

REPORTS

Communities, Opportunities, and Adolescents' Sexual Behavior in KwaZulu-Natal, South Africa

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In 2002, the prevalence of HIV among South African clinic attendees under the age of 20 was 15 percent, suggesting a correspondingly high level of unprotected sex and risky sexual behavior. Past research focused on the dynamics of individuals' and partners' sexual decisionmaking without accounting for the larger context in which such decisions are made. Do adolescents' opportunities for schooling, work, and other community activities make a difference? This study uses data collected from a representative sample of young people living in KwaZulu-Natal, South Africa, to explore these questions. Logit analyses show that for girls, higher levels of education reduced the probability of having had sex in the 12 months prior to the survey, and average wages were positively associated with condom use. Greater participation in community sports increased risk-taking behaviors among boys but decreased them among girls. Within the household, education of adults had a positive effect on condom use for both boys and girls. (STUDIES IN FAMILY PLANNING 2004; 35[4]: 261–274)

South Africa's HIV-prevalence statistics are both daunting and hopeful. During the past decade, the prevalence of HIV among the young soared, but now appears to be declining. In 1994, 7 percent of adolescents aged 15–19 were HIV-positive; in 1998, 20 percent of antenatal clinic attendees younger than age 20 were found to be HIV-positive. In 2001, that number was 16 percent, and by 2002 it had declined to 15 percent. Although the decline provides a glimmer of hope, it seems to have occurred only at young ages: An astounding 35 percent of those aged 25–29 in 2002 were HIV-positive, rising from 31 percent in 2000 (South African Department of Health 2003). These statistics suggest an ongoing high level of unprotected sex and risky sexual behavior among young South Africans, especially as they take on adult roles and responsibilities.

A number of studies have investigated what might be considered the proximate social determinants of sexual activity in South Africa, that is, those forces (for ex-

ample, reproductive knowledge, communication between partners, and perceived risk) that exert influence on individuals and couples (Varga and Makubalo 1996; Varga 1997, 1999, and 2003; Wood and Jewkes 1997; MacPhail and Campbell 2001; Jewkes and Abrahams 2002). Each of these studies postulates the importance of contextual factors for adolescents' behavior, particularly as these factors may impart a sense of fatalism. Thus far, however, little empirical work considers the effect of community context on individual behaviors in South Africa, although the country presents a strong case for such consideration. As Gilbert and Walker (2002) point out, the country's history of social inequality—often manifested in geographic differentials persisting from apartheid-era racial boundaries—has patterned the spread of the disease and underpins the perceptions and prejudices concerning its prevention and treatment. Yet, we know little about how this persisting differential in community life is woven into the content of the everyday life of adolescents, or how that weave might influence safe or unsafe sexual practices. We know even less about how the differentials in community effects vary by race or by sex.

A rapidly growing body of research, focused primarily on the United States, addresses multiple levels of influences on risky sexual behavior among the young (Rutter 1993; Resnick et al. 1997; Kirby 2001). Communities (Brookes-Gunn et al. 1997; Mullan Harris and Ryan 2001;

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Kling and Liebman 2004), families and schools (Jaccard et al. 1996; Resnick et al. 1997), and peers (NCPTP 1999) have had demonstrable effects on several dimensions of adolescents' risky sexual behavior. The form and scope of the multilevel influences likely to affect this age group's behavior in developing or transitional countries have received scant attention, however. This void is particularly disturbing because the highest levels of sexually transmitted diseases, including HIV/AIDS, exist in these regions (Blanc and Way 1998; Mensch et al. 1998; UNAIDS 2001). We know little about the contextual factors shaping potentially fatal sexual decisions and behaviors in countries in which community and cultural influences might matter the most (Eaton et al. 2003).

The present analysis uses data from South Africa to examine the importance of community opportunities related to school, work, and other activities with regard to risky sexual behaviors of young people. The premise guiding this analysis is that adolescents act differentially according to the opportunities or limitations they experience at school, work, and play.

The Community Context

Theories describing the relationship of community opportunities to adolescents' sexual behavior have appeared in the literature only relatively recently. In the following review, we assess research that situates adolescents' experience in daily life and that considers the relationship of various areas of daily life to sexual risk-taking. We also examine the larger literature studying the effects of community on adolescents' sexual behavior. Our focus is primarily on cross-national research, particularly from sub-Saharan Africa, broadened to include research from other regions and countries, including the United States, when appropriate.

Educational attainment and achievement of children and young adults are the focus of a large body of research. Researchers have considered critically the relationship of schooling to sexual behavior (Lloyd and Mensch 1999; Lloyd et al. 2000). As Lloyd and Mensch (1999) point out, research on education often describes schooling as a conservative force that entrenches gender roles and reproduces racial or economic disparities through the content and form of instruction. Schools also may be a locus of sexual harassment and an environment providing opportunities for sexual contact. At the same time, they provide supervised time, thereby offering students, especially girls, an alternative to higher-risk activities available outside the schoolyard gates (Nichols et al. 1987; Ajayi et al. 1991; Zabin and Kiragu 1998). Schools may also provide adolescents with psychological and social

tools with which to nurture and negotiate healthy relationships and encourage growth in self-esteem so that they can communicate better with their partners about safer sex practices. Empirical evidence supporting or refuting these contradictory descriptions of school time and adolescence remains slim. For example, although some studies tend to show a negative relationship between school enrollment or educational attainment and risky sexual behavior (see, for example, Meekers and Ahmed 1999), few studies account appropriately for the ambiguous causality between the two (Mensch et al. 1998).

Although schooling occupies a significant amount of adolescents' time, after-school hours, the time when teenagers have the greatest opportunity to engage in risky behavior, are often unstructured and unsupervised (Boyer and Kegeles 1991; Flannery et al. 1999; Larson and Verma 1999). Drawing on results from studies conducted in the United States, Pawelko and Magafas (1997) argue that the young seem to make poor choices in the use of their time outside of school. For example, Flannery and colleagues (1999) found that boys and girls who spent time after school with peers and without adult supervision reported higher levels of risky behavior and susceptibility to peer pressure compared with adolescents who spent time at home with a parent. Similarly, Larson and Verma (1999) found an association between "driving around in cars" and delinquent behaviors. These studies provide some evidence of association, but they do not investigate the causal mechanisms relating the use of free time to risky behavior. Jemmott and Jemmott (1993)—referring also to the experience of adolescents in the United States—propose that adolescents' increased use of alcohol and drugs associated with their unsupervised free time raised the likelihood of their engaging in risky sexual behavior. A number of other studies conducted in the United States also found a clear and positive relationship between alcohol and drug use and risky sexual behavior (Hingson et al. 1990; Langer and Tubman 1997; Langer and Girard 1999). Although little research has been conducted on this subject, many youth centers and religious programs in developing countries are providing forums for sports, recreational games, educational seminars, and other organized activities to encourage young people to use their free time constructively.

In many developing countries, after-school hours do not represent free time; they are spent at work, often unpaid or domestic work. The *State of the World's Children, 1997* report (UNICEF 1998) estimated that 400 million children work at jobs that include unpaid labor. In South Africa, for example, an estimated 36 percent of 5–17-year-olds worked at least three hours for remuneration, five hours in school, and seven hours in unpaid labor per week (International Labour Organization 1999). Most

studies, however, focus on wage work, either in the formal or informal sector (Esim et al. 1999), even though wage work is uncommon among adolescent girls (Mensch et al. 1998). Moreover, most research considering adolescents and work focuses on the extent of participation, wages, and working conditions. Few consider the link between work of any sort and sexual behavior (see Amin et al. 1998, however, for an examination of the effects of the delay in marrying and childbearing among young female garment workers in Bangladesh).

Research concerning the effects of communities' characteristics on adolescents' behavior has progressed much further in developed countries. In a review of the US literature, Kirby (1999) found a number of studies that include the effects of such characteristics on adolescents' sexual behavior. His review suggests that the adolescents most likely to take sexual risks live in communities that endure high levels of crime, high residential turnover, extreme rates of poverty, elevated unemployment rates, and low educational levels. The emphasis on structural aspects of community life, primarily the aspects considered in research on sexual behavior, is in part the result of the availability of data drawn from census information and other administrative sources. A recent study conducted in the United States used randomized housing vouchers to estimate the causal effect of neighborhoods on several adolescent outcomes including educational attainment, criminal activity, drug consumption, and pregnancy. Although no effect of neighborhoods was found either on girls' becoming pregnant or on boys' impregnating girls, in general girls were shown to benefit from moving to more affluent communities, while the effects for boys were either insignificant or detrimental (Kling and Liebman 2004). Developments in theories concerning community effects on adolescents' behavior, however, have challenged researchers to move beyond these static measures. Theories of community effects are rooted in the US literature on poverty, have often drawn on social capital theory (see Coleman 1988), and have been framed in terms of structural characteristics (Brewster 1994; Darling and Steinberg 1997; Duncan et al. 1997; Gephart 1997; Mullan Harris and Ryan 2001) and the collective lifestyles of communities (Frohlich et al. 2002) in which children and young people are socialized. Studies using multidimensional measures of communities find that structures of opportunities within communities are important to children's and adolescents' development. They also find that the effects of such structures often are mediated by family processes and by a family's ability to draw on resources within the community.

With regard to the developing world, theoretical impetus for contextual-effects approaches to individual be-

havior has existed for some time (Casterline 1982 and 1985; Tsui 1985). Indeed, this approach has been used with increasing frequency in the demographic literature, especially to evaluate mortality risks or health-care service provision (Curtis and Steele 1996; DeGraff et al. 1997; Magadi et al. 2001). Research that has modeled the effects of the community context on contraceptive use and sexual behavior typically uses samples of women aged 15–49 (Entwisle et al. 1996; Steele et al. 1996 and 1999; Ali 2001). A few exceptions exist. Gupta (2000) estimated multilevel models of three rounds of Demographic and Health Survey (DHS) data from Brazil and found that religious involvement, exposure to television, and education all had a statistically significant effect on adolescents' sexual initiation and use of contraceptives in the expected directions.

Studies of contextual effects on reproductive behavior are similarly scarce. Kaufman (1998) found evidence that community-level economic status and migration patterns affected contraceptive use among black South African women aged 15–49 during the apartheid era. The association of sexual risk and disease outcomes with individuals' community involvement was explored recently by Campbell and colleagues (2002). In that study, for which both biological and behavioral measures were collected from a representative sample of 15–44-year-olds from a mining town near Johannesburg, belonging to a sports club decreased the likelihood of using a condom with a casual partner among young women aged 15–24, but also decreased the likelihood of being HIV-positive for young men and women. Being involved with a youth group also had a statistically significant negative effect on young women's likelihood of being HIV-positive and on having had a casual partnership in the past year; no such effect was found for young men. In summary, the thin evidence concerning contextual effects on adolescents' behavior is, at best, uneven; by and large, the evidence is absent. For South Africa, a country in which the spread of HIV infection is extensive among young people, an improved understanding of this relationship is critical to coherent and appropriate program and policy development.

In the present analysis, we place sexual risk in the context of South African community life. The extent to which adolescents perceive community opportunities and then take advantage of them will shape their sexual risk-taking behaviors. Brewster (1994:604), in her study of sexual transition among young black women in the United States, describes this approach in the following way:

The opportunity structure and the normative context [of local communities] are posited to affect sexual and contraceptive behavior indirectly

through their influence on the young woman's beliefs . . . [and her motivations] to avoid the possible consequences of unprotected intercourse.

In short, an adolescent's use of time—taking advantage of or passing up available opportunities—provides the frame through which opportunities may affect her or his behavior. We expect, for example, that young people who spend a great deal of time “hanging out” are more likely to engage in sexual risk-taking. In places where many opportunities exist for young people to become involved in community activities, however, adolescents are likely to limit risk-taking behaviors, whether or not they themselves participate in the community activities available. Those who live in communities where many of their peers attend school are likely to see education as an expectation or as a promise for the future and will be less likely to engage in risky behavior. Work and employment prospects are likely to operate in a similar manner. Those who live in areas where others of their own age are working and earning a reasonable income may be motivated by these employment opportunities and, therefore, may be less willing to take sexual risks.

Setting, Data, and Methods

KwaZulu-Natal lies on the eastern coast of South Africa along the Indian Ocean. With a population of 8.4 million, it is the country's most populous province. The population is about 45 percent urban. Durban, the largest port, is the third-largest city in the country. Slightly less than one-fourth of the country's African population resides in the province, and within its borders, Africans, primarily Zulu-speaking, make up approximately 80 percent of the total. The Indian population, originally brought to the province as indentured servants in the nineteenth century to work on sugar plantations, are the next-largest group, just under 10 percent of the total, followed by whites at 7 percent (Central Statistical Service 1997).

Data for this analysis are drawn from the first round of a longitudinal study of young adults in KwaZulu-Natal entitled *Transitions to Adulthood in the Context of AIDS in South Africa* (Rutenberg et al. 2001). For this study, two districts—Durban Metro and Mtunzini—were selected within KwaZulu-Natal in order to include urban, transitional, and rural regions. Within these two districts, the study used a modified multistage cluster sample to represent all racial groups and classes. The first round of data collection included individual interviews with 3,052 adolescents aged 14–22. These interviews were conducted in 113 randomly selected census enumeration areas during a six-week period from 16 September to 30 October 1999. The interviews included

a variety of questions about sexual health and behaviors as well as about the context of adolescent life, in terms of schooling, work, and other activities. The complete educational history and current enrollment status of each respondent were recorded. Questions were asked about work experiences and participation in organizations. Information concerning communities is based on aggregated individual data because no equivalent data are available from other sources.

In the present analysis, we focus on two aspects of sexual risk-taking: having had sex in the past 12 months and condom use at last sex within the past 12 months. These two behaviors represent critical points on which sexual risk may turn. Clearly, abstaining from sex reduces to zero the probability of disease transmission via sexual contact. Although debate continues about condom use as an effective means to reduce disease transmission, a recent review from the National Institute of Allergy and Infectious Diseases (NIAID 2001) deemed condoms effective if used properly and consistently (Cates 2001). A vast literature exists on condom use in many settings, but none of these studies has considered community effects on adolescents' behavior.¹ The literature on sexual initiation and frequency of intercourse is growing quickly, although few studies consider community effects, and those that do are based on US samples (Billy et al. 1994; Ku et al. 1998; Mullan Harris and Ryan 2001). No study has considered the incidence of recent sexual abstinence, regardless of sexual experience. These two behaviors, then, capture the essence of sexual risk for adolescents. Condom use is considered here as a two-stage decisionmaking process. The first step is whether or not to have sex; the second, conditional on having sex, is whether or not to use a condom.² The variables are derived from a series of questions about sexual activities. The first question asked whether respondents have ever had sexual intercourse and, if so, how many partners they have had sex with in the past 12 months. For the variable indicating recent sexual experience, we coded as one respondents who stated they had had at least one partner in the past year. We coded all other respondents as zero, including those who had never had sexual intercourse. Respondents were then asked detailed questions about their three most recent sexual partners in the past 12 months, including whether they had used a condom the last time they had sex with each of those partners. For those who had had sex, we examined condom use for all mentioned partnerships (up to three). If a condom had not been used with one or more partners, we coded condom use at last sex as “no” (zero). We coded condom use as “yes” (one) if a condom had been used at last sex for all partners mentioned. This variable thus requires a high standard of consistent condom use across partners (NIAID 2001).

Our explanatory variables of interest—experiences of school, work, and other activities—are posited to play an integral role in sexual risk-taking among adolescents. In our analytic approach, we draw theoretically from recent work on the community and family context of adolescents' risk-taking behavior as described above. We model community influences on individual behavior, controlling for individual and household characteristics. The community variables do not measure individual associations; instead they capture dynamics of the environments in which adolescents live. Although our data do not permit an assessment of process variables, such as interactions among neighbors, structural components that we use here are an important first step. We aggregate individual-level data to the cluster (or enumeration area) level, excluding the observation of the index child.³ Aggregation of individual-level data poses some methodological challenges such as endogeneity (Oakes 2004); that is, individuals contribute to these measures of community, as much as they may be influenced by them, even if the index person's contribution is excluded from the aggregate measure. We conceptualize these measures as community "norms," however; that is, the measures capture the choices made by community members, given the opportunities available to them. Therefore, we do not argue for causality, but for association (Subramanian 2004). We exclude from the analysis enumeration areas containing fewer than ten observations (less than 2 percent of the individual samples, which represents 14 of the 113 enumeration areas). Excluding clusters with such small numbers of observations guards against biased cluster averages, although standard errors still may be relatively large. Large standard errors, however, would tend to bias our results toward nonsignificance, so the estimates presented here are conservative.⁴ In order to facilitate sample design, the clusters were based on 1996 South African census boundaries and may not correspond precisely to local conceptions of communities. Nonetheless, a relatively strong sense of neighborhood exists in urban areas of Durban and in village or farming areas of rural KwaZulu-Natal. Certainly urban and rural community dynamics are likely to differ as a result of historical and local differences in norms and expectations of behavior. Rural areas of this particular district are generally well-linked to urban communities by means of reasonable transportation and communication systems. Thus, although some variation in community influences is likely, we expect minimal differences in urban and rural dynamics with respect to sexual behavior among the young, compared with that of many other rural areas of South Africa. Community educational norms are defined as the proportion of young people enrolled at any level of school and the proportion of people aged

20 and older who graduated from secondary school. Norms of employment are measured by two dimensions of current employment: the proportion of adolescents performing wage labor in a community, and the (log) wages they earn per week. Extracurricular activities are examined by measuring the proportion of adolescents participating in organized activities. Participation is coded according to three main categories of activity: community youth programs, sports, and religious clubs, selected on the basis of frequency of participation (more than 15 percent of the sample participating in any given category). These categories closely resemble those relevant to South African young people as specified by Campbell and colleagues (2002).

Household factors are also likely to affect adolescents' behaviors (Mullan Harris et al. 2002), and these influences must be controlled in model estimation. We use two variables for household-level controls. The first is quality of housing material, which is used as a proxy for the economic well-being of the household. The second captures education of the household members, because the value placed on schooling, and the resources a household provides for it, may be an important factor in determining an individual's behavior. We code household education as a dummy variable, indicating whether any adult aged 23 or older has completed at least 12 years of schooling.

In addition to community and household variables, individual demographic controls of sex, race, and age are included. We also include individual measures of educational attainment, work status, and participation in extracurricular activities to account for individual-level effects net of these influences. The correlation of each such variable with its community counterpart did not exceed 0.36. Note that adolescents may be involved in all types of activities or in none of them. For education, because many respondents had advanced beyond primary or secondary school, we used the variable representing current enrollment at any educational level. We included as the individual-level indicator for employment whether the respondent was currently working, because wages and current employment status were highly correlated (0.98) at the individual level.⁵

The data are described in Table 1. They are weighted and exclude missing cases and colored respondents—those of mixed heritage—because these numbers are too small for meaningful analysis, bringing the total sample size to 2,992. Approximately 47 percent of the sample reported having had sexual intercourse within the past 12 months. Of those, about 47 percent ($n = 1,318$) had used a condom at last sex.⁶ About 55 percent of the sample is female, and the racial composition approximates the distribution for the sampled areas. Slightly

Table 1 Percentage of boys and girls aged 14–22, by selected variables, KwaZulu-Natal, South Africa, 1999

Variable	Male		Female		Total	
	Per-cent	(n)	Per-cent	(n)	Per-cent	(n)
Dependent variable						
Total ^a	100	(1,346)	100	(1,646)	100	(2,992)
Had sex in past 12 months	49	(640)	46	(737)	47	(1,377)
Total		(1,300)		(1,613)		(2,914)
Number of current partners						
0	55	(719)	58	(926)	57	(1,645)
1	27	(350)	40	(649)	34	(999)
2+	18	(234)	2	(32)	9	(266)
Total		(1,302)		(1,608)		(2,910)
Used condom at last sex in past 12 months						
49	(303)	46	(322)	47	(625)	
Total		(613)		(705)		(1,318)
Independent variable						
Individual						
Race and residence						
African rural	24	(323)	24	(395)	24	(718)
African urban	54	(727)	58	(955)	56	(1,676)
Indian	14	(188)	13	(214)	14	(419)
White	8	(108)	5	(82)	6	(180)
Total		(1,346)		(1,646)		(2,992)
Age						
14–15	25	(331)	25	(409)	25	(739)
16–19	52	(699)	50	(820)	51	(1,518)
20–22	24	(317)	25	(418)	24	(734)
Total		(1,346)		(1,646)		(2,992)
Education						
Enrolled in primary, secondary, or post-secondary school	78	(1,045)	72	(1,179)	74	(2,204)
Total		(1,340)		(1,638)		(2,978)
Work and employment						
Currently working	14	(182)	8	(126)	10	(308)
Total		(1,346)		(1,646)		(2,992)
Involved in organized activity						
Community	18	(244)	15	(245)	16	(490)
Sports	45	(608)	17	(282)	30	(890)
Religious	24	(316)	31	(512)	28	(828)
Total		(1,346)		(1,646)		(2,992)
Household						
Housing type						
Traditional material	19	(251)	19	(309)	19	(560)
Temporary shack	5	(63)	5	(78)	5	(141)
Permanent shack	18	(244)	19	(309)	18	(548)
Permanent house	58	(764)	57	(931)	58	(1,696)
Total		(1,322)		(1,623)		(2,945)
Education (household)						
Adult schooling (≥12 years)	49	(655)	46	(756)	47	(1,411)
Total		(1,346)		(1,646)		(2,992)
Community variable						
(average percent of enumeration areas, universe = all 109 enumeration areas) ^b			Percent	Standard deviation		
Education						
Enrolled in primary or secondary school			66	12.7		
Matriculated (age ≥20)			7	5.8		
Work and employment						
Currently working			12	13.1		
Amount earned per week (mean, in Rand)			207	128.0		
Involved in organized activity						
Community			15	16.0		
Sports			28	13.7		
Religious			28	16.4		

Note: Data are from Rutenberg et al. (2001). Results are weighted.
^a Totals for each variable differ slightly as a result of missing data. Percentages are rounded. ^b Each respondent in a given enumeration area is assigned a different value for the enumeration-area variable because of the deletion of the index case from the aggregated value. The table presents the average for each area; an average across all areas was calculated using all of the community averages.

more than 50 percent of respondents are aged 16–19, and the other half is evenly distributed between the younger ages (14–15) and the older ages (20–22). About three-fourths of respondents are currently enrolled in an educational program, although only 10 percent are currently employed (more boys than girls are working). Slightly less than a third of respondents are involved in organized activities, more in sports and religious activities than in community activities. Almost 60 percent of the sample live in permanent housing, and about half reside in a household where at least one adult older than the respondent has completed 12 or more years of education. On average, across communities, 66 percent of young people are enrolled in primary or secondary school, although fewer than 10 percent have passed the national secondary-school completion test (matric). About 12 percent, on average, work for wages in communities, earning about 200 Rand a week (about US\$30 per week in 1999). Respondents live in communities where slightly less than a third of adolescents participate in sports or religious organizations, and 15 percent participate in community organizations.⁷

Community Influences on Adolescents' Sexual Behavior

Because of the likely gender differences in risk-taking, separate models are presented for girls and boys. A nested-model approach is used to demonstrate the changes in effects when community-level education, work, and activity variables are added. All models are based on weighted data, and standard errors are adjusted for cluster design of the sample. Odds ratios and p-values are shown in all tables.

Table 2 presents the odds ratios for girls' having had sex in the past 12 months. Model 1 indicates that the odds of having had sex in the past year are six times lower for Indian girls than for white girls. No other racial group shows odds that are statistically significantly different from those of white girls. As expected, the odds that a girl has had sex in the past 12 months increase substantially with age. School enrollment significantly decreases the odds of girls' having had sex, whereas current employment status is not significantly associated with such behavior. Girls who are involved in a community organization have about two times the odds of having had sex than do those who are not. Girls' participation in religious and sports activities does not appear to affect the odds of their having had sex in the past year, and no effect of housing type is found, but educational attainment of household members is significantly and negatively related to the likelihood that girls have had sex.

Table 2 Odds ratios for adolescent girls surveyed who reported having had sex in the past 12 months, KwaZulu-Natal, South Africa, 1999

Characteristic	Model 1		Model 2	
	Odds ratio	p-value	Odds ratio	p-value
Individual				
Race and residence				
White (r)	1.00	—	1.00	—
Indian	0.16	0.001	0.15	0.002
African rural	1.63	0.343	1.33	0.559
African urban	2.26	0.097	1.44	0.504
Age				
14–15 (r)	1.00	—	1.00	—
16–19	9.31	0.000	9.69	0.000
20–22	27.64	0.000	30.26	0.000
Enrolled in any school				
No (r)	1.00	—	1.00	—
Yes	0.18	0.000	0.17	0.000
Currently working				
No (r)	1.00	—	1.00	—
Yes	1.23	0.566	1.20	0.645
Involved in organized activity				
No (r)	1.00	—	1.00	—
Community	1.92	0.039	2.07	0.030
Sports	0.82	0.251	0.74	0.099
Religious	0.83	0.377	0.83	0.339
Household				
Housing type				
Permanent house (r)	1.00	—	1.00	—
Traditional material	0.66	0.108	0.56	0.038
Temporary shack	1.53	0.688	1.06	0.911
Permanent shack	0.72	0.391	0.52	0.103
Education (household)				
Adult schooling				
≤12 years (r)	1.00	—	1.00	—
≥12 years	0.56	0.029	0.59	0.047
Community				
Education (aggregate)				
Enrolled in primary or secondary school	—	—	0.03	0.002
Matriculated (age ≥20)	—	—	0.01	0.011
Work (aggregate)				
Currently working	—	—	0.14	0.106
Average earnings per week (log)	—	—	0.62	0.002
Involved in organized activity				
Community	—	—	2.32	0.272
Sports	—	—	0.19	0.026
Religious	—	—	1.34	0.732
(n)	(1,542)		(1,513)	
Wald chi-squared (degrees of freedom)	400.0 (15)		411.3 (22)	

Note: Data are from Rutenberg et al. (2001). Results are weighted and standard errors are adjusted for clustering. (r) = Reference category. — = Not applicable.

When the community-level education variables are included (see Model 2), the effects of all individual- and household-level items remain approximately the same, although those living in traditional housing are about half as likely as those living in permanent housing to have engaged in sex within the past 12 months. Girls

appear to be influenced by the opportunities available in their communities, even after controlling for individual and household characteristics. The effect of both community-level education variables on the probability of having had sex in the last year is highly significant and highly negative for girls. Community-level wages and participation in sports programs also appear to make a difference. For every one-unit increase in the log mean wages, the odds of girls having had sex in the past 12 months decreases by about 0.4. Similarly, for every unit increase in sports activities in communities, the odds of recent sex decrease by about 0.8. Thus, for girls, a high level of community participation in schooling, work, and sports appears to decrease their sexual activity.

The analogous models for boys, shown in Table 3, indicate a different pattern of effects. African boys from urban and rural areas are significantly more likely (about four times more likely) than white boys to have had sex in the past year, a finding that persists for urban African boys after community variables are included. As it is for girls, age for boys is highly and positively related to having had sex, just as current school enrollment is highly negatively related. Unlike girls, however, boys who are currently employed are almost three times more likely than those who are unemployed to have had sex, whereas boys involved in sports are more than two times more likely to have had sex than those who are not. For boys, household-level characteristics are not significant, nor is the education level of adults in the household. Although community-level effects in the girls' model were important, not one measure of community opportunities is significant for boys.

Tables 4 and 5 present the results of the logit analysis for condom use at last sex for girls and boys. Strikingly, in Model 1 (which excludes community-level effects), no significant racial differences with respect to condom use are found for either boys or girls. Age also does not appear to matter. Even after controlling for community influences (Model 2), age remains insignificant, whereas only rural African boys appear to be significantly less likely than whites to use condoms regularly. For girls, those living in houses made of traditional materials are about half as likely to use a condom as are those living in permanent houses, although the effect disappears once community measures are included. Similarly, although household-level education increases condom use for girls, that effect is somewhat diminished when community variables are considered. In contrast with their effects on recent sexual engagement reported in Table 2, community measures are less influential in determining condom use for girls. Only one of the community-level work variables, the average log earnings per week, has a significant and positive effect. With every log-unit

Table 3 Odds ratios for adolescent boys surveyed who reported having had sex in the past 12 months, KwaZulu-Natal, South Africa, 1999

Characteristic	Model 1		Model 2	
	Odds ratio	p-value	Odds ratio	p-value
Individual				
Race and residence				
White (r)	1.00	—	1.00	—
Indian	0.81	0.613	0.69	0.467
African rural	4.12	0.025	3.03	0.124
African urban	4.25	0.003	4.04	0.012
Age				
14–15 (r)	1.00	—	1.00	—
16–19	10.86	0.000	11.33	0.000
20–22	29.86	0.000	31.65	0.000
Enrolled in any school				
No (r)	1.00	—	1.00	—
Yes	0.37	0.000	0.37	0.000
Currently working				
No (r)	1.00	—	1.00	—
Yes	2.97	0.000	2.99	0.000
Involved in organized activity				
No (r)	1.00	—	1.00	—
Community	0.87	0.583	0.79	0.336
Sports	2.32	0.007	2.22	0.013
Religious	0.94	0.815	0.90	0.671
Household				
Housing type				
Permanent house (r)	1.00	—	1.00	—
Traditional material	0.66	0.292	0.60	0.207
Temporary shack	2.68	0.318	2.75	0.302
Permanent shack	0.84	0.708	0.86	0.744
Education (household)				
Adult schooling				
≤12 years (r)	1.00	—	1.00	—
≥12 years	1.30	0.244	1.42	0.189
Community				
Education (aggregate)				
Enrolled in primary or secondary school	—	—	0.34	0.440
Matriculated (age ≥20)	—	—	1.10	0.966
Work (aggregate)				
Currently working	—	—	0.24	0.193
Average earnings per week (log)	—	—	0.85	0.440
Involved in organized activity				
Community	—	—	0.34	0.251
Sports	—	—	4.32	0.140
Religious	—	—	2.08	0.465
(n)	(1,231)		(1,208)	
Wald chi-squared (degrees of freedom)	488.1 (15)		538.6 (22)	

Note: Data are from Rutenberg et al. (2001). Results are weighted and standard errors are adjusted for clustering.
(r) = Reference category. — = Not applicable.

Table 4 Odds ratios for adolescent girls surveyed who reported having used condoms during their last intercourse in the past 12 months, KwaZulu-Natal, South Africa, 1999

Characteristic	Model 1		Model 2	
	Odds ratio	p-value	Odds ratio	p-value
Individual				
Race and residence				
White (r)	1.00	—	1.00	—
Indian	0.64	0.427	0.54	0.368
African rural	0.92	0.878	0.85	0.823
African urban	0.72	0.466	0.59	0.414
Age				
14–15 (r)	1.00	—	1.00	—
16–19	1.16	0.772	1.05	0.920
20–22	1.36	0.514	1.26	0.611
Enrolled in any school				
No (r)	1.00	—	1.00	—
Yes	1.36	0.137	1.44	0.110
Currently working				
No (r)	1.00	—	1.00	—
Yes	1.00	0.982	1.01	0.973
Involved in organized activity				
No (r)	1.00	—	1.00	—
Community	1.29	0.442	1.37	0.298
Sports	1.02	0.961	1.32	0.578
Religious	0.94	0.761	1.12	0.610
Household				
Housing type				
Permanent house (r)	1.00	—	1.00	—
Traditional material	0.54	0.027	0.62	0.062
Temporary shack	0.43	0.368	0.47	0.487
Permanent shack	0.68	0.129	0.99	0.976
Education (household)				
Adult schooling				
≤12 years (r)	1.00	—	1.00	—
≥12 years	1.63	0.004	1.41	0.043
Community				
Education (aggregate)				
Enrolled in primary or secondary school	—	—	5.58	0.256
Matriculated (age ≥ 20)	—	—	6.27	0.506
Work (aggregate)				
Currently working	—	—	3.44	0.496
Average earnings per week (log)	—	—	1.59	0.003
Involved in organized activity				
Community	—	—	1.47	0.652
Sports	—	—	0.25	0.096
Religious	—	—	0.26	0.103
(n)	(664)		(652)	
Wald chi-squared (degrees of freedom)	52.98 (15)		81.44 (22)	

Note: Data are from Rutenberg et al. (2001). Results are weighted and standard errors are adjusted for clustering.
(r) = Reference category. — = Not applicable.

increase in wages in the community, the odds that a girl will use a condom increase by almost 60 percent.

By comparison, Table 5 shows that for boys, education of adults in the household is strongly positively related to the use of condoms. Even after controlling for community factors, boys in households where someone has attained 12 or more years of education are about two times more likely to use a condom at last sex than are

boys in households where this is not the case. Yet educational attainment at the community level has a strong opposite effect, sharply decreasing boys' likelihood of having used condoms. Unlike the model estimated for girls, community-level wages are not significantly associated with condom use; however, current employment is significantly negatively associated. Finally, level of participation in sports has an effect on boys' condom use, but

Table 5 Odds ratios for adolescent boys surveyed who reported having used condoms during their last intercourse in the past 12 months, KwaZulu-Natal, South Africa, 1999

Characteristic	Model 1		Model 2	
	Odds ratio	p-value	Odds ratio	p-value
Individual				
Race and residence				
White (r)	1.00	—	1.00	—
Indian	1.25	0.738	0.60	0.535
African rural	0.46	0.274	0.11	0.031
African urban	0.67	0.553	0.12	0.052
Age				
14–15 (r)	1.00	—	1.00	—
16–19	0.91	0.835	0.80	0.635
20–22	0.99	0.993	0.83	0.776
Enrolled in any school				
No (r)	1.00	—	1.00	—
Yes	1.79	0.102	1.60	0.204
Currently working				
No (r)	1.00	—	1.00	—
Yes	2.05	0.038	2.02	0.051
Involved in organized activity				
No (r)	1.00	—	1.00	—
Community	0.82	0.618	0.92	0.840
Sports	0.71	0.100	0.76	0.223
Religious	1.49	0.189	1.68	0.092
Household				
Housing type				
Permanent house (r)	1.00	—	1.00	—
Traditional material	0.91	0.786	1.08	0.815
Temporary shack	1.00	0.993	0.88	0.667
Permanent shack	1.20	0.634	1.29	0.475
Education (household)				
Adult schooling				
≤12 years (r)	1.00	—	1.00	—
≥12 years	2.05	0.000	2.02	0.000
Community				
Education (aggregate)				
Enrolled in primary or secondary school	—	—	0.04	0.049
Matriculated (age ≥20)	—	—	0.01	0.031
Work (aggregate)				
Currently working	—	—	0.01	0.019
Average earnings per week (log)	—	—	1.42	0.111
Involved in organized activity				
Community	—	—	2.32	0.364
Sports	—	—	0.15	0.044
Religious	—	—	0.80	0.827
(n)	(573)		(564)	
Wald chi-squared (degrees of freedom)	52.8 (15)		77.1 (22)	

Note: Data are from Rutenberg et al. (2001). Results are weighted and standard errors are adjusted for clustering.
(r) = Reference category. — = Not applicable.

in the opposite direction of expectation: A unit increase in sports participation at the community level corresponds to a decrease of 0.85 in the odds of boys' reporting condom use at last sex.

In sum, our findings show that at the community level, educational, employment, and organized-activity opportunities are important influences on individual sexual risk-taking, but not always in the expected direc-

tions, especially for boys. The expected beneficial effects for girls of living in communities with more opportunities, and the mixed and sometimes harmful effects of these same communities for boys, are consistent with some studies of neighborhood effects conducted in the United States (Kling and Liebman 2004). Educational opportunities in the community tend to decrease the odds of sexual activity for girls; for boys, they tend to decrease the odds of condom use. Employment opportunities at the community level tend to decrease boys' condom use, while the average amount of earnings per week appears to be a powerful influence on the behavior of girls, both decreasing their sexual activity and increasing their condom use if they are sexually active. Although this finding could suggest a relationship between the cost of condoms and use, condoms are accessible throughout the communities involved in this study. More likely, young people observe the amount of earnings available to them in their communities; those who perceive the potential for a high level of pay may be more inclined to engage in safe sex practices than are those who perceive a low potential. Finally, regarding adolescents' community-level participation in organized activities, only level of participation in sports seems to matter; no effect was found for involvement in either community groups or religious groups for either sex or for either behavior considered. Community-level participation in sports was found to decrease the probability of condom use among boys, but it also decreased the risk among girls of having had sex in the past year.

Discussion and Implications

Results of this study indicate that in addition to individual and household characteristics, community variables representing structures of opportunities for adolescents make a difference in the sexual behavior of young people in South Africa. By shedding light on the often-shrouded sexual decisions and risks taken by adolescents, these findings could help identify promising interventions and highlight likely policy pitfalls. A key finding is that among young people, sex is far more important than race in predicting sexual risk-taking. In South Africa, racial stereotypes persist and are harmful in terms of intervention, program design, and target group. Persistent stereotypes are also harmful to those individuals who believe they are not at risk because of group affiliation.

Sex is also critical with respect to the effects of education on sexual behavior. Girls living in areas with a high level of opportunity for educational attainment tend to report not having had sex recently, whereas no detectable effect on this behavior is found for boys. Yet, the

same situation is associated with a lower likelihood of condom use for boys, even while the effects of household-level education act in the expected direction: Boys from households that include a better-educated adult are more likely to report having used a condom. These results suggest that formal education has not yet produced an environment where girls and boys elect to use condoms. Indeed, the contradictory results for girls and boys suggest that the educational environment may manifest itself differently for girls in various aspects of their sexual behavior. Our findings suggest that schools have ample latitude to promote the knowledge, understanding, and skills to enable young people to make responsible decisions about their sexual behavior. Moreover, educational effects may persist after schooling is completed, because the educational levels of other household members are found to have an important association with risky behavior. Finally, the strong association of household members' education and adolescents' risk avoidance suggest that programs promoting risk reduction for adolescents that emphasize family and households may be particularly successful.

In addition to education, employment prospects shape young people's future plans and expectations. Current economic opportunities for South African adolescents are limited, but the promise of landing a potentially lucrative job appears to influence behavior. Earning potential asserts a strong negative influence on having had sex within the past year among girls, whereas employment potential has a negative effect on condom use among boys. These results suggest that the job marketplace offers different prospects according to sex. If girls perceive that they can work for reasonable wages, they are more likely to engage in safer sex practices. For boys, the association between higher levels of employment and lower probability of condom use is likely to be associated with privilege. Perhaps a higher level of entitlement comes with perceived job opportunities—in this case, entitlement to have sex without a condom. In short, perceived employment potential may be a key antidote to the fatalism of adolescents recorded in other research and in media reports in South Africa, but in different ways according to sex. Our results suggest that programs focusing on livelihoods, particularly for girls, could be important in bringing about safer sex practices (Steele et al. 1998). For boys, work programs that take cognizance of their increased risk could emphasize safe sex practices explicitly. Several projects have begun to address issues of adolescents' time and skills; few of these programs consider a link between livelihoods and sexual behavior, however (Esim et al. 1999; Segil and Sebastiani 1999).

The impact of participation in organized activities was found to be ambiguous. This study provides evidence that high levels of participation in sports for adolescents decrease girls' likelihood of having sex, for example. In contrast, for boys, the level of participation decreases the likelihood of using condoms at last sex. These results suggest that organized activities, especially sports, may also be a critical point of intervention. Girls may respond favorably to the possibility of participating in sports, especially if their peers already do so (see, for example, Brady 1998). For boys, participating in sports or having opportunities for participation may actually increase opportunities for sex and may enhance the perception that "real men" don't use condoms. Promoting different messages tailored to each sex may provide an effective path for intervention.

Conclusions

Although the results of this study provide promising programmatic direction, they require some qualification. This study, like others similar to it, does not consider the causal mechanisms relating community norms to sexual risk-taking. Do adolescents refrain from risky behavior because of what they learn on the job, at school, or in a club? Or do they gain important negotiating skills through participation in these activities or garner sufficient self-esteem and confidence to seek out and maintain healthy relationships? Untangling these connections will provide information important for appropriate program design focused on adolescents. The measures of context used here, based on the aggregation of individual-level measures, do not allow us to make causal interpretations of community characteristics. Although the study's community-level results must be considered associational, nonetheless such results offer an important starting point for future research concerning the contextual influences on individual behavior in developing or transitional countries. Finally, this study was limited to only three racial groups in one metropolitan area of South Africa. Different contextual associations may be found in other areas and among other groups. Differences according to sex may be of particular interest because they are manifest across the highly diverse rural areas of the country.

Strong theoretical arguments and a growing body of empirical research suggest that community conditions are important in the lives—and decisionmaking—of adolescents. Their susceptibility to outside forces may prove to be both a blessing and a curse. If they perceive that high returns accrue from educational attainment and employment options, they may be motivated to en-

gage in safer sex practices. If they are unable to stay in school or to find jobs, however, they may discount the costs of acquiring HIV or other sexually transmitted diseases and, thus, be willing to take greater risks. If educational, employment, or activity opportunities bring with them incorrect messages, or messages that do not counter prevailing ideas that perpetuate sexual risk, these adolescents may continue to take unnecessary risks. The results of this study should encourage researchers studying HIV/AIDS, particularly in high-prevalence settings such as South Africa, to consider a wide range of influences on adolescents' lives, because the context in which adolescents face decisions may be critical to their sexual behaviors. Such influences are particularly important to address in view of the recent decline in HIV prevalence for people younger than 20, juxtaposed with the discouraging increases for those in their twenties.

Notes

- 1 Although community influences have not been featured in the literature on condom use, a few recent articles assess the effects of community behavioral interventions (Agha et al. 2001; Ahmed et al. 2001). These tend to describe community context or controls in relation to the behavioral intervention.
- 2 Alternatively, sexual decisionmaking may be modeled as a multinomial logit, which assumes a simultaneous decision among three distinct and largely independent options: abstaining, having sex with a condom, and having sex without a condom. Although a Hausman test of the independence of irrelevant alternatives fails to reject this assumption, solid theoretical reasons exist to believe that these decisions are sequential and dependent on available alternatives. In general, the substantive results from the multinomial logit were markedly close to the two-step, two-equation process modeled here. Two interesting distinctions appear: In the multinomial analysis (results not shown), African boys are significantly more likely than whites to have intercourse without a condom, but are not more likely to engage in sexual relations with condoms relative to abstaining. We also found that, again using "no sex" as the comparison group, high levels of employment in the community significantly decrease sexual activity with condoms. For ease of interpretation we present only the results from the two separate logits. We caution, however, that the models we present do not resolve the challenge of modeling adolescents' decisionmaking processes. Instead, our results show correlates of specific decisions regarding sexual safety.
- 3 Because samples are limited in several of the enumeration areas, the aggregate community variables are not calculated separately by sex or race. We contend, however, that in postapartheid South Africa, differences in opportunities for educational attainment, employment, and participation in organized activities are minimal within a given neighborhood. Moreover, most of the work opportunities for adolescents are not sex-differentiated by wage, hours, or type. Although boys may be more likely to engage in construction work and girls may be more likely to serve as hairdressers, for example, in a consideration of the community as a whole, such differences are unlikely to affect adolescents' participation in risky sexual behavior.
- 4 We note that smaller clusters will have larger standard errors than larger clusters and may introduce some bias into the estimates and the standard errors. We ran a sensitivity analysis using clusters of sizes 15 and 20 or greater, representing 90 percent and 80 percent of the sample, respectively. The substantive results did not change, although the smaller sample effectively eliminated the Indian responses. Again, the smaller clusters will produce conservative estimates because of the larger standard errors. Regressions weighted by size of the cluster also produced substantively similar results with only a few changes in the significance of community variables. Community sports participation became an insignificant predictor for girls' sexual engagement and a significant predictor of their condom use at the 5 percent level. For boys, participation in community activities became a significant positive predictor of condom use.
- 5 Individual-level measures may be endogenous to the dependent variables. For example, whether respondents' having had sex in the past 12 months resulted in school-leaving (for example, as a result of pregnancy) is not known; nor is it clear whether respondents who drop out of school then have sex (for example, because they have more unsupervised time). To avoid overestimation of the effect of community variables, which may otherwise capture both individual and community effects, we include the individual-level items in the model. To verify our results, we also estimated models that exclude the potentially endogenous individual-level variables. Our results were substantively similar.
- 6 The relatively high level of condom use may seem contrary to expectations. Reports from several other settings in the region indicate low levels of condom use among young people. Unfortunately, empirical data on this topic are limited for South Africa. Studies tend to be localized and qualitative in nature. A few exceptions are found, although direct comparisons are difficult because of differences in samples or questions. The South African DHS (SAMRC et al. 1999) reports that among girls aged 15–19, 20 percent used a condom at last sex. In 1996, Richter reported that among her sample of 864 urban African adolescents (girls and boys aged 16–20), condom use at last sex was 27 percent. Compared with these figures, ours are high. Recent media reports, however, suggest that safe sex practices are increasing (Reuters 2001), as demonstrated by data from antenatal clinics showing stabilized rates of new infection (Makubalo et al. 2000) and by views expressed in focus-group discussions with adolescents in which young people who do not use condoms are described as "ignorant." Indeed, our study also found remarkably favorable attitudes toward condom use among a wide range of adolescents (Robinson et al. 2001).
- 7 Aggregate values for an enumeration area vary for each adolescent, because each adolescent contributes a different value to the aggregate that is then excluded for the specific aggregation valuation for that index child. The table calculations are derived by averaging community-variable scores across individuals within one community or cluster and taking an average of all community averages.

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