

Appendix A

Measures

We used a combination of established and newly designed instruments to measure primary and secondary outcomes. These scales are described below and summarized in Table B1 (e.g., number of items, possible range, qualitative interpretation of higher scores, estimates of internal consistency reliability). Prior to conducting an impact analysis, we used pre-intervention data (i.e., step 1) from all participants to adapt and construct measures. This process involved an assessment of item-level descriptive statistics, internal consistency reliability, and the results of confirmatory factor analyses. Scales with highly skewed items or evidence of a poor fit between the data and expected factor structures were revised through item screening and follow-up exploratory factor analysis (EFA). We relied on EFA results and prior theory to guide scale construction decisions; we preferred parsimonious and theoretically-meaningful factor structures containing items loading greater than 0.40 on one factor with no loadings of this magnitude or greater on other factors.

Family Communication

Parent-Adolescent Communication Scale. The Parent-Adolescent Communication Scale assesses quality of communication within adolescent and caregiver dyads with a focus on openness (Barnes & Olson, 1985). Caregivers and youth rated statements on an ordinal scale from “not at all true” to “very true.”

Whole Family Communication. The Whole Family Communication scale was developed for this study based on formative qualitative work. Items assess frequency and quality of family communication activities, including problem-solving. Items measuring frequency are rated on a 6-point scale ranging from “never” to “multiple times per week”. Two of the items assessing quality are rated on a 5-point scale from “never” to “very often”, and the final item rates overall communication from “very unpleasant” to “very pleasant”. Items were standardized, summed to create a scale, and the resulting scale was standardized to have a mean of 0 and standard deviation of 1.

Frequency of Communication about Sex and HIV. The Frequency of Communication about Sex and HIV scale includes items adapted from two existing scales of

parent-child communication related to sexual risk (Miller et al., 1998; Hutchinson et al., 2003).

Both caregivers and youth completed this measure, responding to statements on a 4-point scale describing the frequency with which they discuss topics related to sex and sexual risk.

Quality of Communication About Sex. The Quality of Communication About Sex scale was developed by Miller et al. (Miller et al., 1998) and includes items related to the helpfulness and openness of caregiver-child communication about sex. Both caregivers and youth completed the measure, and responses include a 4-point likert scale from “strongly disagree” to “strongly agree”.

Economic Support Communication. The Economic Support Communication scale was developed for this study from qualitative formative work and assesses communication regarding the provision of basic needs from the child’s perspective. Items focused on discussions about the child’s needs and reasons they can or cannot be met, as well as the child’s perceptions of the degree to which caregivers’ are concerned about providing for them. Youth responded on 4-point likert scales reflecting magnitude or frequency.

Parenting and Social Support

Alabama Parenting Questionnaire. Parenting practices were assessed with a subset of items from the Alabama Parenting Questionnaire (APQ) (Shelton et al., 1996). Confirmatory factor analysis revealed a poor fit of the data to the original 6-factor model. Results of an exploratory factor analysis suggested a 3-factor model reflecting parental involvement, positive parenting, and negative parenting. Both caregivers and youth completed this measure, responding on a 5-point likert scale ranging from “never” to “always”. Youth reported about joint behavior of both caregivers, if more than one, on positive and negative parenting subscales, but about caregivers separately on the involvement subscale.

Network of Relationships Inventory. The Network of Relationships Inventory (Furman & Buhrmester, 1985) is a 45-item measure of social support. For this study, we assessed caregiver-provided support and calculated two composite scores: Social Support and Negative Interactions. Only youth completed this measure, responding on a 5-point scale ranging from “Little or none”, to “The most”.

HIV Risk Indicators

Brief HIV Knowledge Questionnaire. The Brief HIV Knowledge Questionnaire (Carey & Schroder, 2002) measures the respondent's knowledge about HIV with a focus on etiology and transmission. Response choices were yes, no, or don't know.

Sex Self-Efficacy. Five items were used to assess youths' self-efficacy related to protective sexual behavior, including condom use and refusing unwanted sex. Three items were drawn from the Self-Efficacy to Refuse Sexual Behavior Scale (Cecil & Pinkerton, 1998), and two were developed for this study. Youth reported their level of confidence on a scale from 1 to 5.

Sex Beliefs. The Sex Beliefs scale is comprised of items that measure endorsement of beliefs associated with sexual risk (e.g., "It is ok for men to have multiple partners."). Youth responded to statements on a 4-point scale indicating level of agreement.

Mental Health

To assess mental health, we administered three established measures widely used in Western contexts, including the Multi-Dimensional Anxiety Scale for Children 10-item short version (March et al., 1997); the Children's Depression Inventory (Kovacs, 1992); the Strengths and Difficulties Questionnaire (Goodman, 2001). Confirmatory factor analyses and item-level descriptives revealed problems with several items, leading us to use a reduced number of well-performing items.

Appendix B
Supplementary Figures and Tables

Table B1
Internal consistency reliability by round

Outcome	Items (1)	Scale (>) (2)	Round 1		Round 2		Round 3		Round 4		Round 5	
			α (3)	Obs (4)	α (5)	Obs (6)	α (7)	Obs (8)	α (9)	Obs (10)	α (11)	Obs (12)
Social support from MCG (Y)	21	1-5 (+)	0.93	198	0.93	163	0.90	152	0.89	116	0.84	44
Social support from FCG (Y)	21	1-5 (+)	0.91	237	0.92	221	0.91	207	0.90	152	0.92	54
Frequency of communication about sex (FCG)	7	0-3 (+)	0.85	226	0.85	204	0.85	198	0.91	142	0.87	54
Frequency of communication about sex (MCG)	7	0-3 (+)	0.84	152	0.83	137	0.83	125	0.85	92	0.93	43
Quality of communication about sex with FCG (Y)	7	1-4 (+)	0.82	237	0.78	218	0.82	208	0.75	152	0.89	54
HIV knowledge (Y)	27	0-1 (+)	0.82	237	0.76	221	0.67	208	0.70	155	0.69	55
Parent-adolescent communication with MCG (Y)	8	1-4 (+)	0.81	176	0.82	165	0.79	153	0.85	116	0.84	44
Negative interaction with FCG (Y)	9	1-5 (+)	0.78	237	0.78	221	0.72	207	0.38	152	0.48	54
Parent-adolescent communication with FCG (Y)	8	1-4 (+)	0.77	230	0.81	220	0.81	208	0.85	151	0.91	54
Frequency of communication about sex with FCG (Y)	7	0-3 (+)	0.77	237	0.83	221	0.84	209	0.84	155	0.87	55
Negative interaction with MCG (Y)	9	1-5 (+)	0.77	193	0.78	163	0.57	152	0.32	116	0.46	44
Economic communication (Y)	11	0-3 (+)	0.76	236	0.78	221	0.81	210	0.77	155	0.87	55
Quality of communication about sex with MCG (Y)	7	1-4 (+)	0.75	189	0.73	163	0.76	153	0.73	116	0.81	44
Negative parenting (Y)	13	1-5 (-)	0.74	237	0.65	221	0.59	209	0.54	155	0.63	55
CDI (Y)	24	0-2 (-)	0.74	236	0.66	222	0.64	209	0.56	154	0.66	55
Quality of communication about sex (FCG)	7	1-4 (+)	0.73	226	0.66	202	0.67	198	0.74	141	0.70	54
Rosen self-esteem (Y)	9	0-3 (+)	0.72	237	0.79	222	0.88	209	0.88	155	0.87	55
Parental involvement with MCG (Y)	7	1-5 (+)	0.71	184	0.70	167	0.72	153	0.70	116	0.67	44
SDQ Difficulties (Y)	14	0-2 (-)	0.70	237	0.71	222	0.69	209	0.53	155	0.41	55
Sex beliefs (Y)	8	1-4 (-)	0.70	237	0.73	221	0.83	209	0.82	155	0.83	55
Whole family communication (Y)	8	z (+)	0.69	237	0.79	221	0.79	209	0.74	155	0.83	55
Parental involvement (MCG)	7	1-5 (+)	0.66	152	0.67	136	0.63	124	0.64	91	0.67	43
Negative parenting (MCG)	13	1-5 (-)	0.65	152	0.67	136	0.81	124	0.80	91	0.33	43
Sex self-efficacy (Y)	5	1-5 (+)	0.64	237	0.70	221	0.74	209	0.74	155	0.71	55
Whole family communication (C)	8	z (+)	0.64	229	0.77	222	0.69	208	0.61	151	0.73	55
Quality of communication about sex (MCG)	7	1-4 (+)	0.63	152	0.77	135	0.64	125	0.57	89	0.82	43
Positive parenting (MCG)	6	1-5 (+)	0.63	152	0.67	136	0.48	124	0.70	91	0.61	43
Positive parenting (FCG)	6	1-5 (+)	0.63	226	0.59	202	0.58	198	0.57	143	0.51	54
Parental involvement with FCG (Y)	7	1-5 (+)	0.61	237	0.71	218	0.72	208	0.68	150	0.76	54
Parental involvement (FCG)	7	1-5 (+)	0.60	226	0.60	202	0.60	198	0.63	143	0.48	54

Continued on next page

Table B1 – continued from previous page

			Round 1		Round 2		Round 3		Round 4		Round 5	
Outcome	Items (1)	Scale (>) (2)	α	Obs	α	Obs	α	Obs	α	Obs	α	Obs
			(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Positive parenting (Y)	6	1-5 (+)	0.58	237	0.71	221	0.64	209	0.71	155	0.74	55
Parent-adolescent communication (FCG)	8	1-4 (+)	0.58	225	0.65	202	0.74	200	0.79	141	0.76	54
Parent-adolescent communication (MCG)	8	1-4 (+)	0.55	152	0.72	136	0.63	125	0.76	92	0.83	43
Negative parenting (FCG)	13	1-5 (-)	0.55	226	0.69	202	0.63	198	0.61	143	0.49	54

Note. This table reports internal consistency reliability as measured by Cronbach's alpha (α) for each survey round. Column 1 reports the number of items included in the scale. Column 2 lists the scale of each outcome. The character in parentheses indicates the valence of higher values: good (+) or bad (-). Columns 3 to 12 report the scale alpha and the number of observations in each round.

Table B2
Treatment compliance

	All		Church 1		Church 2		Church 3		Church 4	
Participants	<i>N</i>	Value	<i>n</i>	Value	<i>n</i>	Value	<i>n</i>	Value	<i>n</i>	Value
Family treatment compliance (%)	125	75.2	34	67.6	28	67.9	33	81.8	30	83.3
Male caregiver attendance rate	81	41.7	20	27.8	17	51.0	20	36.7	24	50.9
Female caregiver attendance rate	120	61.8	34	59.8	27	65.4	32	59.4	27	63.4
Couples attendance rate	77	28.7	20	25.6	16	36.8	20	21.7	21	32.3
Youth attendance rate	237	72.6	67	75.6	41	69.9	69	69.2	60	74.8

Note. “Family treatment compliance” is defined as at least one caregiver and at least one youth attending 5 or more sessions of the 9 session intervention; the value represents the percentage of compliant families (households). Attendance rates are calculated as the number of sessions attended divided by 9, the maximum possible sessions; the value represents the mean attendance rate. “Couples attendance rate” is the mean proportion of sessions attended by the female caregiver and male caregiver among 2-caregiver homes.

Table B3

Comparison of baseline ($j=1$) characteristics among found and unfound youth

Variable	Found ($n=215$)		Unfound ($n=22$)		p-value
	Mean	SD	Mean	SD	
Age	12.22	1.99	12.82	2.40	0.193
Female	0.50	0.50	0.68	0.48	0.109
Attends school	0.99	0.12	1.00	0.00	0.579
Orphan	0.34	0.48	0.55	0.51	0.062
Luo tribe	0.60	0.49	0.68	0.48	0.432
Negative parenting (FCG)	1.50	0.38	1.36	0.24	0.103
Parental involvement (FCG)	3.33	0.67	3.44	0.78	0.485
Positive parenting (FCG)	3.68	0.63	3.42	0.73	0.065
Frequency of communication about sex (FCG)	1.05	0.93	1.05	0.68	0.983
Frequency of communication about sex (MCG)	1.02	0.85	0.87	0.61	0.576
Negative parenting (MCG)	1.60	0.42	1.73	0.59	0.356
Parental involvement (MCG)	3.35	0.69	3.65	0.51	0.160
Positive parenting (MCG)	3.60	0.63	3.88	0.30	0.149
Parent-adolescent communication (FCG)	3.03	0.43	2.99	0.38	0.722
Parent-adolescent communication (MCG)	3.00	0.38	3.06	0.34	0.641
Quality of communication about sex (FCG)	2.89	0.56	2.66	0.66	0.075
Quality of communication about sex (MCG)	2.85	0.47	2.69	0.44	0.284
SDQ Difficulties (C)	0.65	0.34	0.73	0.31	0.289
SDQ Strengths (C)	1.72	0.28	1.83	0.22	0.080
Negative parenting (Y)	1.77	0.46	1.52	0.46	0.014
Positive parenting (Y)	3.27	0.57	3.52	0.75	0.054

Continued on next page

Table B3 – continued from previous page

Variable	Found (<i>n</i> =215)		Unfound (<i>n</i> =22)		p-value
	Mean	SD	Mean	SD	
CDI (Y)	0.27	0.20	0.20	0.13	0.105
Church support, ask leader (Y)	0.45	0.77	0.71	1.14	0.147
Church support, ask member (Y)	0.75	1.05	1.12	1.44	0.145
Coping, active (Y)	0.63	0.27	0.62	0.25	0.958
Coping, avoidant (Y)	0.55	0.26	0.68	0.29	0.035
Economic communication (Y)	1.69	0.55	1.63	0.67	0.627
Whole family communication (Y)	2.67	0.82	2.97	1.06	0.115
Parental involvement with FCG (Y)	2.76	0.70	3.06	0.81	0.065
Social support from FCG (Y)	3.56	0.77	3.81	0.62	0.153
Negative interaction with FCG (Y)	4.43	0.53	4.72	0.26	0.013
Quality of communication about sex with FCG (Y)	2.51	0.64	2.52	0.73	0.899
Frequency of communication about sex with FCG (Y)	0.62	0.66	0.58	0.78	0.756
HIV knowledge (Y)	0.68	0.17	0.65	0.29	0.495
Parental involvement with MCG (Y)	2.53	0.79	2.51	0.88	0.931
Social support from MCG (Y)	2.96	0.92	2.96	0.96	0.992
Negative interaction with MCG (Y)	4.53	0.48	4.80	0.31	0.031
Quality of communication about sex with MCG (Y)	2.41	0.59	2.22	0.65	0.226
Parent-adolescent communication with MCG (Y)	2.90	0.53	2.73	0.63	0.260
Parent-adolescent communication with FCG (Y)	3.12	0.46	3.24	0.39	0.246
Religious coping (Y)	2.50	0.41	2.67	0.32	0.069
Rosen self-esteem (Y)	2.14	0.40	2.20	0.29	0.507
SDQ Difficulties (Y)	0.52	0.32	0.57	0.29	0.443
SDQ Strengths (Y)	1.75	0.30	1.88	0.19	0.038

Continued on next page

Table B3 – continued from previous page

Variable	Found (<i>n</i> =215)		Unfound (<i>n</i> =22)		p-value
	Mean	SD	Mean	SD	
Sex self-efficacy (Y)	2.93	1.00	3.22	1.09	0.204
Sex beliefs (Y)	1.72	0.44	1.61	0.42	0.270
Stress events (Y)	0.47	0.20	0.52	0.19	0.237
Traumatic events (Y)	0.41	0.28	0.44	0.39	0.683
Trauma symptoms (Y)	1.33	0.66	1.21	0.65	0.431
Ever vaginal sex	0.24	0.43	0.36	0.49	0.193
High risk sex	0.87	0.34	0.60	0.55	0.123

Note. Attrition defined as being unfound at the first post-intervention observation: $j=2$ for youth from Church 1, $j=3$ for youth from Church 2; $j=4$ for youth from Church 3; $j=5$ for youth from Church 4.

Abbreviations: Y=Youth; C=Caregiver; MCG=Male caregiver; FCG=Female caregiver.