

Review article

## Connectedness as a Predictor of Sexual and Reproductive Health Outcomes for Youth

Christine M. Markham, Ph.D.<sup>a,\*</sup>, Donna Lormand, M.P.H.<sup>a</sup>, Kari M. Gloppen, M.P.H.<sup>b</sup>,  
Melissa F. Peskin, Ph.D.<sup>a</sup>, Belinda Flores, M.P.H.<sup>a</sup>, Barbara Low, Dr.P.H.<sup>a</sup>,  
and Lawrence Duane House, M.A.<sup>c</sup>

<sup>a</sup>University of Texas Prevention Research Center, University of Texas Health Science Center-Houston, Houston, Texas

<sup>b</sup>Division of Adolescent & School Health, Centers for Disease Control and Prevention, Atlanta, Georgia

<sup>c</sup>Division of Reproductive Health, Centers for Disease Control and Prevention, Atlanta, Georgia

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### Abstract

To review research examining the influence of “connectedness” on adolescent sexual and reproductive health (ASRH). Connectedness, or bonding, refers to the emotional attachment and commitment a child makes to social relationships in the family, peer group, school, community, or culture. A systematic review of behavioral research (1985–2007) was conducted. Inclusion criteria included examination of the association between a connectedness sub-construct and an ASRH outcome, use of multivariate analyses, sample size of  $\geq 100$ , and publication in a peer-reviewed journal. Results were coded as protective, risk, or no association, and as longitudinal, or cross sectional. Findings from at least two longitudinal studies for a given outcome with consistent associations were considered sufficient evidence for a protective or risk association. Eight connectedness sub-constructs were reviewed: family connectedness (90 studies), parent–adolescent general communication (16 studies), parent–adolescent sexuality communication (58 studies), parental monitoring (61 studies), peer connectedness (nine studies), partner connectedness (12 studies), school connectedness (18 studies), and community connectedness (four studies). There was sufficient evidence to support a protective association with ASRH outcomes for family connectedness, general and sexuality-specific parent–adolescent communication, parental monitoring, partner connectedness, and school connectedness. Sufficient evidence of a risk association was identified for the parent overcontrol sub-construct of parental monitoring. Connectedness can be a protective factor for ASRH outcomes, and efforts to strengthen young people’s pro-social relationships are a promising target for approaches to promote ASRH. Further study regarding specific sub-constructs as well as their combined influence is needed. Published by Elsevier Inc.

### Keywords:

Connectedness; Bonding; Adolescent; Sexual behavior; Reproductive health

Adolescent births and sexually transmitted infections (STIs) including HIV are serious public health issues in the United States [1–5]. To make a significant impact on this public health issue, it is important that a multipronged

approach be taken to give adolescents the knowledge, skills, and motivation to make healthier sexual and reproductive health choices. Previous reviews indicate that a positive youth development (PYD) approach is effective for producing long-term behavioral change and ultimately reductions in teen pregnancy and STIs [6, 7]. However, there are gaps in our understanding of how constructs targeted in PYD programs may mediate changes in adolescent sexual behavior.

*Connectedness* or *bonding* has been recognized as a central element of PYD programming. A review by Catalano et al. identified *bonding* as one of the 15 key constructs targeted in youth development programs, describing it as,

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\*Address correspondence to: Christine M. Markham, PhD, University of Texas Prevention Research Center, University of Texas Health Science Center at Houston, 7000 Fannin, 26th Floor, Houston, TX 77030.

E-mail address: [christine.markham@uth.tmc.edu](mailto:christine.markham@uth.tmc.edu)

“The emotional attachment and commitment a child makes to social relationships in the family, peer group, school, community, or culture” [8]. They also recognized that the quality of a child’s bonds to family and other domains is an essential element of positive development into a healthy adult [8]. Similarly, in their synthesis of findings supporting the need for a PYD approach, Pittman et al. identified *connection* as one of the five primary developmental outcomes for youth [9].

In a review of the role of *connectedness* in youths’ lives, Barber and Schluterman identified three key concepts: relatedness, which refers to the importance of youths’ interpersonal connections to significant others; autonomy, the degree to which youth feel that their individuality is validated; and regulation, through which the behaviors of others (e.g., parents, teachers, or peers) interact with the youth’s behavior to achieve a state of appropriate regulation [10]. Previous studies indicate that these *connectedness* concepts may protect youth from potentially harmful behaviors, including sexual risk-taking [11–13]; however, to date, no systematic review has examined the influence of *connectedness* on a broad range of adolescent sexual and reproductive health (ASRH) outcomes. This study seeks to address this gap by reviewing the evidence that *connectedness* may predict later ASRH outcomes.

Much of the literature on adolescent *connectedness* or *bonding* has focused on youths’ interpersonal relationships with family members, peers, or romantic partners, and with their school and community. Several decades of research indicate that family factors influence youths’ sexual behavior [14, 15]; however, less is known regarding the influence of these other *connectedness* areas on ASRH. Multiple sub-constructs of *connectedness* have also been examined, including concepts such as support, close relationships, intimate communication, and guidance across multiple actors and socialization domains. For review purposes, eight sub-constructs of *connectedness* were identified, which were representative of the majority of research conducted in this area. These sub-constructs were:

- *Family connectedness*: family variables such as parental warmth, support, parent–adolescent closeness, and child attachment to parents [14].
- *Parent–adolescent general communication*: the frequency, content, and quality of communication regarding general topics [14].
- *Parent–adolescent communication about sexual topics*: the frequency, content, and quality of communication regarding topics such as puberty, abstinence, and contraceptive use [14].
- *Parental monitoring or regulation*: the degree to which parents know about their child’s activities, friends, and whereabouts, as well as parental supervision and specific rules for child’s behavior [14].
- *Peer connectedness*: youths’ feelings of closeness and being supported and cared for by friends [10].

- *Partner connectedness*: youths’ perception of attachment or feelings of love and caring to a boyfriend, girlfriend, or romantic partner [16].
- *School connectedness*: youths’ perceptions of relationships to people at school, perceptions of relationship to school, and attitudes toward the importance of school [10].
- *Community connectedness*: youths’ sense of community belongingness which includes subcategories such as degree of support, friendships, activities, and safety [10].

This review examined existing evidence regarding the influence of these *connectedness* sub-constructs on ASRH outcomes to identify associations and gaps in the current knowledge base. Given the variability of the extent to which each *connectedness* sub-construct has been studied and the diversity with which each has been operationalized, we chose to conduct a broad, descriptive, inclusionary review to describe the full range of relevant research and to identify promising leads in understudied areas. Recommendations regarding future research and intervention strategies to enhance these sub-constructs within the context of PYD programs are proposed.

## Methods

We conducted a systematic literature review of nonintervention, behavioral research published between 1985 and 2007. The search terms included variations of the Boolean terms for *sexual behavior* (e.g., sex, coital, intercourse), *sexual and reproductive health outcomes* (e.g., pregnancy, STIs, HIV), *adolescence* (e.g., youth, teen, middle school, high school), and terms related to the youth development construct of *connectedness*. Search terms and selection criteria were adapted from a search strategy established by Catalano et al. [8]. For *connectedness*, search terms included general (e.g., connectedness, attachment, bonding, affiliation, trust, and belonging), as well as specific terms (e.g., parental monitoring and parent–adolescent communication). The search queried nine databases: PsychINFO (Ovid), The Cumulative Index to Nursing and Allied Health (CINAHL), The Latin American and Caribbean Literature on Health Sciences Database (LILACS), Cochrane Reviews, Education Resources Information Center (ERIC), Sociological Abstracts, Social Services Abstracts, EMBASE, and Medline. In addition to searching databases, we hand-searched reference lists of recent review articles.

Abstracts yielded from the search were screened for inclusion by a team of researchers using the following criteria. To qualify for inclusion, studies had to: (1) examine an association between a *connectedness* sub-construct and an ASRH outcome, (2) have the majority of participants aged  $\leq 20$  at the time that outcomes were assessed, (3) include the general population or youth at risk (i.e., incarcerated and parenting teens were included but psychiatric populations were excluded), (4) be published in a peer reviewed research

journal, (5) be conducted in North, Central, or South America, Europe, Australia, or New Zealand, and (6) have an adequate study design. Our standards for adequate study design included a sample size of at least 100 for significant results and 200 for nonsignificant results, and use of multivariate analyses to assess the association between connectedness and sexual and/or reproductive health outcomes [11].

Articles that met inclusion criteria were summarized and categorized according to the *connectedness* sub-construct(s) and ASRH outcome(s) assessed. The ASRH outcomes included: *ever having sex, frequency of having sex, recent/current sexual activity, early sexual debut, pregnancy/birth, contraceptive use, condom use, number of sexual partners, sexual risk index, contraction of an STI, and sexual intentions*. Findings were coded according to study design (longitudinal or cross sectional), type of analysis (direct or indirect effect), and nature of association (protective, risk, or no association, i.e., not statistically significant at  $p < .05$ ). Findings were classified as *protective* if the presence or a high score of a *connectedness* sub-construct was associated with a decreased ASRH risk outcome, or if the absence or low score of a *connectedness* sub-construct was associated with an increased ASRH risk outcome. Findings were classified as having a *risk* association if the presence or high score of a *connectedness* sub-construct was associated with an increased ASRH risk outcome. Each reported comparison in which a *connectedness* sub-construct did not show a significant association with ASRH outcomes was categorized as *no association*. Several studies resulted in multiple findings because they assessed multiple ASRH outcomes, used multiple measures to assess the *connectedness* sub-constructs, or stratified results by sub-group.

A standard of evidence requiring consistent findings that indicated a protective or risk association from at least two longitudinal studies was developed and applied to findings for each *connectedness* sub-construct. The standard of evidence focused on longitudinal rather than cross-sectional research because longitudinal studies are able to establish time order, and provide more valid information about associations between sub-constructs and behavioral outcomes. Thus, requirement of at least two longitudinal studies ensured stronger evidence of a causal association between the *connectedness* sub-construct and the behavioral outcome. Furthermore, given the variability of the extent to which each *connectedness* sub-construct has been studied, the diversity of measures used to assess each sub-construct, and the diversity of ASRH outcomes, a standard of evidence based on two or more longitudinal studies afforded a more inclusionary approach. Given that this is the first systematic review to relate connectedness to ASRH, we did not want to overlook associations which may be promising for future research. Thus, this standard of evidence met the need to apply a degree of rigor as well as to make progress in understudied areas of *connectedness*.

When two or more longitudinal studies revealed significant findings in a risk and protective direction, the evidence

was considered mixed and represented an area where no clear association could yet be determined. The purpose of this review was to identify whether the *connectedness* sub-constructs could be protective factors for ASRH outcomes, and not risk factors; therefore, the *no association* findings were not factored into the standard of evidence. However, they were included in the summary because they provide important information about the state of research in the field. To aid in the interpretation of inconsistent or mixed findings, we examined results of bivariate analyses, and considered the quality of the measures used. Finally, we addressed generalizability across sub-groups by applying the same standards of evidence (i.e., two or more separate longitudinal studies showing a significant association between a *connectedness* sub-construct and at least one ASRH outcome) to findings by gender, race/ethnicity, and age. More details regarding the review process have been described by House et al. [17].

## Results

Results are summarized in the following paragraphs for each of the eight *connectedness* sub-constructs. Over 190 articles met the inclusion criteria. An evidence table providing detailed descriptions of each article (e.g., sample characteristics, measures, and findings) is available on request from the lead author. Longitudinal findings are summarized in the text as they relate to the *a priori* standard of evidence demonstrating a protective or risk association. Cross-sectional findings are included in the tables primarily to provide an indication of the extent to which each sub-construct had been studied overall, and in regard to which outcomes. Most often, cross-sectional findings mirrored the direction of associations identified by the longitudinal findings as well as findings of no association. Inconsistency in findings (i.e., some studies found a protective association, whereas others found no association between a specific *connectedness* sub-construct and ASRH outcome) may have been due, in part, to differential impact among sub-groups, to variations in measurement, or to mediating or moderating influences of other factors. However, few consistent patterns explaining these inconsistencies were apparent.

### *Family connectedness*

Ninety studies (34 longitudinal and 56 cross-sectional) examined the direct association between *family connectedness* and ASRH outcomes; 15 studies also examined indirect effects. Specific measures used to assess *family connectedness* varied across studies. Although the majority ( $n = 49$ ) used measures of parental closeness (e.g., warmth, caring, support, attachment to family), other studies ( $n = 32$ ) used measures such as satisfaction with the parental relationship, quality of relationship, and family cohesion. Fifteen studies examined parental involvement (e.g., how many activities the parent and child do together). The majority of studies ( $n = 76$ ) assessed *family connectedness* from the adolescent

perspective; however, six studies used parent report, six used both adolescent and parent report, and two used observer ratings. Although the majority assessed *family connectedness* through multi-item scales, nine studies used single-item measures. Cronbach's alphas for multi-item scales ranged from .53 to .95, with over 90% being greater than or equal to .70.

Table 1 shows the findings of direct association between *family connectedness* and ASRH outcomes. Overall, there was sufficient evidence that family connectedness can be protective, with at least two longitudinal studies demonstrating a protective association for four ASRH outcomes (*ever had sex*, *early sexual debut*, *frequency of sex*, and *pregnancy/birth*). No longitudinal studies reported a risk association.

*Family connectedness* was found to be protective of *ever having sex* in 14 findings from two longitudinal studies [18–24]; however, 31 findings from 11 longitudinal studies [18, 19, 21, 24–32] demonstrated no association. For example, two studies using data from the National Longitudinal Study of Adolescent Health (Add Health) indicated that greater levels of mother–child connectedness, parental closeness, and parent–child shared activities were all protective of sexual initiation [18, 21]. Although there was a protective effect for boys between mother–child connectedness and initiation of sex for 10th and 11th graders, no association was found for girls of the same age [21]. There was also no association between family connectedness indicators between fathers and sons and sexual initiation [21]. Notably, more studies reporting “no association” used measures referring to “parents” in general, rather than to a specific parent [21, 25, 28–32]. Measures referencing specific parents (e.g., mothers vs. fathers), especially those assessing parental involvement [21, 22], were more likely to show a protective effect for *ever had sex* than parental involvement measures which referenced “parents” in general [25, 28, 32]. One study [31] reported a protective association at the bivariate level only, indicating possible mediation or moderation by other factors.

There was sufficient evidence to suggest that *family connectedness* can be a protective factor for early sexual debut with two findings from two longitudinal studies indicating a protective association [56, 60]. However, four findings from three longitudinal studies [56, 57, 59] reported no association. Bingham and Crockett (1996) [56] assessed quality of parent relationship and reported a protective association; though, this association became non-significant after adjusting for self-esteem and positive affect prior to first intercourse. Browning and colleagues [60] assessed “family attachment and support” and reported a protective association when controlling for individual, family, and neighborhood predictors. Only one longitudinal study reporting findings of no association reported bivariate analysis [59], indicating a protective association which was not sustained in multivariate analyses.

There was sufficient evidence to suggest that *family connectedness* can be a protective factor for *frequency of sex*, with three findings from two longitudinal studies

indicating a protective association [76, 77]. However, one of these studies [76] also reported three findings of no association. Sabo et al. [77] assessed “family cohesion” and reported a protective association for males and females among African American and white youth. In contrast, Lauritsen [76] assessed “attachment to family” and reported a protective association for white males only (no association was reported for white females or for African American youth). Given limited descriptions of measures, it was not possible to examine exact differences in item wording or operationalization. Bivariate analyses were not reported.

There was sufficient evidence to suggest that *family connectedness* can be a protective factor for *pregnancy/birth*, with four findings from three longitudinal studies [23, 88, 89] reporting a protective association. However, 11 findings from eight longitudinal studies [64, 77, 88–93] reported no association. One longitudinal study [88] measuring satisfaction with the father–child relationship reported a protective association for pregnancy among athletes but not among nonathletes, whereas another longitudinal study [89] measuring parental involvement reported a protective association among white and African American youth but not among Latinos. Four of the eight longitudinal studies reporting findings of no association reported bivariate analyses [64, 77, 88, 90]; of these, three [64, 88, 90] reported a protective association which was not sustained in multivariate analyses.

There were too few longitudinal studies to draw conclusions about the relationship between *family connectedness* and other ASRH outcomes.

Fifteen studies examined the indirect effects of *family connectedness* on ASRH outcomes. Path analysis from longitudinal and cross-sectional studies revealed that *family connectedness* had indirect protective effects through individual factors (e.g., academic performance [90], depression [90], substance use [90], self-control [27]) and external factors (e.g., peer deviance [90], number of partners [25], and eating meals with a parent [25]). One longitudinal study from England reported an indirect *risk effect* for early sexual initiation [26]. This risk effect was mediated through decreased conflict and through lack of explicit parental standards or expectations for their child's behavior. Another longitudinal study [173] reported a more complex pathway involving both *family connectedness* (operationalized as family involvement) and parental monitoring. Family involvement mediated the effects between family conflict and parental monitoring; parental monitoring then affected “problem behavior” (e.g., sexual risk-taking), both directly and through youth association with deviant peers.

Regarding generalizability of findings for specific subgroups, there was sufficient evidence to support mother–child connectedness, specifically, as a protective factor for both males (three findings from two longitudinal studies [18, 21]) and females (two findings from two longitudinal studies [19, 24]) for *ever had sex*. There were insufficient longitudinal studies to make any definitive conclusions about racial/ethnic or age-level subgroups.

Table 1  
Distribution of reviewed studies' findings related to the association between family sub-constructs and adolescents' sexual and reproductive health outcomes

Sexual behaviors by sub-construct	Nature of association		
	Protective association	Risk association	No association
Family connectedness (34 longitudinal and 56 cross-sectional studies)			
Ever had sex	14 <sup>a,b</sup> [18–24] 12 <sup>b,c</sup> [13, 33–42]		31 <sup>a,b</sup> [18, 19, 21, 24–32] 24 <sup>b,c</sup> [16, 33, 34, 36, 37, 43–50]
Recent sex/current sexual activity	6 <sup>c</sup> [51, 52, 53, 40]		3 <sup>a</sup> [54, 55] 7 <sup>c</sup> [36, 46, 51]
Early sexual debut	2 <sup>a,b</sup> [56, 60] 7 <sup>c</sup> [36, 52, 58, 61]	2 <sup>c</sup> [57, 58]	4 <sup>a</sup> [56, 57, 59] 10 <sup>c</sup> [36, 57, 58, 62, 63]
Use of contraception	1 <sup>a</sup> [23] 4 <sup>c</sup> [40, 46, 53, 43]		2 <sup>a</sup> [64] 6 <sup>c</sup> [42, 43, 46]
Use of condom	2 <sup>a</sup> [67] 3 <sup>c</sup> [68–70]		2 <sup>a</sup> [67] 15 <sup>c</sup> [36, 44, 46, 68, 70, 71]
No. sexual partners	8 <sup>c</sup> [51, 52, 45, 58, 72, 73]		1 <sup>a</sup> [27] 11 <sup>c</sup> [51, 58, 73–75]
Frequency of sex	3 <sup>a,b</sup> [76, 77] 8 <sup>c</sup> [52, 77–79]		3 <sup>a</sup> [76] 13 <sup>c</sup> [42, 74, 78, 80]
Sexual risk index	2 <sup>a</sup> [81] 4 <sup>c</sup> [69, 82, 84]		2 <sup>a</sup> [81] 32 <sup>c</sup> [83, 68, 84–86]
Contracted an STI			1 <sup>a</sup> [87]
Pregnancy/birth	4 <sup>a,b</sup> [23, 88, 89] 5 <sup>b,c</sup> [94, 36, 95]		12 <sup>a,b</sup> [64, 77, 88–93, 99] 15 <sup>b,c</sup> [35, 36, 63, 77, 95–98]
Intentions	1 <sup>c</sup> [100]		2 <sup>c</sup> [38, 100]
Subtotal	28 <sup>a</sup> 59 <sup>c</sup>	0 <sup>a</sup> 2 <sup>c</sup>	61 <sup>a</sup> 135 <sup>c</sup>
General parent–adolescent communication (four longitudinal and 12 cross-sectional studies)			
Ever had sex	2 <sup>a,b</sup> [101, 102] 5 <sup>b,c</sup> [35, 101–104]		4 <sup>b,c</sup> [103, 83]
Recent sex/current sexual activity	3 <sup>a</sup> [105]		4 <sup>a</sup> [105]
Early sexual debut	2 <sup>a</sup> [105]		5 <sup>c</sup> [50, 106, 107]
Use of condom	1 <sup>a</sup> [102] 3 <sup>c</sup> [102, 103, 108]		5 <sup>c</sup> [103, 106, 107]
No. sexual partners	3 <sup>c</sup> [106]		6 <sup>c</sup> [106, 107]
Frequency of sex	4 <sup>c</sup> [106, 107]		5 <sup>c</sup> [106, 107]
Sexual risk index			1 <sup>c</sup> [109]
Contracted an STI			1 <sup>c</sup> [103]
Pregnancy/birth	2 <sup>c</sup> [96, 110]		4 <sup>a</sup> [110] 5 <sup>c</sup> [35, 110]
Subtotal	8 <sup>a</sup> 17 <sup>c</sup>	0 <sup>a</sup> 0 <sup>c</sup>	8 <sup>a</sup> 32 <sup>c</sup>
Parent-adolescent communication about sex (12 longitudinal and 46 cross-sectional studies)			
Ever had sex	3 <sup>c</sup> [111–113]	3 <sup>a</sup> [114] 5 <sup>c</sup> [119, 40, 45, 46, 118]	11 <sup>a</sup> [18, 31, 114–117] 9 <sup>c</sup> [46, 112, 113, 119–123]
Recent sex/current sexual activity		2 <sup>c</sup> [46]	1 <sup>c</sup> [120]
Early sexual debut	2 <sup>a,b</sup> [19, 115] 8 <sup>b,c</sup> [103, 124–128]	1 <sup>a,b</sup> [115] 2 <sup>b,c</sup> [124]	10 <sup>a,b</sup> [19, 115] 15 <sup>b,c</sup> [106, 107, 112, 125, 127]
Use of contraception	8 <sup>c</sup> [120, 123–125, 129, 130]	1 <sup>a</sup> [115]	3 <sup>a</sup> [115] 9 <sup>c</sup> [31, 40, 113, 120, 124, 125]
Use of condom	1 <sup>a</sup> [131] 15 <sup>c</sup> [103, 122, 126, 130, 132–134]	1 <sup>a</sup> [115]	3 <sup>a</sup> [115] 26 <sup>c</sup> [70, 103, 106, 107, 112, 124, 132–135]
No. sexual partners	5 <sup>c</sup> [124, 132]	4 <sup>c</sup> [106, 45, 124]	5 <sup>a</sup> [115, 131] 6 <sup>c</sup> [106, 107, 132]
Frequency of sex	1 <sup>a</sup> [131] 1 <sup>c</sup> [107]	2 <sup>c</sup> [106]	6 <sup>c</sup> [40, 78, 106, 107, 136]
Sexual risk index	1 <sup>a</sup> [81] 4 <sup>c</sup> [138–140]		3 <sup>a</sup> [81, 137] 8 <sup>c</sup> [86, 109, 138, 140]

(Continued)

Table 1

Distribution of reviewed studies' findings related to the association between family sub-constructs and adolescents' sexual and reproductive health outcomes (Continued)

Sexual behaviors by sub-construct	Nature of association		
	Protective association	Risk association	No association
Contracted a STI	1 <sup>c</sup> [141]		
Pregnancy/birth	4 <sup>a</sup> [142] 3 <sup>c</sup> [176, 143]	3 <sup>c</sup> [124]	14 <sup>a</sup> [142] 2 <sup>c</sup> [113, 124]
Intentions	1 <sup>a</sup> [137] 1 <sup>c</sup> [112]		1 <sup>a</sup> [137] 5 <sup>c</sup> [112, 136, 144]
Subtotal	9 <sup>a</sup> 49 <sup>c</sup>	6 <sup>a</sup> 18 <sup>c</sup>	50 <sup>a</sup> 87 <sup>c</sup>
Parental monitoring (27 longitudinal and 34 cross-sectional studies)			
Ever had sex	8 <sup>a,b</sup> [27, 116, 145–147]	2 <sup>a,b</sup> [29, 148]	13 <sup>a,b</sup> [20, 29, 54, 60, 145, 146, 149–152]
Recent sex/current sexual activity	13 <sup>b,c</sup> [33, 39, 49, 50, 122, 153–156] 3 <sup>c</sup> [51, 106, 158]	2 <sup>b,c</sup> [157] 2 <sup>c</sup> [157]	7 <sup>b,c</sup> [38, 50, 155–157] 4 <sup>c</sup> [46, 157]
Early sexual debut	6 <sup>a,b</sup> [19, 28, 61, 159–161] 7 <sup>b,c</sup> [122, 155, 162, 163]		6 <sup>a,b</sup> [19, 61, 159, 161] 4 <sup>b,c</sup> [111, 155, 163]
Use of contraception	2 <sup>a,b</sup> [152, 164]		1 <sup>a,b</sup> [149] 4 <sup>b,c</sup> [43, 155, 156]
Use of condom	3 <sup>a,b</sup> [102, 164] 6 <sup>b,c</sup> [157, 69]	1 <sup>b,c</sup> [68]	4 <sup>b</sup> [102] 13 <sup>b,c</sup> [68, 122, 154, 156–158]
No. sexual partners	2 <sup>a</sup> [164] 7 <sup>c</sup> [51, 75, 106, 158, 165]		2 <sup>a</sup> [27, 149] 4 <sup>c</sup> [51, 74, 158]
Frequency of sex	5 <sup>c</sup> [51, 78, 79, 158]		1 <sup>a</sup> [149] 6 <sup>c</sup> [74, 78, 158]
Sexual risk index	1 <sup>a</sup> [166] 9 <sup>c</sup> [68, 69, 82, 86, 109, 140, 168, 169]		1 <sup>a</sup> [167] 2 <sup>c</sup> [68, 140]
Contracted a STI	4 <sup>a,b</sup> [164, 170] 2 <sup>b,c</sup> [165, 171]		3 <sup>a,b</sup> [167, 170] 5 <sup>b,c</sup> [157]
Pregnancy/birth	1 <sup>a</sup> [160] 2 <sup>c</sup> [153]		6 <sup>a</sup> [91, 172] 2 <sup>c</sup> [158]
Intentions	2 <sup>a</sup> [150] 1 <sup>c</sup> [38]	2 <sup>c</sup> [157]	2 <sup>a</sup> [150] 2 <sup>c</sup> [157]
Subtotal	29 <sup>a</sup> 55 <sup>c</sup>	2 <sup>a</sup> 7 <sup>c</sup>	39 <sup>a</sup> 53 <sup>c</sup>

<sup>a</sup> Indicates the studies were longitudinal in design.

<sup>b</sup> Indicates that it met the standard of evidence (i.e., findings from *at least two* longitudinal studies provided evidence for a protective or risk association).

<sup>c</sup> Indicates the studies were cross-sectional in design.

### Parent–adolescent general communication

Sixteen studies (four longitudinal and 12 cross-sectional) examined the direct association between *parent–adolescent general communication* and ASRH outcomes. Three studies [101, 102, 105] included longitudinal and cross-sectional analyses. One study examined the indirect effect of *parent–adolescent general communication* [179]. Measures used to assess *parent–adolescent general communication* varied widely. Three studies used a single item to assess quality of communication [101, 103, 110]. Six studies used the Parent–Adolescent Communication scale for open communication and problem communication [83, 96, 102, 104, 174, 179]. Two studies adapted the Parent–Adolescent Communication scale, and three developed original scales, one of which included an item about sexual and reproductive health-related communication. One study

used a parent–adolescent conflict-focused communication indicator, whereas another used a combined index score for quality of maternal–adolescent general communication and mother–daughter relationship. The majority of studies (n = 16) used adolescents' self-report; two studies used mother and adolescent reports [106, 107]. Of the 11 studies that presented a Cronbach's alpha, scores ranged from .76 to .91.

Table 1 indicates that there was sufficient evidence that *parent–adolescent general communication* can be a protective factor for ASRH outcomes, with two longitudinal studies indicating a protective effect for one outcome (*ever had sex*). No longitudinal studies reported a risk association.

Regarding *ever had sex*, two findings from two longitudinal studies [101, 102] demonstrated a protective association, whereas no longitudinal studies supported a nonassociation. The two longitudinal studies used measures of general

mother–adolescent and father–adolescent communication among males and females in a white clinic-based sample [101] and among African American inner-city youth [102].

Too few longitudinal studies examined the relationship between *parent–adolescent general communication* and other ASRH outcomes or reported stratified results to assess the generalizability of findings by sub-groups. Regarding indirect effects, one study reported that the influence of *parent–adolescent general communication* was mediated by peer factors and sex-role attitudes [179].

#### *Parent–adolescent sexual communication*

A total of 58 studies (12 longitudinal and 46 cross-sectional) examined the direct association between *parent–adolescent sexual communication* and ASRH outcomes. One study included both longitudinal and cross-sectional analyses [31]; 13 included examination of indirect effects. Three additional studies examined indirect effects only.

The measures used to assess *parent–adolescent sexual communication* were varied. Content ranged from the type and amount of sexual topics discussed between parent and child to the quality or ease of communication. Twelve studies used a single item to assess the construct, 31 used scales ranging from 2 to 12 items (in several articles not enough information was provided to assess the number of items), and four used a combination of both scales and individual items. Eight studies analyzed multiple measures of communication; 10 studies provided insufficient information to assess the type of measure used. Of the 22 studies that presented a Cronbach's alpha, alphas ranged from .65 to .91; 21 studies reported an alpha greater than or equal to .70.

Overall, there was only sufficient evidence to support a protective association between *parent–adolescent sexual communication* and *early sexual debut*. Two findings from two longitudinal studies [19, 115] demonstrated a protective association; however, one study also reported a risk association [115], and 10 findings from these same studies indicated no association. Wight et al. [115] examined comfort of communication with fathers and mothers in a mixed-gender sample and reported both a protective and risk association for father–daughter communication only. Females who reported being very comfortable talking about sex with their fathers were less likely to report early sexual debut compared with those who were uncomfortable or very uncomfortable; however, females who had some comfort were at increased risk. In contrast, McNeely et al. [19] reported a protective association for females using a maternal communication measure focused on disapproval of sex. However, they reported no association for males or females regarding other topics of communication. Only one longitudinal study reported bivariate analyses, indicating a protective association for females only [115].

There were too few longitudinal studies to draw conclusions about the relationship between *parent–adolescent sexual communication* and other ASRH outcomes.

For six outcomes (*ever had sex, contraceptive use, condom use, number of sexual partners, frequency of sex, pregnancy/birth*), there was some evidence of a risk association; however, these results did not meet our standards of evidence, with consistent findings from at least two longitudinal studies for a given outcome. In one longitudinal study, Pearson et al. [114] found risk associations for *ever had sex* among female, white, and Latino youth when assessing frequency of communication. In another longitudinal study, Wight et al. reported a risk association for *contraceptive use* among males related to ease of communication with their father. However, no association was found among males related to ease of communication with their mother, nor among females communicating with their father or mother [115]. The remaining studies indicating risk association were cross-sectional studies.

Regarding generalizability of findings for sub-groups, a key finding was that *parent–adolescent sexual communication* seemed to be more protective for females than males. Four of eight longitudinal findings [19, 81, 131, 137] found a protective association for females as compared with no longitudinal protective findings for males. Almost half of the cross-sectional findings also reinforced the protective association for females. Too few longitudinal studies stratified findings by race/ethnicity to draw conclusions about generalizability; however, cross-sectional studies showed mostly protective results, especially for African Americans. With regard to age, there was sufficient longitudinal evidence for a protective association among high school–aged youth only [81, 115].

The type of measure of communication also appeared to be important—protective influence may be dependent on the quality of communication and the content. For example, “ever” communicating with youth was protective for *condom use, frequency of sex, and pregnancy/birth*. Quality of communication was protective for *intent to have sex* for females but not for males [137]. However, ease and frequency of communication [18, 114, 116] were related to risk associations in certain sub-groups.

#### *Parental monitoring*

Sixty-one studies (27 longitudinal and 34 cross-sectional) examined the direct association between *parental monitoring* and an ASRH outcome; seven studies (five longitudinal and two cross-sectional) also examined an indirect effect.

Most studies used measures assessing the parent's knowledge of their child's whereabouts, friends, or activities (indirect monitoring), or the amount of time that their child spent at home or in public without adult supervision (direct monitoring). Some studies assessed parental strictness or rules about dating and other activities, such as curfews, and a smaller number of studies assessed factors such as parental overcontrol or parental–adolescent decision-making. Fourteen studies used a combination of measures. The majority of studies (n = 45) assessed parental monitoring from the

adolescent perspective; however, seven used parental report only, and seven used both youth and parental report. One study [106] reported satisfactory correlation between youth and parental reports ( $r = .25, p < .01$ ) and combined both sets of items into one scale (Cronbach's  $\alpha = .71$ ).

Ten studies used single-item measures to assess *parental monitoring*; the remainder used scales ranging from 2 to 24 items. Of these studies, 30 presented a Cronbach's alpha; the range of scores was .45–.90; 24 (67%) of the alphas presented were greater than or equal to .70. Six studies conducted factor analysis with parental monitoring items. Thirty studies used scales for which validity had been previously established.

Table 1 shows the findings of direct association between ASRH outcomes and *parental monitoring*. Overall, there was sufficient evidence that parental monitoring can be a protective factor for ASRH outcomes, with at least two longitudinal studies demonstrating a protective association with four outcomes (*early sexual debut, contraceptive use, condom use, and contraction of an STI*). Findings for ever had sex were mixed, with sufficient findings from two or more longitudinal studies reporting both a protective and a risk association. Furthermore, when findings were broken down by specific behaviors and subgroups, results were inconsistent with some evidence for a risk association.

Findings regarding *ever had sex* were mixed, with eight findings from five longitudinal studies [27, 116, 145–147] reporting protective findings for sexual initiation, 13 from 10 longitudinal studies [20, 29, 54, 60, 145, 146, 149–152] reporting no association, and two from two longitudinal studies [29, 148] reporting a risk association. Hope and Chapple [27] found that parental monitoring at ages 11–13 was protective against sexual initiation 4 years later for males and females in a multi-ethnic sample. Similarly, using data from Add Health, Roche et al. [116] reported that greater parental decision-making (i.e., whether the parent makes decisions for the youth, such as who the youth spends time with, how often, and what they are allowed to watch on TV, curfews, choice of clothing and diet) at ages 12–13 was protective of later sexual initiation for males and females. In contrast, five longitudinal studies conducted in multi-ethnic samples reported no association between parental monitoring and sexual initiation for males or females [29, 54, 145, 149, 150]. One longitudinal study of 12–15-year-old African American and white females found that the type of parental monitoring was influential; direct monitoring of unsupervised time at home was protective against being sexually experienced but no association was found between direct monitoring of time with peers, indirect parental monitoring (i.e., knowledge of youth's whereabouts), and sexual experience [146]. Only two of the 10 longitudinal studies reporting no association reported bivariate analyses. Both reported a protective association at the bivariate level [20, 149], indicating that other factors may influence the effect of parental monitoring on sexual initiation.

Regarding evidence of risk association, two findings from two longitudinal studies indicated that perceived parental overcontrol was a consistent risk factor for *ever having sex* among males and females [29], whereas perceived stricter parental rules was a risk factor for males [148].

There was sufficient evidence indicating that *parental monitoring* can be a protective factor against *early sexual debut*. Six findings from six longitudinal studies [19, 28, 61, 159–161] indicated a protective association; however, a similar number of findings indicated no association. No studies reported a risk association. Although Longmore et al. [28] reported that *parental monitoring* was protective of early debut for males and females aged  $\geq 13$  years in a predominantly white sample, findings from two longitudinal studies among multi-ethnic samples reported a protective association for females only [19, 159], and one longitudinal study reported a protective association for males only [61]. In a German study, Meschke et al. [161] examined several types of parental monitoring and found that not being alone on a date was protective for females but not for males and that having a curfew was nonsignificant for males and females. Only one of the four longitudinal studies [161] reporting findings of no association reported bivariate analyses. Similar to the multivariate findings from this study, not being alone on a date was protective at the bivariate level but having a curfew was not, adding little information regarding the association between *parental monitoring* and *early sexual debut*.

Regarding *contraceptive use*, there was sufficient evidence to indicate that *parental monitoring* can be a protective factor among females, predominantly African American youth, with two findings from two longitudinal studies [152, 164] reporting a protective association. However, longitudinal data from the National Survey of Children conducted among African American and white youth indicated no association [149]. Part of the discrepancy may relate to how the dependent variable was measured—the longitudinal studies reporting protective associations assessed use of hormonal or dual methods versus no contraceptive use [152], and contraceptive use at last intercourse [164], whereas the longitudinal study reporting no association assessed contraceptive use during the last 4 weeks [149]. However, the latter study indicated a protective association between *parental monitoring* and *contraceptive use* at the bivariate level, indicating the potential presence of mediating factors.

For *condom use*, there was sufficient evidence to indicate that *parental monitoring* can be a protective factor, although findings were mixed. DiClemente et al. [164] reported a protective association between indirect *parental monitoring* and *condom use* in a longitudinal study of African American females. Similarly, Stanton et al. [102] reported that indirect parental monitoring was a protective factor for condom use at 6- and 18-months later in a longitudinal study of African American, low-income youth aged 9–15 years; however, no association was found at 12-, 24-, 36-, and 48-months, perhaps because of less consistency in monitoring over a period. This same study reported a protective association

between indirect *parental monitoring* and *condom use* at the bivariate level, indicating that other factors may mediate or moderate the association over time [102].

Regarding *contraction of an STI*, four findings from two longitudinal studies provided sufficient evidence to support *parental monitoring* as a protective factor; however, three findings from two longitudinal studies also reported no association. Crosby et al. [170] and DiClemente et al. [164] both reported a protective association between indirect parental monitoring and contraction of certain STIs among African American females aged 14–18 years. However, Crosby et al. [170] also reported no association for gonorrhea and for multiple STIs, both in bivariate and multivariate analyses. Similarly, a longitudinal study of older adolescent white males in Oregon found no association between indirect monitoring and STI acquisition [167].

With regard to *recent sexual activity*, *number of sexual partners*, *frequency of sex*, *sexual risk indices*, *experience of pregnancy or birth*, and *sexual intentions*, there were too few longitudinal studies to draw conclusions about the relationship between *parental monitoring* and these outcomes.

In addition to the direct associations presented in Table 1, the indirect effects of *parental monitoring* on sexual health outcomes were also reviewed. Among a predominantly white sample of youth in the Pacific Northwest, Ary et al. [173] reported that the effect of parental monitoring on later problem behavior was mediated through the youth's association with deviant peers. In a longitudinal study of white and non-white youth, Hope and Chapple [27] reported that self-control mediated the effect of parental monitoring on adolescent sexual behavior. These findings provide clues to the potentially more complex effect of parental monitoring on sexual and reproductive health that needs further investigation.

We also considered the generalizability of findings across sub-groups. Substantially greater evidence supported both indirect and direct *parental monitoring* as a protective factor for females than for males, with 11 longitudinal studies reporting a protective association for females [19, 61, 145, 146, 150, 152, 159–161, 164, 170] and two longitudinal studies indicating a protective association for males [61, 150]. In addition, two longitudinal studies indicated that parental overcontrol (measured as too many rules or overly strict rules) was a *risk* factor for males [29, 148]. With regard to race/ethnicity, greater evidence exists to support a protective association between *parental monitoring* and sexual outcomes among African American youth (10 findings from three longitudinal studies [102, 164, 170]) than among white youth (one protective finding from one longitudinal study [161]). No longitudinal studies presented stratified results for Latino, Asian, or Native American youth, indicating the paucity of longitudinal research within these sub-groups. With regard to age, there was longitudinal evidence for a protective association between *parental monitoring* and sexual outcomes among middle school youth, with six protective findings from three longitudinal studies [27,

116]. For high school youth, the findings were less consistent. Although eight findings from three longitudinal studies indicated a protective association [19, 150, 164], 10 findings from four longitudinal studies indicated no association. Further, two cross-sectional studies indicated a risk association [68, 157]. No studies reported on youth aged < 20 years who are out of high school.

#### *Peer connectedness*

Nine studies (four longitudinal and five cross-sectional) examined the association between *peer connectedness* and ASRH outcomes. Of these studies, eight examined direct associations, whereas one cross-sectional study examined indirect effects only. The studies used a variety of measures to assess the quality [51, 57, 74, 94, 175] and frequency of friends' support [81], or the amount of time spent with peers [76]. Six studies used scales to assess peer connectedness; four studies used previously validated instruments or items adapted from established instruments. Four studies provided Cronbach's alphas, ranging from .66 to .82; four (67%) of the alphas presented were greater than or equal to .70.

Table 2 shows the findings of direct associations between ASRH outcomes and *peer connectedness*. Overall, there was insufficient evidence to evaluate the association because of the limited number of longitudinal studies. However, when results were broken down by specific behaviors and sub-groups, they revealed some evidence of both a risk and protective association.

Regarding *frequency of sex*, one longitudinal study among a nationally representative sample of 11–17 year olds reported a risk association for African American females and white males related to greater time spent with friends [76]. Similarly, one longitudinal study among white 7th–9th graders (12–15 year olds) reported a risk association regarding *early sexual debut* for girls and boys; youth who reported better peer relations were more likely to initiate sex before age 16 [57].

Regarding *number of sexual partners*, one longitudinal study reported a protective association among African American high school students [175]; however, one cross-sectional study conducted in a multi-ethnic rural sample reported an increased likelihood of multiple sex partners in youth aged < 15 years and no association among 16–17 year olds [51].

Regarding *pregnancy/birth*, two cross-sectional studies conducted among Latino females reported a protective association with *peer connectedness* [94, 176]. Of the six studies that reported findings of no association, three reported bivariate analyses; two indicated a protective association at the bivariate level [81, 74], and 1 indicated no association [57]. It is possible that some of these associations would have retained significance if another analytic method that considered indirect effects had been used.

Given the limited number of stratified findings by gender and racial/ethnic group, it was not possible to draw conclusions about the association between *peer connectedness* and ASRH outcomes for sub-groups.

Table 2

Distribution of reviewed studies' findings related to the association between peer connectedness, partner connectedness, school connectedness, community connectedness and adolescents' sexual and reproductive health outcomes

Sexual behaviors by sub-construct	Nature of association		
	Protective association	Risk association	No association
Peer connectedness (four longitudinal and five cross-sectional studies)			
Recent sex/current sexual activity			2 <sup>a</sup> [51]
Early sexual debut		1 <sup>b</sup> [57]	1 <sup>b</sup> [57]
Frequency of sex		2 <sup>b</sup> [76]	3 <sup>b</sup> [76, 175]
No. sexual partners	1 <sup>b</sup> [175]	1 <sup>a</sup> [51], 1 <sup>b</sup> [175]	1 <sup>a</sup> [74]
Sexual risk index			3 <sup>a</sup> [51, 74]
Pregnancy/birth	2 <sup>a</sup> [94, 176]		2 <sup>b</sup> [81]
Subtotal	1 <sup>b</sup>	3 <sup>b</sup>	6 <sup>b</sup>
	2 <sup>a</sup>	1 <sup>a</sup>	6 <sup>a</sup>
Partner connectedness (four longitudinal and eight cross-sectional studies)			
Ever had sex	2 <sup>b,c</sup> [177, 178]	3 <sup>b,c</sup> [178]	1 <sup>b,c</sup> [177]
		3 <sup>a,c</sup> [16, 179]	1 <sup>a,c</sup> [43]
Recent sex/current sexual activity		1 <sup>a</sup> [51]	1 <sup>a</sup> [51]
Use of contraception	2 <sup>b,c</sup> [180, 181]		3 <sup>b,c</sup> [180]
	2 <sup>a,c</sup> [182, 183]		1 <sup>a,c</sup> [43]
Use of condom	1 <sup>b</sup> [181]	2 <sup>a</sup> [183, 184]	1 <sup>a</sup> [182]
	1 <sup>a</sup> [182]		
No. sexual partners		1 <sup>a</sup> [51]	1 <sup>a</sup> [51]
Intentions		1 <sup>a</sup> [16]	2 <sup>a</sup> [16, 185]
Subtotal	5 <sup>b</sup>	3 <sup>b</sup>	4 <sup>b</sup>
	3 <sup>a</sup>	8 <sup>a</sup>	7 <sup>a</sup>
School connectedness (11 longitudinal and 7 cross-sectional studies)			
Ever had sex	4 <sup>b,c</sup> [149, 178, 186]		7 <sup>b,c</sup> [55, 178, 186, 187]
	5 <sup>a,c</sup> [119, 33, 188]		4 <sup>a,c</sup> [33, 34, 188]
Early sexual debut	3 <sup>b,c</sup> [13, 59]		1 <sup>a,c</sup> [52]
	1 <sup>a,c</sup> [52]		
Use of condom			2 <sup>b</sup> [149, 189]
No. sexual partners	1 <sup>b</sup> [189]		1 <sup>b</sup> [149]
	1 <sup>a</sup> [52]		1 <sup>a</sup> [52]
Frequency of sex	3 <sup>b,c</sup> [76, 77]		6 <sup>b,c</sup> [76, 77, 149]
	1 <sup>a,c</sup> [52]		2 <sup>a,c</sup> [52, 78]
Sexual risk index	1 <sup>a</sup> [82]		
Pregnancy/birth	1 <sup>b</sup> [172]		4 <sup>b</sup> [77]
Subtotal	12 <sup>b</sup>		20 <sup>b</sup>
	9 <sup>a</sup>		8 <sup>a</sup>
Community connectedness (one longitudinal and three cross-sectional studies)			
Ever had sex	3 <sup>a</sup> [33, 190]		2 <sup>a</sup> [35, 190]
Recent sex/current sexual activity	1 <sup>b</sup> [66]		
Use of contraception	1 <sup>b</sup> [66]		1 <sup>b</sup> [66]
Use of condom			2 <sup>b</sup> [66]
No. sexual partners	2 <sup>b</sup> [66]		
Pregnancy/birth			1 <sup>a</sup> [35]
Subtotal	4 <sup>b</sup>		3 <sup>b</sup>
	3 <sup>a</sup>		3 <sup>a</sup>

<sup>a</sup> Indicates the studies were cross-sectional in design.

<sup>b</sup> Indicates the studies were longitudinal in design.

<sup>c</sup> Indicates that it met the standard of evidence (i.e., findings from at least two longitudinal studies provided evidence for a protective or risk association).

### Partner connectedness

Twelve studies (four longitudinal and eight cross-sectional) examined the association between *partner connectedness* and an ASRH outcome. All studies investi-

gated the direct association of *partner connectedness* on ASRH outcomes; one study examined an indirect effect.

A variety of measures were used to assess *partner connectedness*. All assessed the emotional and social connection and commitment between sexual partners. Two studies

used measures that examined whether youth felt that having a child would bring them closer to their partner [51, 43]. Other studies included measures looking at how satisfied the adolescent was with their current boy/girlfriend [185], whether they had a relationship involving caring, closeness, and physical contact [16], or whether they were in love with their partner or needed to feel like they were in love with their partner before being sexually intimate [177, 182]. Additional studies asked youth whether they considered their relationship to be romantic [180, 181], or asked about characteristics of the relationship to determine the level of connectedness [178, 183, 184]. Only two studies included information about the psychometrics of their measures, reporting Cronbach's alphas of 0.60 and 0.92.

Table 2 shows the findings of direct association between ASRH outcomes and *partner connectedness*. Overall, there was sufficient evidence indicating that partner connectedness can be a protective factor for ASRH outcomes, with at least 2 longitudinal studies demonstrating a protective association with two outcomes (*ever had sex* and *contraceptive use*). However, when findings were broken out by sub-constructs and specific outcomes, results were less consistent with some evidence of a risk association, although insufficient to meet the *a priori* standard of evidence.

There was sufficient evidence to support a protective association between *partner connectedness* and *ever had sex* for females; however, differential findings were reported by racial/ethnic group and by type of measure. Bearman and Bruckner [178] reported a protective association for emotional commitment to a partner among African American females; however, it represented a risk factor for *ever having sex* among male and female non-African American youth, and among African American males. In an English study, Taris and Semin [177] reported a protective association for emotional commitment among females but not in males. However, the authors did report indirect effects for males. The level of emotional commitment that males felt had an effect on the types of courtship strategies (progressing through holding hands, kissing, necking, light and heavy petting, and sexual intercourse) that they felt were permissible, which in turn had a significant effect on whether they had sex.

Findings from two longitudinal studies provided sufficient evidence to support a protective association between *partner connectedness* and *contraceptive use* for females; the evidence for males was mixed [180, 181]. Manlove et al. [180] found that the effect of *partner connectedness*, as measured by whether the participant described their relationship as romantic or nonromantic, on contraceptive use depended on the way the outcome was coded, and by gender. Being in a romantic relationship was not a significant predictor of ever versus never using contraceptives for males or females; however, being in a romantic relationship was protective for always versus no or inconsistent contraceptive use for females. Ford et al. [181] found that adolescents who reported being in a romantic relationship were more likely to

use contraception than those who did not categorize their relationship as romantic.

For additional outcomes (*recent sexual activity*, *condom use*, *number of sexual partners*, and *intentions*), only cross-sectional research findings were available which limits the conclusions that may be drawn.

Considering the generalizability of findings, there was sufficient evidence to support a protective association between *partner connectedness* and sexual health outcomes among females only [177, 180]. There was insufficient evidence to assess the influence of *partner connectedness* among racial/ethnic sub-groups or among sub-groups related to age. These studies emphasize the need to better understand under what circumstances, and for whom, *partner connectedness* may have a protective or risk effect.

#### *School connectedness*

Eighteen studies (11 longitudinal and 7 cross-sectional) examined the direct association of *school connectedness* on ASRH outcomes. The studies used a variety of measures. Five studies used single items to assess the level of involvement in school activities [52, 76, 77, 187, 189], five used scales to assess whether youth liked school and felt it was important [33, 78, 119, 149, 172], and seven used scales to assess variables such as bonding with peers and teachers, and perceptions of fair treatment and safety at school [13, 34, 55, 82, 178, 186, 188]. Eight studies provided Cronbach's alphas, ranging from 0.57 to 0.89; 5 studies had alphas greater than 0.70.

Table 2 shows the findings of direct association between ASRH outcomes and *school connectedness*. Overall, there was sufficient evidence that *school connectedness* can be a protective factor for ASRH outcomes, with at least 2 longitudinal studies demonstrating a protective association with three outcomes (*ever had sex*, *early sexual debut*, and *frequency of sex*). No studies demonstrated a risk association.

Four findings from 3 longitudinal studies [149, 178, 186] found *school connectedness* to be protective for *ever had sex*; however, 7 findings from 4 longitudinal studies [55, 178, 186, 187] found no association. Bearman and Bruckner [178] assessed feelings of closeness, inclusion, fair treatment, and happiness at school, reporting a protective association for non-African American adolescents only. McNeely and Falci [186] assessed students' report of teacher support and feelings of social belonging using data from the National Longitudinal Study of Adolescent Health; across the sample, only teacher support was protective for *ever had sex*. Among a sample of white and African American youth, Baumer and South found that self-reported "school attachment" was protective of sexual initiation [149]. In contrast, Ohannessian and Crockett (1993) [187] assessed participation in academic activities and reported a protective association for white males and females at the bivariate level; however, the multivariate association was nonsignificant. Similarly, Cleveland [55] reported

a bivariate level protective association between school attachment and virginity status, which did not retain significance in multivariate analyses, indicating that other factors may mediate or moderate these associations.

Regarding *early sexual debut*, three findings from two longitudinal studies [13, 59] reported protective effects for *school connectedness* among males and females; no longitudinal studies reported results of risk or no association.

There was sufficient evidence to support a protective association between *school connectedness* and *frequency of sex* with three protective findings from two longitudinal studies [76, 77]; however, findings were inconsistent across sub-groups and by type of school connectedness. Lauritsen [76] reported a protective association for African American females but not for white females, nor for African American or white males. Sabo et al. [77] reported a protective association related to sports involvement for females but not for males, whereas involvement in arts was protective for males but not for females. Baumer and South [149] reported a protective association at the bivariate level only, indicating that other variables may have mediated the association.

There are very few longitudinal studies to draw conclusions about the relationship between *school connectedness* and other ASRH outcomes (*condom use*, *number of sexual partners*, *sexual risk index*, and *pregnancy/birth*).

Regarding generalizability of findings across sub-groups, there was sufficient evidence for a protective association among males [59, 77, 178] and among females [59, 76, 77, 172, 178, 189]. However, there was insufficient evidence to draw conclusions regarding the influence of *school connectedness* by race/ethnicity or by age.

#### Community connectedness

Four studies (one longitudinal and three cross-sectional) investigated the direct association of *community connectedness* on an ASRH outcome. A variety of measures were used to assess *community connectedness*. Two studies used measures that examined perceptions of neighborhood social support (Quality of Neighborhood Scale) [191] and neighborhood monitoring [33, 35]. These scales had Cronbach's  $\alpha$ , .63 and .69, respectively. One study used a single-item measure that assessed youth participation in community-based African American organizations or social groups, one study used a scale from the Youth Asset Survey ( $\alpha = .78$ ), and one study used a count of the number of community activities in which the youth is involved but provided no information on the reliability of the measure.

Table 2 shows the findings of direct association between ASRH outcomes and *community connectedness*. Based on the small number of studies, there was insufficient evidence to conclude that *community connectedness* is a protective factor. However, no studies demonstrated a risk association, and the stratified results revealed areas for additional research.

One longitudinal study [66] found *community connectedness* to be protective for *recent sex*, *contraceptive use*, and

*number of sexual partners* among African American female adolescents. This study showed that youth involved in African American organizations were less likely to report *recent sex* and more likely to report *fewer sexual partners* and greater *contraceptive use* with their steady partner. However, the study also found no association between involvement in African American organizations and *contraceptive use* with a casual sexual partner and consistent *condom use* with either a steady or casual partner. Two cross-sectional studies found *community connectedness* to be protective for *ever had sex* [33, 190]. Oman et al. [190] found *community connectedness* to be protective for youth living in a two-parent family but not for those living in a one-parent family. Small and Luster [33] found *community connectedness* to be protective for both males and females for *ever had sex*, but another cross-sectional study [35] found no association between *community connectedness* and *ever had sex* among African American females.

Given the small number of identified studies, it was not possible to assess the generalizability of findings. The one longitudinal study [66] used a sample of African American females, as did one of the cross-sectional studies [35]. All of the studies included youth of high school age, so it was unclear whether the influence of *community connectedness* is differential by age.

#### Discussion

As summarized in Table 3, this review found sufficient evidence to support a protective association between ASRH outcomes and six *connectedness* sub-constructs: *family connectedness*, *parent–adolescent general communication*, *parent–adolescent sexual communication*, *parental monitoring*, *partner connectedness (for females)*, and *school connectedness*. All six demonstrated evidence for delaying sexual initiation (*ever had sex*) or for protecting against *early sexual debut*. Four sub-constructs were also protective for sexually experienced youth either reducing the *frequency of sex* (*family connectedness* and *school connectedness*) or increasing *condom and contraceptive use* (*parental monitoring* and *partner connectedness*). There was insufficient longitudinal evidence to examine the association between ASRH outcomes with *peer connectedness* or *community connectedness*; however, there was some evidence for a risk association for the former, which requires further investigation.

Only one connectedness measure of *parental monitoring* indicated sufficient evidence of a risk association—parental overcontrol. Although there were some longitudinal and cross-sectional findings indicating a risk association for *parent–adolescent sexual communication*, *peer connectedness*, and *partner connectedness*, these findings did not meet the *a priori* standards of evidence. Further research is warranted to examine the contexts in which these factors exert a protective or risk influence.

Table 3  
Summary of key findings

Connectedness sub-construct	Findings	
	Sufficient evidence for protective association	Comments on sub-groups and measures
Family connectedness	Ever had sex Frequency of sex	Mother-child connectedness protective for males and females Measures referring to “mother” or “father” specifically, rather than “parents” in general more likely to show protective association
Parent-adolescent general communication	Early sexual debut Pregnancy/birth	Insufficient evidence to examine sub-group effects Protective for females Protective for older youth Type of measure may influence outcomes Some evidence of risk association
Parent-adolescent sexual communication	Ever had sex Early sexual debut	
Parental monitoring	Ever had sex Early sexual debut Contraceptive use Condom use Contraction of an STI	Protective for males and females Protective for African-American youth Protective for middle school youth Intrusive monitoring or parental over-control a risk factor
Peer connectedness	Insufficient evidence	Insufficient evidence to examine sub-group effects Some evidence of risk association
Partner connectedness	Ever had sex Contraceptive use	Protective for females Some evidence of risk association
School connectedness	Ever had sex Early sexual debut Frequency of sex	Protective for males and females
Community connectedness	Insufficient evidence	Insufficient evidence to examine sub-group effects

Few sub-constructs yielded sufficient evidence to examine their influence on specific youth sub-groups. *Family connectedness*, *parental monitoring*, and *school connectedness* seem to have protective effects for both males and females, whereas *parent-adolescent sexual communication* and *partner connectedness* may have a protective influence among females only. With regard to racial and ethnic sub-groups, much of the existing *connectedness* in the published data has been conducted among white and African American youth, with a notable lack of studies among Latino and other minority groups. This has an impact regarding our understanding of the cultural relevance of these sub-constructs as well as the cultural sensitivity of measures and intervention strategies. Similarly, it is important to understand how the influence of these sub-constructs alters across the natural development process, as there is an increase in autonomy and in sexual experience in youths.

It is evident from the variety of measures used that existing research has been extremely disparate in how it defines, structures, and operationalizes the construct of *connectedness* [10]. There was also inconsistency in the quality of measures used. With regard to the family-focused sub-constructs, it is evident that youth have potentially different relationships with each of their parents and that use of measures that assess relations with a “mother” or “father” specifically, versus generic “parent” measures, may yield more informative results. Further research is needed to support the validation of measures for the sub-constructs that have received least attention, such as, *peer connected-*

*ness* and *community connectedness*, to better understand the role that these factors play in healthy youth development. Developing an electronic compendium of previously validated, reliable measures for these *connectedness* sub-constructs, as well as for other constructs targeted in PYD programs, would greatly advance the field in terms of measurement science.

With the exception of *school connectedness* and *community connectedness*, other *connectedness* sub-constructs examined evidence of both direct and indirect effects on sexual and reproductive health outcomes. This research is critical because, from a theoretical perspective, many of these sub-constructs may be expected to have a more distal influence on adolescent sexual behavior, for example, by influencing youths’ attitudes and friendship patterns related to responsible sexual behavior [14]. As few studies used analytic techniques that considered indirect effects (such as, structural equation modeling, path analysis, or mediation analysis), this may in part explain the numerous findings of “no association” among multivariate studies. Furthermore, additional research is needed to examine the synergy that exists between these sub-constructs as well as with other youth development constructs. For example, family connectedness may moderate the influence of parental monitoring on ASRH outcomes, in that youth who perceive greater levels of family connectedness view parental monitoring practices favorably [173].

There is a need for more intervention research to assess how best to enhance these *connectedness* sub-constructs

guided by a stronger mechanistic understanding of the effect of these variables on ASRH in the context of PYD programs. Some programs that address family connectedness and other parental practices have been shown to have a positive effect on ASRH and substance use outcomes. *Familias Unidas*, a parent-centered youth development program for Latino youth, included group sessions and family visits to strengthen families' ability to provide support, use positive parenting, communicate effectively, and increase their involvement [192]. Other PYD programs have included skills training to enhance parent–adolescent general and sexual communication, using strategies such as guided practice and role plays [192–195]. It is possible that enhancing relations with pro-social, responsible peers may have a positive effect on sexual attitudes and behavior. PYD programs, such as the Teen Outreach Program [196] and the Children's Aid Society Carrera Program [197], provide stable, long-term, peer group interactions focusing on pro-social activities. Both programs have demonstrated sustained positive effect on ASRH outcomes. Similarly, several effective PYD programs have included strategies to enhance the school climate. The Gatehouse Project included strategies to improve the social climate of the whole school (e.g., anti-bullying guidelines, or introduction of mentoring programs) and the classroom (e.g., the use of more interactive teaching styles and acknowledgement of all students' contribution) [198, 199]. The Aban Aya program also includes a school task force to promote changes in school policy and teacher training to enhance interactive and cultural teaching, and proactive classroom management [193]. These strategies may enhance positive perceptions of *school connectedness*. However, it is also critically important that future PYD intervention research includes measures to assess change in these *connectedness* sub-constructs as well as in behavioral and health outcomes so as to better understand the mechanisms of change.

There were several strengths and limitations in this review. First, we included a broad search of nine large databases and hand-search of bibliographies of recent review articles. The selection criteria limited the review to studies with strong research methodology. Second, the review encompassed multiple sub-constructs of *connectedness*, providing an overview of the diverse ways in which this construct has been operationalized in ASRH research. However, some sub-constructs, most notably those related to family relations, have received greater study than others and the next logical step would be to assess the strength of these effects. Third, we did not include *no association* findings in our standard of evidence, although in several cases a substantial number of findings fell into this category. It is possible that these findings are real, that is, there is no association between the *connectedness* sub-constructs and ASRH outcomes for some sub-groups of youth. Yet it is also possible that many of the *no association* findings were related to inadequate sample size or use of multivariate methods that may have masked indirect effects. This is indicated by the multiple occasions in which bivariate results that

were available demonstrated significant associations that were no longer significant at the multivariate level. Future research is needed to address these questions. A final limitation was that the review was limited to a systematic, descriptive literature review rather than a meta-analysis. Given the multiple constructs, lack of standardization of measures, multiple outcomes, and lack of prior reviews examining a comprehensive array of *connectedness* sub-constructs, a broader, more inclusive approach was deemed valuable, that is, one that included promising leads and described the full range of relevant research. There are precedents for this approach in the published data [200, 201]. Further, a key finding from the review is that the published data are relatively sparse in terms of the numbers of studies that examined comparable outcomes and used comparable measures. Focusing the papers on the small body of research for which meta-analyses could be conducted would have severely restricted the ability to describe the broader body of the published data, identify ways that future research can be strengthened, and provide guidance for intervention development.

## Conclusions

This review indicates that *connectedness* can be a protective factor for responsible ASRH outcomes. PYD programs that provide supportive relationships with pro-social adults, a sense of belonging, and appropriate structure may have a positive effect on sexual and reproductive health, as well as other youth outcomes. Furthermore, integration of family, school, and community efforts in PYD programs may provide a synergy to enhance these effects. There is a critical need for additional measurement studies to develop valid and reliable measures for all youth sub-groups and to conduct further normative and longitudinal research to examine the influence of *connectedness* across the adolescent years. Finally, further research is needed to examine under what circumstances or contexts *peer connectedness* and *partner connectedness* may exert a protective or risk effect.

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