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Journal of Adolescent Health 46 (2010) S75–S91

JOURNAL OF ADOLESCENT HEALTH

Review article

A Review of Positive Youth Development Programs That Promote Adolescent Sexual and Reproductive Health

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Manuscript received August 17, 2009; manuscript accepted November 22, 2009

Abstract

Purpose: Positive youth development (PYD) may be a promising strategy for promoting adolescent health. A systematic review of the published data was conducted to identify and describe PYD programs that improve adolescent sexual and reproductive health.

Methods: Eight databases were searched for articles about PYD programs published between 1985 and 2007. Programs included met the following criteria: fostered at least one of 12 PYD goals in multiple socialization domains (i.e., family, school, community) or addressed two or more goals in at least one socialization domain; allocated at least half of the program activities to promoting general PYD outcomes (as compared with a focus on direct sexual health content); included youth younger than 20 years old; and used an experimental or quasi-experimental evaluation design.

Results: Thirty programs met the inclusion criteria, 15 of which had evidence of improving at least one adolescent sexual and reproductive health outcome. Program effects were moderate and well-sustained. Program goals addressed by approximately 50% or more of the effective programs included promoting prosocial bonding, cognitive competence, social competence, emotional competence, belief in the future, and self-determination. Effective programs were significantly more likely than those that did not have an impact to strengthen the school context and to deliver activities in a supportive atmosphere. Effective programs were also more likely to build skills, enhance bonding, strengthen the family, engage youth in real roles and activities, empower youth, communicate expectations, and be stable and relatively long-lasting, although these differences between effective and ineffective programs were not statistically significant.

Conclusion: PYD programs can promote adolescent sexual and reproductive health, and tested, effective PYD programs should be part of a comprehensive approach to promoting adolescent health. However, more research is needed before a specific list of program characteristics can be viewed as a ''recipe'' for success. Published by Elsevier Inc.

Keywords: Adolescent; Sexual and reproductive health; Positive youth development

In the United States, teen pregnancy and sexually transmitted infections (STIs) represent serious public health issues. Approximately, 745,000 females younger than 20 years become pregnant every year, and birth rates among adolescents aged 15–19 years increased 3% from 2005 to 2006—the first such increase since 1991 [1]. One in four (26%) U.S. young women between the ages of 14 and 19—3.2 million teenage girls—is infected with at least one of the most common STIs [2]. In addition, more than 20,000 male and female youth and young adults aged 10–24 years are living with HIV/AIDS [3].

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the U.S. Centers for Disease Control and Prevention.

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1054-139X/10/$ – see front matter Published by Elsevier Inc.
doi:10.1016/j.jadohealth.2009.11.215

Sex education can give youth the skills and knowledge they need to refuse sex or to practice safer sexual behaviors [4], and positive youth development (PYD) programs may provide them with the motivation and confidence needed to use those skills [5]. PYD programs help youth strengthen relationships and skills, embed them in positive networks of supportive adults, and help them develop a more positive view of their future by providing academic, economic, and volunteer opportunities [6–9]. In other words, PYD programs target a different, but complementary, set of mediating variables than those targeted by many sexuality education programs.

One of the challenges faced by the PYD field has been the difficulty of defining a ''positive youth development program.'' Many definitions have been developed by academic researchers, program providers, and funding organizations that have worked in this area. However, there has been no agreement on the characteristics, program activities, or program atmosphere that define PYD programs. In the first comprehensive literature review of PYD programs, Catalano and colleagues [6] identified 15 characteristics of effective PYD programs that were repeatedly discussed in the published data. These included 12 specific program ''goals'': bonding, competence (social, cognitive, emotional, behavioral, moral), belief in the future, self-efficacy, clear and positive identity, prosocial norms, spirituality, and self-determination (for definitions of these program goals, please see Catalano and colleagues [2002] [6]). The program goals serve as the mediating influences through which behavior change occurs. For example, youth with a more positive view of their future, or who are bonded to prosocial adults, may be less likely to take behavioral risks that might jeopardize their future goals or harm important relationships.

Roth and Brooks-Gunn [10] drew on this earlier work when they proposed that PYD programs have a set of distinctive characteristics. First, they maintained that PYD programs can be identified by the types of ''opportunities and experiences'' that are provided to youth. That is, PYD programs seek to strengthen supports available to youth at home, in school, and in their community. Examples of opportunities and experiences are parenting classes that promote bonding by teaching parents better ways to communicate with their children and set and reinforce behavioral expectations for them; teacher training that strengthens teachers' ability to build competencies in youth; and modification of the school climate to create more opportunities for youth to engage in prosocial activities. PYD programs help youth build skills through such activities as a competency-building curriculum, direct academic instruction, homework help, and community service. They also provide opportunities to engage in real and challenging roles and activities, for example, by designing, writing, and producing a newspaper; getting a job; engaging in leadership opportunities such as tutoring or peer mediation, doing community service, visiting a museum or college campus, and engaging in a new sport or recreational activity.

Another set of PYD program characteristics refers to the ''atmosphere'' within which activities are delivered [6, 9]. The atmosphere is supportive, in which bonding between youth and program staff and adults involved in the program is actively encouraged, as is developing a sense of belonging with other program participants. It is also empowering, with youth being encouraged to engage in useful roles, practice self-determination, and develop or clarify their goals for the future. PYD programs communicate expectations for positive behavior by defining clear rules for behavior and consequences for infractions, fostering prosocial norms, encouraging youth to practice healthy behaviors, and conveying a belief in adolescents as capable individuals. They also provide opportunities for recognition by rewarding positive behaviors within the program or by structuring opportunities for public recognition of skills. Finally, PYD programs tend to be stable and relatively long-lasting; that is, they last an entire school year or longer so that youth have adequate time to build relationships and benefit from program activities.

The most recent attempt to identify and describe key characteristics of PYD programs with evidence of promoting adolescent health was completed more than 10 years ago [6], and no review has focused on adolescent sexual and reproductive health. This review was designed to address this gap and has the following purposes: [1] identify PYD programs with evidence of promoting adolescent sexual and reproductive health, [2] describe the nature and magnitude of the programs' impact on sexual risk behavior and health outcomes, and [3] describe key characteristics of these programs.

Methods

Because the PYD approach is still relatively new, our aim was to be inclusive rather than limiting. We adapted the search strategy created by Catalano and colleagues [6] for their review of PYD programs. Librarians at the U.S. Centers for Disease Control and Prevention conducted searches for articles published during the period 1985–2007 in the following eight databases: Medline, PsychInfo, CINAHL, Sociological Abstracts, Social Services Abstracts, LILACS, Cochrane, and ERIC (a list of key search terms is available on request from the first author). We also identified unpublished documents and articles that were in press by talking to professionals working in the field and by searching the Internet.

For purposes of the literature review, we defined a PYD program as one that had the following characteristics: [1] the program addressed one of the 12 PYD goals defined by Catalano and colleagues [6] in multiple socialization domains (i.e., family, school, community) or addressed two or more goals in at least one socialization domain; [2] a majority of youth served by the program were younger than 20 years of age; and [3] at least 50% of the program time and/or content was allocated to promoting general

PYD outcomes, as compared with a focus on more proximal antecedents to sexual behavior, such as knowledge of HIV/AIDS or outcome expectations of getting pregnant as an adolescent. This last criterion was applied because we wanted to examine the effect of programs that target a different set of mediators (i.e., the 12 PYD goals listed earlier in the text) than those usually found in sexuality education programs, and because the sexuality education programs have been more extensively examined (e.g., see Kirby 2007 [4]).

Other inclusion criteria related to the evaluation design: [1] use of an experimental or quasi-experimental design with a reasonably equivalent, structured comparison group; [2] appropriate statistical methods for analyzing the outcome data; [3] use of an appropriate unit of analysis; and [4] evaluation of the impact of the program on at least one sexual or reproductive health outcome measured during adolescence, such as initiation or frequency of sexual intercourse, use of condoms or birth control, number of sexual partners, history of becoming pregnant or giving birth, or diagnosis of a STI. We considered a program ''effective'' if it resulted in a significant change in at least one sexual and reproductive behavioral or health outcomes listed above, relative to youth in no-treatment control or alternative treatment conditions. A change in knowledge or attitudes was insufficient to classify a program as ''effective''.

Identified programs were judged on whether they met inclusion criteria and were coded for their characteristics using a standard template that included the following: identification of key intervention activities, demographics of the population served, type of evaluation design, and program's effects on adolescent sexual and reproductive health behaviors or outcomes (a p value of $\leq .05$ was used to determine significance). Characteristics of the program's goals, activities, and atmosphere, as defined previously [6, 9], were also coded. Each program summary was independently coded by two investigators (from among the five authors of this review) who had either a masters or doctoral-level degree in a public health–related field and had expertise in adolescent sexual and reproductive health and program evaluation. Each pair of investigators subsequently met to reach 100% consensus on coding. The investigator codes were then sent to the original developers of the program for clarification and/or confirmation; 70% of the program descriptions were confirmed in this way (i.e., 30% of the original program developers did not respond).

Results

We identified 30 PYD programs that met inclusion criteria. Table 1 briefly describes each of the programs, their key components and activities, target population, evaluation design, and major program outcomes.

Fifteen of the 30 programs had evidence of improving at least one adolescent sexual and reproductive health outcome : 7 programs resulted in delayed sexual initiation [13, 14, 17, 19–22, 41–42, 44, 48], 3 programs saw decreased frequency or recency of sex [11, 41–42, 51], 6 resulted in increased use of birth control or condoms [11, 13, 17, 31–32, 44–45, 51], 2 reported decreased number of sexual partners [44–45, 34–36], 6 resulted in fewer pregnancies or births [12, 13, 17, 25–28, 44–45, 52–55], and 2 led to fewer reported STIs [18, 44–45]. Although the range of measures and analytic methods used makes direct comparisons difficult, the overall pattern indicates that effective programs had a moderate impact on behavior and health. Further, the program effects tended to be well sustained. The periods of follow-up for which effects were maintained varied: 2 programs measured outcomes only at immediate post-test, 1 program followed up after less than 1 year, 5 programs followed up at 1–2 years, and 7 programs assessed outcomes more than 2 years after intervention. Three programs implemented in preschool and elementary school years continued to have a positive impact on youth into the young adult years [12, 25, 44–45].

The programs with evidence of improving adolescent sexual and reproductive health were delivered to a range of age groups: 2 were delivered during the preschool years [12, 25–28]; 1, during the elementary school years [44–45]; 7, during middle school years [11, 14, 19–22, 31–32, 34–36, 41–42, 48]; 4, over a period spanning middle and high school [13, 17, 18, 52–55]; and 1, during the high school years [51]. All but 3 [19–22, 48, 52–55] of the 15 effective programs were implemented among at-risk youth (as defined by the program developers), such as youth living in disorganized and/or poor communities, youth living in single-parent households, or youth with high rates of risk behavior. Other programs targeted at-risk individuals such as siblings of pregnant or parenting teens [13] and youth who were experiencing a recent divorce in the family [34–36]. All of the effective programs were delivered to mixed-gender groups of youth. In seven of the programs, participants were from mixed racial and ethnic backgrounds; the other eight programs focused almost exclusively on a single racial or ethnic group: African American (n = 5) [11, 12, 14, 25–28, 31–32], Hispanic (n = 1) [18], or White (n = 2) [19–22, 34–36] populations. Programs were delivered in a range of settings, including schools (n = 10) [11, 12, 14, 19–22, 25–28, 41–42, 44–47, 48, 51, 52–55] and community organizations (n = 5) [13, 17, 18, 31–32, 34–36].

A listing of the goals addressed by each program that reported a positive program effect on adolescent sexual and reproductive health outcomes is found in Table 2. The most common program goals, targeted by approximately 50% or more of the effective programs, were pro-social bonding, cognitive competence, social competence, emotional competence, belief in the future, and self-determination. Approximately one-third of the programs targeted behavioral competence, moral competence, self-efficacy, and pro-social norms. One quarter of the effective programs attempted to help youth develop a clear and positive identity. None of the programs, effective or ineffective, addressed spirituality as a program goal.

Table 1
Summary of positive youth development programs included in the review

Program and key components	Evaluation		
	Study population	Study design	Results
Aban Aya—Social development curriculum [11]			
Classroom-based curriculum delivered by college students to fifth–eighth graders (16–21 sessions/year) that promotes African American cultural values of unity, self-determination, and responsibility and teaches skills to build self-esteem and empathy; to manage anger, stress, and anxiety; and to develop interpersonal relationships, communication, decision-making, problem-solving, conflict-resolution, resisting peer pressure, and goal-setting abilities. Homework assignments involve parents. Approximately 20% of curriculum had direct sexual health content.	1,153 fifth graders (baseline average age 10.9 years); 50% female; 100% African American; 12 schools in urban Chicago.	Random assignment to social development curriculum, school/community intervention, and health enhancement control condition; recruited fifth graders and followed through eighth grade.	Male and female students in social development curriculum group did not significantly differ from peers in the other two conditions on measures of recent sexual intercourse and condom use.
Aban Aya—School/community intervention [11]			
Classroom-based social development curriculum (described above) plus school task force—led (a) parent training workshops on child supervision and discipline, anger and stress management, and communication; (b) teacher training on interactive and cultural teaching and proactive classroom management; and (c) school policy change and community support development. Approximately, 20% of curriculum focused on direct sexual health content.	See above.	See above.	Male students in the school/community condition demonstrated significantly less recent sexual intercourse and significantly more condom use than peers in health enhancement condition, but did not differ significantly from peers in social development condition. There were no significant group differences for female students.
Abecedarian [12]			
Full-day child care was provided year-round for 6–8 hours per day, 5 days a week for 5 years (infancy to kindergarten) using a systematic curriculum emphasizing the development of cognitive, language, and adaptive behavioral skills. No activities focused on direct sexual health content.	111 infants (baseline); mixed gender, 98% African American, poor families, many born to young mothers without a high school degree.	Random assignment to experimental and control (no treatment) condition; follow-up at age 21.	Intervention youth were significantly less likely than control youth to be a parent before age 20.
Adolescent sibling pregnancy prevention program [13]			
Providers had at least one face-to-face contact per month over a 9-month period with younger siblings of pregnant or parenting youth. An average 20 hours of services were provided per month per participant, including reproductive health counseling, transportation, tutoring, advocacy at expulsion and court hearings, help in acquiring medical insurance, access to sports, media literacy, and social skills training. Approximately, 25% of program focused on direct sexual health content.	1,594 adolescents (baseline) with a sibling who was pregnant or parenting, enrolled in a program serving at-risk youth; mean age of 14; mixed gender; three quarters Hispanic.	Quasi-experimental design comparing youth in the program against a waitlist comparison group; 9-month follow-up period.	Female participants were significantly less likely to have had sex or get pregnant than those in the comparison group; no significant differences on these outcomes among male youth. Male youth in the intervention group were significantly more likely than those in the comparison group to use condoms consistently; no significant difference on this outcome among female youth.
Adult Identity Mentoring [14]			
Classroom-based curriculum of 10 sessions delivered to seventh-grade students over 6 weeks, which covered the following topics: legacy, role models, and peers; visions of possible selves in terms of future careers; identification of skills needed to be competitive in the marketplace and the value of self-presentation; and development of skills to promote one's life goals. No activities focused on direct sexual health content.	248 seventh grade students (baseline); mixed gender; 98% African American from low-income families; 12–14 years of age; suburban town near a southeastern city.	Random assignment of seventh-grade classes from one middle school to intervention and control (health education) condition; follow-up at 19 weeks and 1-year post-baseline.	At 1 year, male participants were significantly less likely to have had sex in the previous year than controls. There were no significant group differences for female students.

All Stars Character Education [15, 16]			
Classroom-based program delivered by teacher or community representative to sixth–seventh graders (14 entire class, 4 small group, 4 one-on-one sessions) that helps students to identify their ideal lifestyle and examine how risk behaviors may interfere with that lifestyle, to increase beliefs about peer norms about risk behavior, and to make a personal commitment to avoid risk behavior. Homework reinforces lessons learned and involves parents. Approximately, 30% of program focused on direct sexual health content.	1,655 sixth–seventh graders (baseline modal age 12); 55% female; 69% white, 25% African American, 6% Hispanic; Midwestern urban community; 8 treatment, and 6 control schools.	Matched pairs of schools in 2 cities randomly assigned to teacher-implemented program, community representative–implemented program, and health education class control condition; 1-year follow-up.	No significant group differences on sexual health index that included frequency of sexual intercourse and number of partners.
Carrera Program [17]			
After-school program for 13- to 15-year-olds (3 hours/day, 6 days/week for 350 days/year) with five activity components (Job Club, academic support, comprehensive family life, and sexuality education, art, individual sports) and two service components (mental health and medical care), and involvement of parents. Providers included part-time employees, social workers, and medical personnel. Approximately, 15% (1 of 7 sessions) focused on direct sexual health content.	484 13–15-year-olds; 55% female; 60% non-Hispanic black, 40% Hispanic; New York City communities.	Students randomly assigned to Carrera program and usual-services control; 3-year follow-up.	For male students, no significant group differences on measures of ever had sex or pregnancy. For female students, Carrera youth were significantly less likely than control youth to have sex under pressure, to have ever had sex, and to have a pregnancy or birth. Female Carrera participants were significantly more likely to use hormonal contraception at last sex than controls, but the groups did not differ significantly on condom use at last sex.
Familias Unidas [18]			
Parent-centered program for seventh graders' families to strengthen families' ability to communicate with their teens, provide support, use positive parenting, and increase their involvement; plus Parent Adolescent Training for HIV prevention (PATH), an HIV-prevention curriculum designed to train parents to educate children about HIV, increase HIV knowledge, and promote parent-child HIV communication. Program, delivered by Hispanic graduate-level facilitators, was composed of 15 group sessions, 2 parent-adolescent discussion circles, 8 family visits; 49 total hours. Slightly less than half of the program focused on direct sexual health content.	266 seventh graders (mean age: 13.4 years, 52% female) and parents (mean age: 40.9, 87% female); 100% Latino; low-income households in Miami.	Families randomized to Familias Unidas plus PATH, English for speakers of other languages (ESOL) plus PATH control, and ESOL plus HeartPower control; 24- and 36-month follow-up.	No significant group differences postintervention or follow-up on past 90-day unprotected sex. At the 36-month follow up, Familias Unidas plus Path youth were less likely to report an STI and unprotected sex at last sex than peers in the two control conditions.
Gatehouse Project [19–22]			
School-based program for 2 years that included a) curriculum delivered by teachers to eighth graders over 8 weeks to build social, problem-solving, and coping skills; b) school- and classroom-level changes in year 1 and 2 (e.g., anti-bullying guidelines, more interactive teaching styles) implemented by school-based action team to promote inclusion and connection; and c) community-school linkages developed by action team. No activities focused on direct sexual health content.	2,546 eighth graders in 25 schools in Australia; 53% female; 13% non-Australian born.	Schools randomly assigned to Gatehouse or no-treatment control; 2-year follow-up.	Students in Gatehouse schools were significantly less likely than control students to report initiation of sex at post-intervention and 2-year follow-up.

(*Continued*)

Table 1. *Continued*

Program and key components	Evaluation		
	Study population	Study design	Results
Healthy for Life—intensive condition [23, 24] The program had four main components: (1) the school component, a 54-lesson curriculum that addressed social inoculation, health advocacy, analyzing media influences, public commitments, etc; (2) the peer component, in which peer leaders served as positive role models; (3) the family component, which included a parent-orientation session, home mailings 3 times during the program, and homework assignments that involved the teen interviewing the adult; (4) the community component, which engaged community members in reinforcement activities. Approximately one-third of activities focused on direct sexual health content. All activities were delivered in seventh grade in one, sequential 12-week block.	2,483 sixth-grade students (baseline); mixed gender, 96% white, 72% lived in two-parent household; suburbs, small cities, and towns in Wisconsin.	Stratified random assignment of 21 middle schools to control (n = 8), age-appropriate (n = 7), and intensive (n = 7) intervention conditions. Follow-up surveys were conducted annually from grade 6 until grade 10.	No significant group differences on lifetime sexual initiation, past-month sexual intercourse, and condom use.
Healthy for Life—age appropriate condition [23, 24] Program activities were identical to those described above for the intensive condition. In the age-appropriate version, the activities were delivered during grades 6—8, via three 4-week segments.	See above.	See above.	No significant group differences on lifetime sexual intercourse or condom use. By ninth grade, students in the age-appropriate condition reported significantly higher rates of intercourse in the past month than the control condition; by tenth grade, the difference was not significant.
High/Scope Perry Preschool Program [25–28] The High/Scope Perry Preschool program promotes social and cognitive development in at-risk preschool-age children. Children attend the program for 1–2 years, 2.5 hours every weekday from October through May Active learning among children is encouraged by allowing them to initiate activities and control their environment. Teachers receive curriculum training and supervision, with 5–6 students assigned to each teacher. Weekly home visits by teachers help parents to participate and support their children's learning. Parents also participate in monthly small-group meetings with other parents that are facilitated by program staff. No activities focus on direct sexual health content.	123 children 3–4 years of age at enrollment, 100% African American and living in poverty.	Random assignment to an intervention or control condition. Follow-up occurred at 19, 27, and 40 years of age.	At age 27, participants in the treatment condition were significantly less likely to have experienced a teen pregnancy than youth in the control condition.
Job Corps [29] Job Corps provides employment assistance to disadvantaged youth between ages 16 and 24. Primary service components include academic education, vocational training, residential living, health care and health education, counseling, and job-placement assistance. The program is primarily residential since an underlying programmatic assumption is that disadvantaged youth need a more supportive surrounding to benefit from educational and vocational training. The average period of participation was 8 months. A small portion of activities (life skills and comprehensive health services and counseling) focused on direct sexual health content.	15,386 Job Corps participants from 105 centers nationwide; mixed gender; mixed race and ethnicity; 18% had children at time of enrollment; 60% received some form of public assistance during the year before enrollment; 88% of participants were residential.	Random assignment to intervention or control (less intensive jobs program) condition. Follow-up occurred at 12 months and 30 months postbaseline.	No significant group differences on history of ever becoming pregnant.

Job Start [30]			
Modeled after the residential Job Corps program, Job Start was a less intensive program because it was nonresidential, had fewer supportive services, and did not provide financial compensation through paid work experience. The major service components included instruction in basic academic skills, occupational skills training, training-related support services (including transportation, child care, life skills training), and job placement assistance. Youth participated in an average of 400 hours of activities, and the average length of participation was 6.8 months. No activities focused on direct sexual health content.	2,312 youth aged 17–21 years, economically disadvantaged, school dropouts with poor reading skills (below eighth grade).	Random assignment to either an intervention or control condition. Follow-up surveys were conducted 12, 24, and 48 months after assignment.	Women in the intervention condition who were custodial mothers at entry had significantly higher rates of pregnancy and birth over the 4-year period. No significant group differences for all other women or for men on history of making someone pregnant or giving birth.
Keepin' It REAL [31, 32]			
Designed for mothers and their 11- to 14-year-old children, the program was delivered in 7 sessions over a 14-week period, with each session lasting 2 hours. Except for portions of the first and last sessions, mothers and adolescents met in separate groups. Sessions covered stress reduction; parenting likes/dislikes; tobacco, alcohol, and drug use, early initiation of sex, and violence; ways to help their child improve school performance; and a potluck dinner to share experiences with others. Youth also participated in visits to senior centers, worksites, and a college and engaged in a community service activity. Approximately, 15% of activities focused on direct sexual health content.	582 adolescents and 491 mothers; mixed gender, mean age of youth at enrollment was 12.2 years, 98% African American, 90% of youth lived with their biological mother; 63% from single-parent homes; 56% of mothers had attended some college, only 11% did not have a high school degree.	Random assignment of 12 Boys and Girls Clubs in inner-city neighborhoods to PYD intervention (n = 3 sites), a non-PYD intervention (n = 4 sites), or to the control (n = 4) condition. Follow up at 4, 12, and 24 months postbaseline.	At the 24-month assessment, sexually active participants in the intervention group were significantly more likely than control youth to use a condom the last time they had sex. No significant group differences on ever had sex, frequency of sex, or rate of condom use in past 30 days, 30 months, or 6–12 months.
Learn and Serve America [33]			
The program involves youth in meaningful service in the community with a structured learning experience (i.e., service-learning). Over one academic year, middle- and high-school students spend an average of 77 hours in direct service. In addition, youth participate in classroom discussions of their service experiences, keep a journal, write essays and research papers, and make presentations. No activities focused on direct sexual health content.	1,052 middle and high school students; mixed gender; 58% were white, 17% African American, 19% Hispanic, 6% other; 38% were economically disadvantaged.	A purposive sample of 17 middle and high schools with well-established programs was selected; a comparison group of students was selected from within the same schools. Follow-up occurred at the end of the school year, and 1 year later.	No significant group differences on history of becoming pregnant or making someone pregnant.
New Beginnings—mother only [34–36]			
Family program delivered by clinician to divorced mothers who have custody of 9- to 12-years-olds (11 group sessions, 1.75 hours/session; 2 individual sessions) that intends to improve mother-child relationship quality and effective discipline, increase father's access to the child, and reduce inter-parental conflict. No activities focused on direct sexual health content.	240 families (mean child age: 10.4, mean mother age: 37.3); 49% of youth female; 88% Caucasian, 8% Hispanic, 2% African American; metropolitan area of Phoenix, Arizona.	Families randomly assigned to mother only, mother plus child, and self-study control; 6-year follow-up.	No significant group differences on number of sexual partners at 6-year follow-up.
New Beginnings—mother plus child [34–36]			
Family program (described above) plus concurrent child component delivered by clinician (11 group sessions, 1.75 hours/session) that focused on improving effective coping, reducing negative thoughts about divorce stressors, and improving mother-child relationship quality. No activities focused on direct sexual health content.	See above.	See above.	At 6-year follow-up, youth in the mother plus child condition had significantly fewer sexual partners than youth in self-study control condition. No significant group differences between youth in the mother plus child and in the mother only condition on number of sexual partners.

(*Continued*)

Table 1. *Continued*

Program and key components	Evaluation		
	Study population	Study design	Results
Project Taking Charge [37]			
School-based program implemented by home economics teacher to 7th graders and parents (27 lessons over 6 weeks to students; 3 parent-youth sessions) that addressed basic values, gender roles, stereotypes, diversity, planning for the future, achieving life goals, puberty, family and friends as support systems, communication techniques, risky behavior, peer pressure, talents, challenges to growth. Included job-shadowing exercise to visit worksite and interviewing individuals about jobs. Slightly less than 50% of activities focused on direct sexual health content.	136 seventh graders (majority 12 years old); 50% female; 29% African American, 63% white, 4% Latino; 4% other; 126 parents; low-income communities in Delaware, Mississippi, and Ohio.	Schools randomly assigned to Project Taking Charge and no-treatment control; 6-month follow-up.	No significant group differences on intent to initiate sexual activity at post-intervention and 6-month follow-up.
Quantum Opportunities Program [38–40]			
The program provides an intensive package of ''quantum opportunities'' and services for disadvantaged youth during their 4 years in high school. Program components included 250 hours/year of intensive activities in three areas: educational assistance, community service activities, and developmental activities. Financial incentives were provided for participation in program activities. A counselor was assigned to a small group of participants for the 4 years of high school. Approximately, 25% of activities focused on direct sexual health content.	250 students; mixed gender; 13%–16% white, 75% black, 5%–8% Hispanic; low income.	A purposive sample of 5 communities was selected. In each community, 50 ninth-grade students were enrolled and randomly assigned to intervention or control group. Follow-up occurred every year for 4 years.	No significant group differences on history of having a child.
Reach for Health–curriculum only [41, 42]			
School-based classroom health curriculum implemented by teachers to seventh and eighth graders (40 lessons in seventh, 34 lessons in eighth) that introduces students to interpersonal risk and protective factors/situations and provides opportunities to identify and practice strategies to avoid conflict and to respectfully communicate their needs. Approximately one-third of activities focused on direct sexual health content.	1,061 seventh–eighth graders; 53% female; 79% non-Hispanic black, 16% Hispanic, 5% other; 2 urban schools in low-income communities in New York.	1 Reach for Health school, 1 standard health education control school (28 classes). In intervention school, 10 classes randomly assigned to curriculum-only and 13 to the curriculum plus the community youth service (CYS+); 2-year follow-up.	No significant differences in recent sexual intercourse and sex behavior index between curriculum-only and control group at end of school year. At 2-year follow-up, curriculum-only students were significantly more likely to initiate sex and to have sex in last 30 days than CYS+ youth.
Reach for Health–Community Youth Service (CYS+) [41, 42]			
Classroom-based Reach for Health curriculum (described above) plus a service-learning component that includes students working in community organizations (3 hours/week for 30 weeks for 90 hours/year) and weekly group sessions to discuss their experiences, problem-solve, consider their community contributions and why their community is counting on them to stay healthy and succeed, and share knowledge gained from their service. Approximately 10% of activities focused on direct sexual health content.	See above.	See above.	CYS+ participants were significantly less likely than control youth to report recent sexual intercourse and have lower score on sex behavior index at end of school year. At 2-year follow-up, CYS+ youth were significantly less likely than curriculum-only youth to report sexual initiation and to have sex in last 30 days.
Recapturing the Vision [43]			
Year-long, classroom-based program for eighth-grade girls consisting of two curricula and other services. Curricula-based activities focused on identifying personal strengths and	597 female students; 63% were black, 20% Hispanic, 4% white, 13% other; mostly living in low-income	Random assignment to intervention and control condition. Three subsequent surveys occurred over	No significant group differences on ever had sex, abstinent last 12 months, number of sexual partners, age at first

resources, developing strategies for fulfilling personal and career goals, building skills to achieve positive goals and resist negative influences, developing effective communication for resisting pressure, developing good relationships, avoiding sexual abuse and date rape, and exploring the benefits of a committed marital relationship. Services entailed home visits by social workers, referrals to local services, after-school tutoring, community service projects, cultural events, a family retreat, an annual Teen Abstinence Rally, and an annual Teen Talk Symposium. Slightly less than one half of activities focused on direct sexual health content.	families; 34% of the girls' parents were married.	the 42–78 months post-baseline.	intercourse, unprotected sex at first and last sex, ever pregnant, ever had a child, ever had STD.
Seattle Social Development Project—Full Intervention [44–47] School and family program delivered over first–sixth grade that consists of (a) teacher training in proactive classroom management, interactive teaching, and cooperative learning (5 days/year); (b) child skill development through first-grade teacher training in the use of a cognitive and social skills training curriculum, interpersonal cognitive problem-solving, and decision-making skills and sixth-grade student training to resist social influences to engage in problem behaviors, and to identify positive alternatives to stay out of trouble while keeping friends (4 hours); and (c) volunteer parent training provided by professional project staff in child behavior management, supporting child's academic development, and reducing child's risks for drug use (firstsecond grade, 7 sessions; second–third grade, 4 sessions; fifth–sixth grade, 5 sessions). No activities focused on direct sexual health content.	643 first–sixth graders; 51% male; 44% white, 26% African American, 22% Asian, 5% Native Americans, 3% other; 18 public schools serving high-crime areas of Seattle.	Schools assigned to Full Intervention, Late Intervention, and no-intervention control; follow-up when youth were 18 and 21 years old.	At age 18, Full Intervention youth were significantly less likely than no-intervention control youth to have engaged in sexual intercourse and to have multiple sex partners. At age 21, Full Intervention youth were significantly more likely than no-intervention control group to report a later age at first sex, fewer lifetime sex partners, and condom use at last sex. African American youth in the Full Intervention group were significantly more likely to use a condom and significantly less likely to report a lifetime STD diagnosis than African American youth in control group. Female participants in the Full Intervention group were significantly less likely to report a lifetime pregnancy or birth than female control youth.
Seattle Social Development Project—Late Intervention [44–47] School and family program (described above) delivered during fifth–sixth grade only.	See above.	See above.	At age 18, Late Intervention and no-intervention control youth did not significantly differ on lifetime sexual activity, multiple sex partners, and pregnancy/birth outcomes.
Staying Connected With Your Teen—Group-administered [48] Family program delivered by trained group leaders to eighth graders and parents that teaches parents strategies to provide their children with opportunities to contribute to their families, to acquire skills to take advantage of opportunities, to use reward and recognition strategies to promote bonding, and to reduce risk with monitoring and effective behavior management. Program consisted of 7 sessions (1 session/week) and 117-minute video in 18 sections, accompanied by a family workbook. Approximately 15% of activities focused on direct sexual health content.	331 families (mean child age 13.7); 51% of youth male; 51% European American, 49% African American; Seattle public schools.	Families randomly assigned to group-administered Staying Connected, self-administered Staying Connected, and no-treatment control; 24-month follow-up.	At the 24-month follow-up, African-American teens in group-administered condition were significantly less likely to have initiated sex compared with African-American teens in the no-treatment control. No significant group differences for European-American youth.

(*Continued*)

Table 1. *Continued*

Program and key components	Evaluation		
	Study population	Study design	Results
Staying Connected With Your Teen—Self-administered [48]			
Family program (described above) that included self-administered video and workbook activities to be completed within 10 weeks with weekly telephone support, which included monitoring of completion, motivation to use materials, and problem-solving to implement.	See above.	See above.	At the 24-month follow-up, youth in the self-administered condition did not significantly differ from control group on initiation of sex.
Summer Training and Education Program (STEP) [49, 50]			
School and community 15-month program for 14- to 15-year-old, low academic achieving adolescents that includes academic remediation (90 hours, 2 summers), financial incentives for time in the classroom, part-time paid summer work (90 hours, 2 summers), life skills training (18 hours, 2 mornings/week), and one-on-one support during the school year (average: 5-15 hours/year). Approximately 10% of activities focused on direct sexual health content.	4,919 14- to 15-year-olds; 52% female; 49% Black, 19% Asian, 18% Hispanic, 14% white/other; low-income households.	Randomly assigned to STEP and summer job–only control condition.	No significant group differences on sexual behavior and teen pregnancy rate.
Teen Incentives Program [51]			
Classroom-based program for high school students. Phase 1: Small groups met weekly for 8 weeks to learn about (a) uncovering untapped talents for building self-esteem and assertiveness; (b) effective communication skills; (c) social interaction skills; (d) confident and efficient decision-making skills; (e) academic performance and career planning; (f) parent/adolescent relationship; (g) substance abuse/peer and community resources; (h) teen sexuality, pregnancy, STIs, and male/female responsibility. Phase 2: Career mentorship during which students spent 6 weeks with a professional person in a chosen area of health care. Phase 3: Through role playing, writing, and acting out skits, students practiced and sharpened skills. Approximately 20% of activities focused on direct sexual health content.	120 high school students; 75% female; mean age 15 years; mixed race and ethnicity (40% African American, 30% West Indian); conducted in an inner-city high school.	Random assignment to intervention or control condition. Follow-up at post-test and 6 months.	At the post-test, youth in the intervention group showed a significant decrease in the frequency of sexual activity compared with the control group. Among sexually active youth, youth in the intervention condition were significantly more likely than youth in the control group to use contraception.
Teen Outreach Program (TOP) [52–55]			
School-based program delivered by teachers or guidance personnel to seventh–twelfth graders that links supervised community volunteer service (minimum 20 hours/year) to classroom discussion, curriculum, and activities (minimum 1 hour/ week) focused on maximizing learning from the service experiences, helping teens cope with important developmental tasks, and addressing key social and developmental tasks, such as understanding yourself and your values, life skills, and dealing with family stress. Approximately 15% of activities focused on direct sexual health content.	3 samples: (a) 1,487 11- to 19-year-olds (mean age 15.7); 68% female; 51% white, 32% black, 8% Hispanic, 9% other; 30 schools nationwide. (b) 695 ninth–twelfth graders (mean age: 15.8); 87% female; 19% white, 67% black, 11% Hispanic, 3% other; 25 sites. (c) 3,277 ninth–twelfth graders (mean age: 16); 73% male; 37% white, 45% black, 13% Hispanic; 5% other; 60 sites.	Students assigned to TOP and no-treatment control; follow-up at end of school year.	TOP students were significantly less likely to become pregnant than control. TOP was more effective with female than male students; effective for teens with no previous pregnancy as well as for teens with a previous pregnancy or birth.

Table 2
Goals of positive youth development programs that were effective in promoting adolescent sexual and reproductive health

Program		Program goals											
		Prosocial Bonding	Cognitive competence	Social competence	Behavioral competence	Emotional competence	Moral competence	Self-determination	Self-efficacy	Identity	Belief in the future	Spirituality	Prosocial norms
Preschool	Abecedarian Project		•	•									
	High/Scope Perry Preschool	•	•	•				•					
Elem	Seattle Social Development Project-full treatment	•	•	•	•								
Middle school	Aban Aya—School/Community	•	•	•	•	•	•		•	•	•		•
	Adult Identity Mentoring			•	•			•	•	•	•		•
	Gatehouse Project	•	•	•		•			•				
	Keepin' It REAL	•		•		•	•				•		•
	Staying Connected with Your Teen—group-administered	•	•	•		•	•	•					
	New Beginnings—mother plus child	•		•		•							
	Reach for Health—Community Youth Service	•	•	•	•	•	•	•	•				•
Middle–high school	Teen Incentives Program	•	•	•	•	•	•	•	•	•	•		•
	Adolescent Sibling Pregnancy Prevention Program	•	•	•	•	•			•		•		•
	CAS-Carrera Program		•	•		•		•		•	•		
	Familias Unidas	•		•									
High school	Teen Outreach Program	•		•		•		•			•		
	% of programs targeting youth development goal	80%	67%	100%	40%	67%	33%	47%	40%	27%	47%	0%	40%

Table 3 summarizes the opportunities and experiences offered and the atmosphere within which activities were delivered among the 15 programs with evidence of promoting adolescent sexual and reproductive health. All but one program attempted to strengthen the family, school, or community context. The family was the most common focus of these programs, followed by the school and community contexts. A broad range of activities was used to strengthen the family, school, and community contexts, including homework assignments in which students engage with their parents; parent training in supervision, discipline, and parent-child communication; and teacher training in proactive classroom management and interactive teaching skills. All effective programs provided youth the opportunity to build skills, and 14 of the 15 programs provided youth an opportunity to engage in real roles and activities. The programs engaged youth in a range of real roles and activities, including community service, producing a newspaper, visiting museums or colleges, being involved in decision-making in families or schools, mentoring younger students, and interviewing professionals working in a career of interest to the youth.

All effective programs delivered activities within a supportive atmosphere (e.g., by modifying parents' and teachers' skills in child behavior management and helping children to succeed in school), and all but one were empowering of youth (e.g., by helping participants to declare a real-life career choice, providing youth with opportunities for involvement in decision-making, helping youth engage in a ''helper'' role via community service). Of the 15 effective programs, 12 communicated expectations for behavior (e.g., by explicit agreement on policies affecting health and safety and consequences for infractions), 12 provided opportunities for recognition (e.g., by publicly acknowledging youth's contributions through award ceremonies and articles in local newspapers about the youth's activities), and 10 lasted at least one school year.

Table 4 compares the characteristics of PYD programs that improved adolescent sexual and reproductive health outcomes with characteristics of PYD programs that did not. Effective and ineffective programs did not differ significantly in their PYD goals. However, compared with programs that did not have an impact, programs with evidence of improving sexual and reproductive health outcomes were significantly more likely to strengthen the school context (53% vs. 7%, $p < .05$) and deliver activities in a supportive atmosphere (100% vs. 67%, $p < .05$), and they were marginally more likely to provide opportunities for recognition (80% vs. 47%, $p = .06$). Effective programs were also more likely than ineffective programs to build skills (100% vs. 93%), enhance bonding (80% vs. 67%), strengthen the family context (73% vs. 47%), engage youth in real roles and activities (93% vs. 73%), empower youth (93% vs. 80%), communicate expectations (80% vs. 47%), and be stable and relatively long-lasting (67% vs. 47%). These differences, however, were not statistically significant.

Discussion

This review identified 15 PYD programs with evidence of promoting a wide range of adolescent sexual and reproductive health behaviors and outcomes, including preventing teen pregnancy and STIs. The magnitude and duration of the impact on reproductive health outcomes are substantial, with the impact of several programs extending into adulthood. The available programs address a range of age groups, have been implemented in school and community settings, have been developed for youth with diverse socio-demographic characteristics, and have the potential to help meet the needs of diverse types of communities.

The review supports previous literature that proposed how to characterize PYD programs by their goals, the opportunities and experiences they provide to youth, and the atmosphere within which activities are delivered [6, 9]. A wide range of PYD goals were addressed by the programs, some more frequently than others. A majority of programs provided youth with key opportunities and experiences and implemented activities in a positive atmosphere. Notably, programs that had evidence of promoting adolescent sexual and reproductive health were more likely to have these characteristics than the programs that did not improve sexual and reproductive health outcomes. For two of these characteristics (strengthened the school domain, delivered activities in a supportive atmosphere), there were statistically significant differences between programs with evidence of improving adolescent sexual and reproductive health and those that did not. This finding can be used to guide the development of new PYD programs or to strengthen existing ones. However, this list of program characteristics should not be viewed as a ''recipe'' for success because some programs with these same characteristics did *not* work. Much more research is needed before a definitive set of PYD program characteristics can be identified and be expected to lead to these outcomes.

Although promising, replication of these results is needed to increase our confidence in these largely unreplicated studies [56,57]. However, replicating multi-level complex interventions can be very challenging. Ideally, the replications will be conducted with the guidance of the original developers of the program, so that it is possible to disentangle the effects of implementation fidelity from the success or failure of the program itself. This challenge has been highlighted in evaluvations of programs modeled after the CAS-Carrera program, which failed to replicate the success of the original program [58,59]. But since these programs were either not fully implemented or conducted without training and input from the original developer, it is hard to know whether the lack of effect was due to the intervention itself or incomplete fidelity of implementation [60].

Our exclusion criteria restricted the study to programs in which less than 50% of program content focused on direct sexual health content because we wanted to examine the effect of programs that target different mediators than those usually

Table 3
Opportunities and experiences and atmosphere of the positive youth development programs that were effective in promoting adolescent sexual and reproductive health

Program		Opportunities and experiences					Atmosphere				
		Strengthen the context									
		Family	School	Community	Build skills	Real roles and activities	Supportive	Empowering	Communicates expectations	Provides Opportunities for recognition	Stable and long-lasting
Preschool	Abecedarian Project	•	•		•	•	•	•	•	•	•
	High/Scope Perry Preschool	•	•		•	•	•	•	•	•	•
Elem	Seattle Social Development Project—full treatment	•	•		•	•	•	•	•	•	•
Middle school	Aban Aya— School/Community	•	•	•	•	•	•	•			•
	Adult Identity Mentoring				•	•	•	•	•	•	
	Gatehouse Project		•		•	•	•	•	•	•	•
	Keepin' It REAL	•			•	•	•	•	•	•	
	Staying Connected with Your Teen—group-administered	•			•	•	•	•	•	•	
	New Beginnings— mother plus child	•			•	•	•	•	•	•	
	Reach for Health— Community Youth Service			•	•	•	•	•	•	•	•
Middle–High school	Teen Incentives Program	•	•	•	•	•	•	•	•	•	
	Adolescent Sibling Pregnancy Prevention Program	•	•	•	•	•	•	•	•	•	•
	CAS-Carrera Program	•			•	•	•	•	•		•
	Familias Unidas	•			•		•				•
High school	Teen Outreach Program		•	•	•	•	•	•		•	•
	% of programs with characteristic	73%	53%	33%	100%	93%	100%	93%	80%	80%	67%

Table 4
Comparing the characteristics of positive youth development programs that were effective in promoting adolescent sexual and reproductive health to those that were ineffective

	Effective programs (n = 15)	Ineffective programs (n = 15)	*p*-value
Program goals			
Prosocial bonding	80%	67%	.68
Cognitive competence	67%	87%	.39
Social competence	100%	80%	.22
Behavioral competence	40%	27%	.70
Emotional competence	67%	33%	.14
Moral competence	33%	33%	1.0
Self-determination	47%	20%	.25
Self-efficacy	40%	27%	.70
Clear and positive identity	27%	7%	.33
Belief in the future	47%	33%	.71
Spirituality	0	0	na
Prosocial norms	40%	60%	.47
Opportunities and experiences			
Family	73%	47%	.26
School	53%	7%	.01
Community	33%	40%	1.0
Strengthens at least one socialization domain (family, school, community)	93%	60%	.08
Builds skills of youth	100%	93%	1.0
Real roles and activities	93%	73%	.33
Program atmosphere			
Supportive	100%	67%	.04
Empowering	93%	80%	.60
Communicates expectations	80%	47%	.13
Provides opportunities for recognition	80%	40%	.06
Stable and long-lasting	67%	47%	.46

Chi-square tests were used to text for differences between programs. However, when an expected cell count was less than 5, Fisher's Exact test was used instead.

found in sexuality education programs. However, because it is possible that the sexual health content could account for the program's effectiveness, we compared the number of effective and ineffective programs that included direct sexual health content. We found that 40% (6 of 15) of the effective programs and 27% (4 of 15) of the ineffective programs had no sexual health content at all, and that the difference was not statistically significant ($p = .35$). This provides additional support to the view that PYD programs can reduce sexual risk behavior by targeting a set of mediators that differ from those targeted in traditional sexuality education.

However, this finding should not be taken as an indication that youth do not need comprehensive sexuality education. None of these programs controlled for exposure to sexuality education, and it is possible that the youth received sexuality education from other sources. The most important point is that there are a number of ways to influence adolescent sexual risk behavior, and this study highlights the role of a new set of potential mediators. It is possible that sexuality education programs provide youth the skills and knowledge needed to practice safe sexual behavior, whereas PYD programs provide them the motivation to do so. More research, however, is needed to confirm this hypothesis.

Our findings have several implications. First, program providers should be encouraged to implement the PYD programs that succeeded in improving adolescent sexual and reproductive health, as there is evidence that these programs work. Doing so will require the development of training and capacity-building materials that prepare schools and other youth-serving organizations to implement these programs with fidelity. There is also a need for applied research to identify the best way to help local providers implement these programs, ensure that the programs are appropriate to local conditions and populations, and facilitate participation by target populations. The importance of careful adaptation is demonstrated by two of the programs included in this review, which examined the impact of different modes of program delivery. Staying Connected With Your Teen compared in-person and self-administered delivery and found the in-person mode was more effective for reproductive health, but the differences were only significant for African Americans, and not for European Americans [48]. A posthoc analysis of the All Stars Character Education program compared the impact of implementation by a school teacher with implementation by a specialist from the community and found no difference for reproductive health outcomes for either mode of delivery [15, 16].

In addition to replicating current efficacious programs, development, and evaluation of new PYD programs is needed. Our review suggests that these programs should target important goals, focus on strengthening family and school environments, provide meaningful opportunities and experiences, and be delivered in a positive atmosphere. Future research should also examine the effect of intervening early in life; the two interventions targeting preschool and the one focused on elementary school age children had some of the strongest and most sustained impacts on adolescent sexual and reproductive health. This may involve the development of completely new interventions, but it might also mean evaluating the impact on adolescent sexual and reproductive health of existing PYD programs that are already developed and being implemented by large youth-serving organizations such as the Young Mens Christian Association, Big Brothers/Big Sisters, and the National 4-H.

Ideally, future evaluations of PYD programs should assess the program's impact on other social and health outcomes. Catalano and colleagues [6] reasoned that if PYD programs addressed a broad range of promotive, protective, and risk factors, given the commonality of many of these factors across a variety of outcomes, then a single PYD program would likely have an impact on multiple outcomes. This review supports this perspective: the programs that improved adolescent sexual and reproductive health also resulted in higher academic achievement (5 programs), decreased levels of violence (4 programs), reduced levels of substance use (9 programs), higher employment and earnings (2 programs), lower rates of crime (3 programs), and improved mental

health (2 programs). Because our review was restricted to studies that reported the impact of the program on sexual and reproductive health outcomes, and many studies were likely to report nonsexual outcomes in separate papers, these findings likely underestimate the broader impact of these PYD programs on nonsexual behavior outcomes. It is recommended that PYD programs measure the full range of adolescent and young adult outcomes. This would strengthen the evidence that PYD programs may achieve an economy of promotive and preventive effects by addressing common precursors of these positive and negative youth outcomes.

Very little is known about the core components of PYD programs, the effect of timing of delivery, and the mechanisms through which specific program elements affect adolescent sexual and reproductive health. Research is sorely needed to address these questions. Several studies included in this review provide examples of this needed research. For example, two studies compared the impact of delivering services at different developmental stages of youth. The Seattle Social Development Project assessed whether an intervention delivered over the full 6 years of elementary school would have the same impact if delivered in fifth and sixth grades only; they found that only the full program had an impact on adolescent health outcomes [44]. The Healthy for Life evaluation examined whether the same program would have comparable effects if delivered over the 3-year period of grades 6–8 versus intensively in the seventh grade alone, and found no difference for reproductive health [23, 24]. Similarly, two programs examined the impact of strengthening socialization domains in addition to working directly with youth. The evaluation of the Aban Aya program compared a curriculum-based program targeting youth alone with a program that targeted youth plus the family, school, and community [11]. The New Beginnings study assessed whether working with divorced mothers alone was as effective as working with the mother and the child together [34–36]. Both programs found that targeting youth and also strengthening the family, school, and/or community context within which youth live resulted in improved adolescent sexual and reproductive health outcomes, whereas targeting the youth alone did not. Among the 15 effective programs examined in this review, only one tested for the significance of mediated effects [18]; the others either assessed the program's impact on mediators by intervention versus control groups, or did not report on mediating variables. Clearly, more research is needed to understand the mechanisms of PYD program effects.

This review has several limitations. Although reviewer guides were developed to standardize the coding of PYD programs' goals, opportunities, and atmosphere, and coding was independently conducted by two researchers, some subjectivity remained; thus, the coding may have limited reliability. However, the fact that nearly three quarters of the original program developers validated the coding indicates that the original intent of the program was captured as best as possible. Other reviews have used more restrictive inclusion criteria, particularly with regard to sample size and attrition. We used somewhat less restrictive criteria so that we could examine a larger number of programs, and several of the programs included in this review may have been omitted had more restrictive criteria been imposed. Finally, very little information was available about program dosage levels, which could have a considerable impact. Future research should attempt to quantify and assess the independent contribution of dosage to the program's impact.

In summary, a growing body of evidence supports the use of PYD as a strategy to promote adolescent sexual and reproductive health. While sexuality education programs provide youth with the specific skills and knowledge needed to refuse sex and practice safe sexual behavior, PYD programs may provide them the motivation they need to use those skills; exposing youth to both types of programs is likely to be more effective than a strategy relying only on one type. Taking the steps needed to encourage more widespread adoption of these efficacious programs, and supporting the additional research described above, would constitute an important contribution to the sexual and reproductive health and overall well-being of youth.

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