communication about sex with their preadolescent age children changes as a result of participating in a sexual risk prevention program. Four categories of predictor variables were examined: time and resource constraints, personal characteristics, the parent-child relationship, and parent perceptions of child readiness for sex communication. As predicted, variables from multiple categories emerged as significant predictors of change with the category of parent perceptions of child readiness for sex commu-

nication predicting both outcome measures: number of sexual topics discussed and parental responsiveness to sex communication.

Although many parents had time and resource constraints, only one of the five variables in this category, educational level, emerged as a significant predictor of change for one outcome measure: sex communication responsiveness. Thus, our findings suggest that demographic circumstances, which are often viewed as constraints or barriers to participating in parenting programs (Kazdin, 2008), had little impact on learning and using sex communication skills with preadolescent age children.

In regard to personal characteristics, preadolescent gender was associated with change in the number of sexual topics discussed: Parents discussed more topics with girls than with boys. This finding is consistent with the literature which examined levels of communication about sex between parents and children without attempting to change communication (see Kotchick et al., 2001, 2006). Our findings extend this literature by suggesting that in parenting interventions designed to increase communication about sex, parents of male children may need more of a rationale for communication and more guidance and skill building on how, when, and what to communicate.

The parent-child relationship was not associated with changes in sex communication. The absence of significant relationships in this category of variables may have resulted from the skewed distribution of the variables assessing this construct. As a consequence of these scores approaching "ceiling effects," the parent-child relationship variables had less variability and, thus, ability to predict change in sex communication for parents participating in the prevention program.

In contrast to the other categories of variables, parent perception of child readiness for sex communication was associated with parental change in both how many topics they discussed and their knowledge, skills, comfort, and confidence in these discussions. To be motivated to learn and use skills to communicate about sex, parents must perceive a need for this type of communication. Thus, for a sexual risk prevention program to be most successful with parents, parents must not only be exposed to and taught sex communication skills, but also view their child as ready to learn about sex. These skills should be taught at a time that parents perceive the child is ready to learn about sex. In addition, interventions focusing on parents of preadolescent aged children may need to have an increased focus on convincing parents that their children may be ready to learn about sex at an earlier age than they might think.

One control variable also deserves mention: Although the majority of parents attended at least four sessions, those who only attended one session changed less on responsiveness than those who attended four or five sessions. This dose effect of the intervention is not surprising and is consistent with our findings for other outcomes (Forehand et al., 2007). A critical component of the intervention is providing parents with the opportunities to build their communication skills through role play, feedback, and practicing during an intervention session with their preadolescent. Parents who did not attend the full intervention likely did not receive the full benefit of this skills-building component that enhances quality of communication. The quality of communication (i.e., responsiveness) is as important, if not more so, than the quantity of communication (Dutra et al., 1999). Thus, emphasizing to parents the importance of consistent attendance in prevention programs in order to build parents' responsiveness cannot be overstated.

TABLE 3. Mixed Model with Multiple Imputation for Predictors of Sex Communication Responsiveness, Participants Enrolled in the Parents Matter! Program: Athens, GA, Atlanta, GA, Little Rock, AR, 2001-2004 (N = 678; 339 participants)

Predictor	Category	Coefficient Estimates						p
		b	Lower Control Limit	Upper Control Limit	DF	t		
Controls	Baseline	0.42	0.34	0.49	4481.21	10.28	<.001	
	Wave	0.11	-0.10	0.31	862.73	1.02	.306	
	Site	-0.13	-0.60	0.34	2291.65	-0.53	.598	
	Atlanta, GA ^b	-0.37	-0.85	0.12	2626.37	-1.49	.135	
	Number of sessions	0.80	-0.69	2.29	1116.37	1.05	.292	
	2 ^c	0.94	-0.29	2.18	560.83	1.50	.133	
	3 ^c	1.20	0.09	2.31	349.96	2.13	.034	
	4 ^c	1.29	0.23	2.34	285.04	2.41	.017	
	5 ^c	0.21	-0.35	0.77	998.28	0.74	.461	
Time and resource constraints	Parent education							
	No high school degree ^d	0.62	0.15	1.10	2708.07	2.58	.010	
	Some College/tech degree ^d	0.33	-0.31	0.97	7980.71	1.00	.316	
	College + ^d	0.07	-0.46	0.59	1895.33	0.24	.808	
	Parental marital status							
	Married, not other parent ^e	0.14	-0.43	0.71	2191.25	0.47	.640	
	Live with/partner	0.36	-0.25	0.98	3614.10	1.15	.248	
	Part time ^f	-0.13	-0.76	0.51	4693.00	-0.39	.693	
	Other ^f	-0.24	-0.70	0.22	1660.61	-1.01	.315	
	Family income							
	\$0-199 ^g	0.34	-0.55	1.23	950.12	0.76	.450	
	\$200-499 ^g	0.03	-0.63	0.70	657.53	0.10	.919	
	\$500-999 ^g	-0.11	-0.68	0.46	1250.17	-0.38	.703	
	\$2,000-2999 ^g	0.08	-0.50	0.66	13397.52	0.27	.785	
	\$3,000-3999 ^g	-0.15	-0.90	0.60	2019.71	-0.40	.690	
	\$4,000+ ^g	-0.57	-1.60	0.46	1877.59	-1.09	.276	

Personal characteristics	Household size	-0.07	-0.20	0.06	2308.39	-1.13	.260
	Parent gender	0.02	-1.04	1.07	906.52	0.03	.973
	Child gender	0.01	-0.37	0.39	1915.18	0.07	.947
	Child age	-0.22	-0.46	0.01	5727.10	-1.86	.064
The parent-child relationship	Parent biological relationship to child	0.05	-0.62	0.72	2624.03	0.14	.890
	Relationship quality	0.10	-0.06	0.27	11441.97	1.21	.225
Parent perceptions of child readiness for sex communication	Child thinking about sex	0.50	-0.29	1.28	2676.95	1.24	.215
	Child ready to learn about sex	0.68	0.22	1.15	2011.32	2.87	.004

^aReference category: 6 months. ^bReference category: Little Rock, AK. ^cReference category: 1 session. ^dReference category: high school degree. ^eReference category: single. ^fReference category: full time. ^gReference category: \$1000-1999. ^hReference category: male. ⁱReference category: a adoptive/other. ^jReference category: no. ^kReference category: not at all true.

The current study had several limitations that should be noted. First, with the exception of the control variables, all data were based on parent report. Second, we examined only four categories of variables and selected variables to examine within these categories. Other categories (e.g., parent psychological adjustment) or other variables within categories (e.g., transportation difficulties as an indicator of time and resource constraints) may have yielded different conclusions. Third, generalizations of our findings beyond African Americans living in the southeastern United States should be viewed with caution.

The current study also had several strengths. First, the large sample size for a prevention study allowed us the opportunity to examine baseline variables which predict variability in outcome. Second, the collection of follow-up data a year postintervention allowed us to examine long-term predictors of outcome.

Most empirically validated HIV prevention programs for youth are school based and target adolescents, many of whom are already engaging in high-risk sexual behavior (Armistead, Kotchick, & Forehand, 2004). In contrast, PMP capitalizes on parents' unique ability to offer continuous, sequential, and time-sensitive sexual health promotion to preadolescents, prior to the onset of sexual risk behaviors. The results of the present study demonstrate that even parents with time and resource constraints are motivated and able to attend a multiple-session prevention intervention and that attending multiple sessions enhances parental sex communication knowledge, skills, comfort, and confidence. Our findings also indicate that PMP has its strongest impact on parents' sex communication when they perceive their child as ready to learn about sex. Given that many parents underestimate their children's involvement in sexual activity (Jaccard et al., 1998), future research should examine strategies for combining messages to inform parents of the prevalence of youth sexual behavior and the importance of influencing youth prior to the onset of sexual behavior with family-based primary prevention programs.

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