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Review article

Competence as a Predictor of Sexual and Reproductive Health Outcomes for Youth: A Systematic Review

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Abstract To examine the association between ''competence'' and adolescent sexual and reproductive health (ASRH) outcomes. Competence refers to the development of skills to perform tasks successfully in four areas including social and behavioral, cognitive, emotional, and moral competence. We conducted a systematic review of research published from 1985 through 2007. Inclusion criteria included use of multivariate analyses, a sample size of $\geq$100, publication in a peer-reviewed journal, and measurement of an ASRH outcome. We coded findings as protective, risk, or no association and as longitudinal or cross-sectional. We considered the presence of two longitudinal studies with consistent findings for at least one outcome to be sufficient evidence for a risk or protective association. We identified 77 studies that examined *cognitive competence*, 27 studies that examined *social and behavioral competence*, 12 studies that examined *emotional competence,* and no studies that met inclusion criteria for *moral competence*. The evidence indicated that *cognitive competence* and *social and behavioral competence* can be protective factors for ASRH, with findings from at least two longitudinal studies demonstrating a protective association with an ASRH outcome. Findings across *cognitive*, *social and behavioral* subconstructs and ASRH outcomes were more mixed. There was insufficient evidence to draw conclusions about *emotional* and *moral competence* and ASRH. Helping adolescents to achieve cognitive, social, and behavioral competence may reduce the likelihood of sexual activity and teen pregnancy, and increase contraceptive use. Additional research is needed to examine other outcomes and the generalizability of findings. Published by Elsevier Inc.

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As they become sexually active, adolescents are vulnerable to sexually transmitted diseases (STDs) and unintended pregnancy [1–3]. In the United States, rates of pregnancies, births, and STDs among adolescents continue to present public health challenges due to the health implications associated with these events. Certainly, the increased use of condoms and contraceptives among adolescents would help reduce the effect of sexual risk behaviors on health; however, 2007 national estimates of condom use at last sex (61.5%) and use of birth control pills at last sex (16%) among sexually active adolescents suggest room for improvement [4]. A key public health question is why have our risk-reduction strategies not resulted in uniform reduction in risks and promotion of health? One partial answer to this question may be that risk-reduction strategies do not promote more general developmental competencies that would enable and motivate young people to employ these prevention strategies in their lives.

Positive youth development (PYD) strategies that promote general developmental competence have been seen as an alternative to approaches that promote adolescent health by focusing solely on risk factors [5]. A growing

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amount of research stresses the importance of understanding the role that promotive and/or protective factors play in reducing negative health outcomes for youth, including adolescent sexual and reproductive health (ASRH) outcomes [6–8]. There is some evidence that a PYD approach can be effective for producing long-term behavioral change and ultimately reduction in teen pregnancy and sexually transmitted infection (STIs) [9]. ''Competence'' is one of five categories of developmental outcomes that Pittman et al have identified as being essential to healthy youth development [10]. To date, there has been no comprehensive review of the role this developmental construct plays with regard to ASRH. This systematic literature review investigated the relationship between competence and ASRH outcomes [7].

To operationalize competence, we followed the work of Catalano et al on PYD programs [7] who summarized the many ways PYD had been conceptualized by program developers and advocates. In a review of programs that promote PYD, Catalano et al identified five competence constructs that have been attached with PYD: cognitive, emotional, social, behavioral, and moral competence [7]. PYD has been conceptualized in many ways (e.g., Search Institutes 40 developmental assets) [11] and there are other ways of capturing core competencies in PYD (Guerra and Bradshaw, 2008) [12]. For example, Pittman et al described competence as the development of knowledge and skills across developmental areas (e.g., physical, social, cognitive, emotional) and the application of those skills [10]. We focused our review on the five competence constructs based on definitions developed by Catalano et al [7], which have incorporated many of the overlapping definitions in the field.

Catalano et al identified two subconstructs that describe *cognitive competence*. The first subconstruct represents ''the ability to develop and apply the cognitive skills of self-talk, the reading and interpretation of social cues, using steps for problem-solving and decision-making, understanding the perspective of others, understanding behavioral norms, a positive attitude toward life, and self-awareness'' [7]. The second subconstruct represents academic and intellectual achievement, which includes a specific ''emphasis on the development of core capacities including the ability to use logic, analytic thinking, and abstract reasoning'' [7].

Catalano et al defined *emotional competence* as ''the ability to identify and respond to feelings and emotional reactions in oneself and others'' [7]. In their definition, the authors [7] incorporated Salovey and Mayer's five elements of *emotional competence*, which include knowing one's emotions, managing emotions, motivating oneself, recognizing emotions in others, and handling relationships [13]. Our review includes studies that share characteristics of Tamara Halle's synthesis of the literature on the understanding and regulation of emotion [14]. In her synthesis, understanding of emotion is defined as ''the ability to recognize and label emotions in oneself and others, and the ability to distinguish internal emotional experiences from external emotional expression'' [14]. Additionally, Joseph Durlak proposed a model of health, which included a psychological domain, where measures of competencies (e.g., self-control, impulsivity, coping) were considered indicators of health, and distress measures were considered indicators of problems [15]. Therefore, this study does not include measures of emotional distress (e.g., depression, anxiety, and clinical disorders) as they were considered correlates of competencies predicted by lack or presence of specific emotion awareness and regulation.

Social competence has been defined as ''the interpersonal skills that help youth integrate feelings, thinking, and actions in order to achieve specific social and interpersonal goals'' [7, 16, 17]. Some examples of social competence include communication ability, assertiveness, refusal and resistance, conflict-resolution, and interpersonal negotiation strategies. Social competence refers to interpersonal skills, whereas *behavioral competence* refers to behavior or action. Catalano et al described three dimensions of behavioral competence including nonverbal communication (through facial expressions, tone of voice, style of dress, gesture, or eye contact), verbal communication (making clear requests, responding effectively to criticism, expressing feelings clearly), and taking action (helping others, walking away from negative situations, participating in positive activities) [7]. Although these are distinct constructs, social competence is often measured by behavior; therefore, we have included these two constructs as a single construct in this review.

Moral competence has been defined as ''a youth's ability to assess and respond to the ethical, affective, or social justice dimensions of any situation'' [7]. *Moral competence* has been operationalized in the literature as empathy, having respect for cultural or societal rules and standards, knowing a sense of right and wrong, or having awareness of moral or social justice issues.

These competence constructs represent the development of necessary skills to make healthy decisions, including decisions regarding sex [7]. Many programs seek to build knowledge while enhancing the skills youth have to use that knowledge in the context of relationships [7]. The purpose of this review was to determine the strength and generalizability of evidence for the association between four competence constructs and ASRH. Given the variability in the extent to which each *competence* subconstruct has been studied 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.

Method

Search criteria

We conducted a systematic literature review of nonintervention behavioral research published from 1985 through 2007. Search terms and selection criteria were adapted from a search strategy established by Catalano et al [7]. The search terms for the literature included Boolean

connection terms (e.g., AND, OR, NOT) and truncated word stem variations (e.g., sex*) for *sexual behavior* (e.g., sex, coital, intercourse), *sexual and reproductive health outcomes* (e.g., pregnancy, STD, human immunodeficiency virus), *adolescence* (e.g., youth, teen, high school), and terms for each of the five competence constructs (a list of search terms is provided in the Appendix). 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), Cochran Reviews, Education Resources Information Center (ERIC), Sociological Abstracts, Social Services Abstracts, EMBASE, and Medline. In addition to searching these nine databases, we scanned the reference list of a recent review article to include studies our search may have missed [18].

Inclusion and exclusion criteria

A group of researchers (screening authors included J.B., C.M., and C.L.) screened abstracts that were yielded from the search for inclusion using the following criteria. Studies had to (1) examine an association between a competence construct and an ASRH outcome; (2) have the majority of participants aged 20 or younger at the time of assessment of outcomes; (3) include the general population or youth at risk (incarcerated and parenting teens were included but psychiatric populations were excluded); (4) be published in a peer-reviewed research journal in English; (5) be conducted in the United States, Europe, Australia, or New Zealand; and (6) have an adequate study design. Our standards for adequate study design required that the sample size be more than 100 for quantitative studies (100 for significant findings and 200 for nonsignificant findings) and that multivariate analyses were used in the assessment of the association between the competence construct and ASRH outcomes. Our sample size requirements are the same as those used in similar reviews to ensure that the studies reviewed had sufficient power for statistical analyses [18].

Synthesis of the literature

We summarized articles that met our inclusion criteria and categorized them according to the construct and outcomes assessed. To identify subconstructs, we conducted a qualitative assessment of the literature categorized by constructs. We then identified and tabulated findings by subconstruct and ASRH outcome. We counted findings if they tested a direct association for a group or subgroup between a competence construct and an ASRH outcome. We used the commonly accepted level of statistical significance ($p < .05$) to indicate an association or no association. Because the focus of this review was to assess the direct relationship between competence constructs and ASRH outcomes, we did not include indirect associations in our finding counts for tabulation. We did code indirect associations either based on individual studies interpretation of indirect effects (e.g., Sobel's test of significance). We coded findings as either a protective association, risk association or no association, and as longitudinal (L) or cross-sectional in terms of study design. We also coded findings as either direct or indirect effects. We categorized each reported comparison in which the competence construct did not show a significant association with ASRH outcomes as ''no association.''

Classifying findings

We classified findings as ''protective'' if the presence and/or high score of the competence construct was associated with a decreased ASRH outcome or if the absence and/or low score of the competence construct was associated with increased ASRH outcome. We classified findings as having a ''risk factor association'' if the presence and/or high score of the competence construct was associated with an increased ASRH outcome or if the absence and/or low score of the competence construct was associated with a decreased ASRH outcome. However, for some constructs, measures did not fit into this pattern (e.g., absence of avoidant coping). In these circumstances, we consulted coauthors to make decisions to code associations as either risk or protective. Several studies resulted in multiple findings because they assessed multiple outcomes, used multiple measures to assess the PYD construct, or stratified results by subgroups. In addition, longitudinal studies often reported both longitudinal and cross-sectional findings (i.e., baseline plus follow-up results). The main subgroups of interest in this review included race and/or ethnicity, age, and gender. We tabulated subgroup findings if studies conducted subgroup analyses. We did not tabulate findings in cases in which we identified only an indirect relationship between a competence construct and an ASRH outcome. Instead, we summarized these findings in the narrative and included them in the interpretation of the body of evidence that we considered in this investigation. We discussed indirect effects because such effects are part of more sophisticated causal models that test both mediating and moderating factors for the association between a construct and an ASRH outcome. For each included study, one reviewer coded and summarized study findings a second reviewer cross-checked the findings summary to ensure accuracy of final counts (reviewing authors involved were D.H., J.B., C.M., and C.L.). We did not use two independent raters to code the findings.

We organized findings according to the ASRH outcome measured. ASRH outcome categories are listed in Table 1 and included: *ever had sex*, *recent sex/current sexual activity*, *early sexual debut*, *use of contraception*, *use of condom*, *number of sexual partners*, *frequency of sex*, *sexual risk index*, *contraction of an STI*, *pregnancy/birth*, and *intentions*.

Standard of evidence

We developed a standard of evidence for this study to apply to each group of findings in the review. If findings

Table 1
Sexual health outcome categories for reporting study findings

Category	Outcomes included in the category
Ever had sex	Measures of coital status, abstinence status, sexual experience, and ever engaged in oral, anal, or vaginal sex
Recent sex/current sexual activity	Measures of sex in the past months or current sexual relationships
Early sexual debut	Measures of age of onset and early sexual initiation (based on authors definition)
Use of contraception	Measures of use of hormonal and non-condom contraceptive in the past or present and dual method use
Use of condom	Measures of past or present condom use, unprotected sex in past or present, condom use frequency, safe sex, and refusal of unsafe sex, unless protection/safety is specified as non-condom or dual method
No. sexual partners	Measures of the no. past or present oral, anal, or vaginal sex partners
Frequency of sex	Measures of past or present frequency of oral, anal, or vaginal sex
Sexual risk index	Measures that address multiple sexual health behaviors or outcomes, such as HIV risk behavior or sexual risk taking
Contracted an STI	Measures that used self-reported or clinic-based reports of sexually transmitted infection
Pregnancy/birth	Measures that used self-reported or clinic-based reports of pregnancy, regardless of pregnancy outcome, or birth
Intention	Including measures of intent to have sex, to be abstinent, to use condoms or other birth control, or to achieve any of the behaviors or outcomes listed above

from two or more separate longitudinal studies showed a significant association between a competence subconstruct and at least one ASRH outcome, we considered there to be sufficient evidence of a *protective* or *risk* association. When two or more longitudinal studies revealed significant findings for both a risk *and* protective association, we considered the evidence to be *mixed* and to represent an area where no clear association can yet be determined. The standard of evidence focused on longitudinal rather than cross-sectional research because such studies are able to track change in groups over time, and provide more reliable information about the continuity or discontinuity of associations between subconstructs and behavioral outcomes. Thus, requirement of at least two longitudinal studies ensured at least some evidence of a causal association between the *competence* subconstruct and the behavioral outcome. Further, given the variability in the extent to which each *competence* subconstruct has been studied, the diversity of measures used to assess each subconstruct, and the diversity of ASRH outcomes, a standard of evidence based on two or more longitudinal studies afforded a more inclusionary approach, so as not to overlook associations that may be promising for future research. Thus, this standard of evidence met the need to apply some degree of rigor as well as to make progress in understudied areas of *competence*.

Additional review

The purpose of this review was to identify significant *protective* and *risk associations* between competence constructs and ASRH outcomes. Therefore, we did not factor no-association findings into the standard of evidence. However, we captured no-association findings as they provide important information about the state of research in the field. For constructs that did not meet the standard of evidence, we described longitudinal *and* cross-sectional findings to clarify relationships between subconstructs and outcomes.

To aid in interpretation of mixed findings, we examined the patterns of protective association versus no association findings, to see whether they used different measures and differed by age, sex, or race and/or ethnicity of the study population. In addition, we conducted a follow-up review of bivariate analyses. Bivariate analyses are typically performed to identify which variables qualify for inclusion in a multivariate analysis. Bivariate findings may suggest a protective or risk association between a construct and an ASRH outcome before controlling for other variables, suggesting the potential for mediating relationships.

We addressed generalizability for each construct by examining patterns of findings by race and/or ethnicity, age, and gender. We applied our standard of evidence to generalizability. If findings from two or more separate longitudinal studies showed a significant association between a character subconstruct and at least one ASRH outcome for a specific population, we considered there to be sufficient evidence of a *protective* or *risk* association for that population. Last, we reviewed the psychometrics of measures for findings when available to provide additional information of the quality of each study.

Results

Results are summarized below for the PYD constructs of *cognitive competence*, *emotional competence*, and *social and behavioral competence*. We considered *social competence* and *behavioral competence* findings together as a result of substantial overlap in how they were operationally defined in the literature. We did not identify any studies of the association between *moral competence* and ASRH outcomes that met our inclusion criteria. We summarized longitudinal findings in the text as they relate to our a priori standard of evidence. We identified some inconsistencies among findings where some studies found a protective association and others found no association between a specific competence subconstruct and an ASRH outcome. Where we identified

inconsistencies among findings, we examined patterns across studies for possible explanations (e.g., subgroup differences, measurement differences). However, we found few consistent patterns. An evidence table providing detailed descriptions of each article (e.g., sample characteristics, measures, and findings) is available upon request from the lead author.

Cognitive competence

We identified 77 studies (43 longitudinal and 35 cross-sectional—one study included both longitudinal and cross-sectional analyses) that examined the association between *cognitive competence* and an ASRH outcome. Of these, two studies also examined the indirect effect of *cognitive competence*.

The measures used to assess *cognitive competence* were extremely varied reflecting distinct subconstructs. The majority of studies (n = 65) used indicators of *academic achievement* to assess *cognitive competence*, using measures such as typical grades in school, grade point average, standardized test scores, retention across one or more grades, or highest grade level achieved in school. Ten studies assessed *intelligence quotient* (IQ) using an established measure such as an abridged version of the Peabody Picture Vocabulary Test used in the National Longitudinal Study on Adolescent Health (Add Health) [19–26], the Wechsler Intelligence Scale for Children [27], or the Armed Forces Qualifying Test [28]. Three studies assessed *problem-solving ability* using an established measure, such as the Problem-Solving Inventory [29].

Among studies reporting their data source 55 used youth report only, eight used youth report as well as data from parents, teachers, or school records, and four used school records only. One study reported stability coefficients of self-reported youth data over a 2-year period (.52, for females, .57 for males, both $p < .001$) [30]; another study reported the correlation between youth and parental reports ($r = .61$) [31]. The majority of studies (n = 46) used single items to assess *cognitive competence*. Twenty-five studies used established scales or standardized test scores; three of the 25 reported measure reliability with a Cronbach's alpha (range: 0.70–0.87).

Table 2 shows the findings of direct association between ASRH outcomes and *cognitive competence* stratified by the subconstructs of *academic achievement*, *IQ*, and *problem-solving ability*. Overall, there was sufficient evidence to indicate that *cognitive competence* can be a protective factor for ASRH outcomes with findings from at least two longitudinal studies demonstrating a protective association with three ASRH outcomes (*ever had sex*, *contraceptive use*, and *pregnancy or birth*). However, when findings were examined separately by subconstructs and specific outcomes, results were less consistent. Key findings are summarized later in the text.

Academic achievement

Academic achievement was found to be protective of *ever having had sex* in 16 findings from 11 longitudinal studies [22, 32–41]. One finding from one longitudinal study reported a risk association [42] and 21 findings from eight longitudinal studies reported no association [22, 32, 33, 35, 37, 39, 43, 44]. We did not find apparent differences in the age, gender, or race and/or ethnicity of the study samples between the studies that had protective and no-association findings. Several multiethnic, mixed-gender longitudinal studies [32, 34, 38, 40] showed protective associations for males and females and for White, Black, and Latino youth. Other longitudinal studies reported protective associations for males only [33, 35] or differential associations for racial and/or ethnic subgroups [22, 35, 37, 39]. There were also few differences related to the type of measure used between studies that found protective and no-association findings. Although most longitudinal studies reporting a protective association used youth-reported measures of grades in school, grade point average, or ability in selected subjects, several of the same studies also reported no association findings for different subgroups. Few studies indicating no association reported bivariate analyses; thus, it was not possible to assess whether the effect of academic achievement on *ever having sex* was masked by the inclusion of other variables in the analytic models.

One study reported a risk association between *academic achievement* and *ever having sex* [42]; however, the primary research question focused on the effect of residential mobility on sexual initiation. Although academic achievement was protective of sexual initiation in initial multivariate models, when residential mobility was entered into the final model, youth reporting higher academic achievement were at greater risk for sexual initiation. The authors hypothesized that youth who move to a new school may be welcomed by a low-performing and more sexually active peer group. Thus, higher academically achieving youth who move often may be more likely to initiate sex.

Table 2 indicates that there was sufficient evidence to support the role of *academic achievement* in promoting *contraceptive use*. Four findings from two longitudinal studies indicated a protective association for a sample of White females [36] and for a nationally representative sample of multiethnic females [68]. Findings of no association were related to type of contraceptive. Specifically, Manning et al reported a protective association for contraceptive pill use compared with condom use at first intercourse, and for any contraceptive method use compared with condom use at first intercourse [68]. Similarly, Brewster et al reported a protective association when comparing contraceptive pill use with condom use; however, they reported no association when comparing contraceptive pill use with non-use, contraceptive pill use with other contraceptive use, or other contraceptive use with non-use [36].

Youth reporting higher *academic achievement* seemed less likely to report a *teen pregnancy or birth*. Twenty-seven findings from 13 longitudinal studies [74–86] indicated a protective association. However, 21 findings from six longitudinal studies [31, 76–78, 86, 87] indicated no

Table 2
Number of reviewed studies' findings related to the association between cognitive competence and adolescents' sexual behaviors and intentions

Sexual behaviors by subconstruct	Nature of finding/relationship		
	Protective association	Risk factor association	No association
Academic ability or achievement (34 longitudinal and 31 cross-sectional studies)			
Ever had sex	16[a,b] [22, 32–41] 21[c] [45–48, 51–62]	1[a] [42]	21[a,b] [22, 32, 33, 35, 37, 39, 43–50]
Recent sex/current sexual activity	2[c] [45, 47, 63]		2[c] [45, 50]
Early sexual debut	1[a] [64] 4[c] [6, 29, 65]		6[a] [27, 64] 5[c] [65, 66]
No. partners	2[a] [40]		1[c] [67]
Use of contraception	4[a,b] [36, 68] 5[c] [50, 53, 58, 67, 69]		3[a] [36] 5[c] [45, 47, 50, 70]
Use of condom	1[a] [36] 3[c] [69, 71, 72]		2[a] [36, 47] 4[c] [45, 71, 72]
Frequency of sex	1[a] [30] 3[c] [51, 63]		1[a] [30] 2[c] [60, 67]
Sexual risk index	3[c] [72, 73]		1[c] [72]
Pregnancy/birth	27[a,b] [74–86] 6[c] [67, 88–90]		21[a,b] [31, 76–78, 86, 87] 1[c] [52]
Subtotal	52[a] 45[c]	1[a]	54[a] 21[c]
Intelligence quotient (eight longitudinal and three cross-sectional)			
Ever had sex	4[a,b] [19, 20, 22] 4[c] [19]		4[a,b] [20, 22]
Early sexual debut	1[a] [27]		1[a] [27]
Use of contraception	4[a,b] [23–25]	2[a] [23]	4[a,b] [24, 25]
Use of condom			1[c] [26]
Pregnancy/birth	2[a] [21, 23] 2[c] [28]	1[a] [23]	
Subtotal	11[a] 6[c]	3[a]	9[a] 1[c]
Problem-solving ability (three cross-sectional studies)			
Ever had sex			2[c] [91]
Early sexual debut	1[c] [29]		1[c] [29]
Use of contraception			2[c] [91]
Intentions	1[c] [92]		2[c] [92]
Subtotal	2[c]		7[c]
Total	63[a] 53[c]	4[a] 0[c]	63[a] 29[c]

Note: Numbers in brackets are reference to studies where findings were observed.
[a] Indicates the number of longitudinal findings.
[b] 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).
[c] Indicates the number of cross-sectional findings.

association. The different findings of protective association and no association may be attributed to sample gender, race and/or ethnicity differences, and variation in academic achievement measures used. Regarding gender, protective associations were reported in seven longitudinal studies with female samples [47, 49, 52–55, 58] and two longitudinal studies with male samples [84, 85]; however, Hanson et al found no association in a female-only study among Black and White females [87]. Findings in mixed-gender studies were inconsistent, often related to the type of academic achievement measure used [31, 76–78]. Regarding race and/or ethnicity, eight longitudinal studies [74, 76, 80–85] reported protective associations among multiethnic samples; however, results were not stratified by racial and/or ethnic group. Kasen et al reported no association in a predominantly White sample [31] and Hanson et al reported no association among Black and White females [87]. Regarding measurement, three longitudinal studies [76–78] used multiple measures to assess *academic achievement*, stratified by gender or racial and/or ethnic subgroup, which produced a large number of protective and no-association findings. All three studies showed some protective associations for White, Black, and Latino youth; however, self-reported grades and standardized test scores were more likely to indicate a protective association than measures using parent or teacher report, grade retention, or high school graduation. Examination of

bivariate analyses from longitudinal studies reporting no association indicated inconsistent results; in one study [78], teacher report and grade retention were protective at the bivariate level but did not retain significance in the final multivariate models. In other studies [76, 77, 86], teacher report, grade retention, and high school graduation were not significant at the bivariate or multivariate level.

There were too few longitudinal studies to draw conclusions about associations between *academic achievement* and other ASRH outcomes (*recent sex/current sexual activity*, *early sexual debut*, *number of partners*, *use of condom*, *frequency of sex*, and *sexual risk*).

Intelligence quotient

Table 2 indicates sufficient evidence to suggest that *IQ* can be a protective factor for ASRH outcomes with findings from at least two longitudinal studies demonstrating a protective association with three outcomes: *ever had sex*, *use of contraception*, and *pregnancy*. Regarding *ever had sex*, three longitudinal studies, all analyzing Add Health data, reported four protective findings [19, 20, 22]; however, two of these same studies also reported findings of no association [20, 22]. These inconsistent findings may be explained through examination of sample differences (age, gender, race/ethnicity). When restricting the sample to 13–15-year-olds, Harris et al [20] found a protective association for males only. Bearman and Bruchner [22] found a protective association among Black males only but no association among females or White, Asian, and Hispanic males. Controlling for age, race, physical maturity, and mother's education, Halpern et al [19] found a protective linear association between *IQ* and *sexual initiation* among youth under age 15 and a curvilinear association among youth ages 15–21, such that both youth with very high and very low *IQ* were less likely to have had sex. Bivariate analyses across the three studies produced mixed results, with eight findings reporting a protective bivariate association and two findings reporting no association.

Findings regarding *IQ* and *contraceptive use* were also inconsistent. Three longitudinal studies, all analyzing Add Health data, showed four protective findings and four findings of no association; however, one study also reported two risk association findings. These studies only stratified results by gender; thus, it is not possible to assess the differential effect by age or racial and/or ethnic group. However, the inconsistencies between these findings may have been due to analytical technique and type of outcome. Among 15–19-year-old females, Brückner et al [23] reported a protective linear association between *IQ* and consistent *contraceptive use* versus non-use, and for inconsistent use versus non-use. However, they also reported risk associations for both outcomes when modeling a curvilinear relationship. They concluded that while a higher IQ was associated with an increase in the likelihood of contraceptive use, among youth with the highest IQs, the likelihood decreased. Examining contraceptive use during first sexual relationships, Manlove et al [24] reported a protective association for higher IQ and having ever used a contraceptive among males and females but no association between higher IQ and consistent versus inconsistent contraceptive use. In a separate study, Manlove et al examined contraceptive use among most recent sexual relationships. The authors reported a protective association for higher IQ and contraceptive use among males only; associations for higher IQ and consistent versus inconsistent contraceptive use were nonsignificant for males and females [25].

Regarding *teen pregnancy*, Brückner et al [23] reported both protective and risk-association findings for females based on the type of analytical model (curvilinear vs. linear) similar to that of *IQ* and *contraceptive use* described in the preceding paragraph. Similarly, Jaccard et al [21] reported a protective association using a curvilinear model—both females with lower IQs and females with higher IQs had a reduced risk of pregnancy independent of other factors such as perceived intelligence.

There were too few studies to draw conclusions about associations between IQ and other ASRH outcomes (*early sexual debut*, *use of condom*).

Problem-solving ability

Only three cross-sectional studies [29, 91, 92] examined the association between problem-solving ability and ASRH outcomes (*ever had sex*, *early sexual debut*, *use of contraception*, and *intentions to have sex or use a condom*), producing inconsistent results. Further, we did not identify any longitudinal studies of problem-solving ability and ASRH outcomes; thus, these findings did not meeting our standard of evidence.

Two longitudinal studies supporting the *cognitive competence* subconstruct of academic achievement as a protective factor also examined the *indirect* effects on *pregnancy* and *ever had sex*. Scaramella et al [79] found that adolescents who were more academically competent also had fewer deviant peer relationships in eighth grade, which indirectly influenced the likelihood of experiencing a teen pregnancy. Cavanagh [37] observed a moderating relationship between low academic competence and early pubertal timing among Latinas that increased the risk of sexual initiation 25-fold.

Considering the generalizability of findings, there was sufficient evidence to support a protective association between *cognitive competence* and *ever had sex* and *pregnancy* among males and females. There was also sufficient evidence to support a protective association among White and Black youth for *ever had sex*. However, we found a limited number of studies that examined this association among youth of other racial and/or ethnic groups. With regard to age, there was sufficient evidence to support a protective association among both middle school and high school youth for *ever had sex*, *use of contraception*, and *pregnancy*.

Emotional competence

We identified a total of 12 studies that examined the association between *emotional competence* and an ASRH

outcome. Four studies reported longitudinal findings and 11 reported cross-sectional findings—three studies reported both cross-sectional and longitudinal findings. Four of these studies examined indirect effects.

A review of measures across studies yielded three distinct subconstructs: *self-regulation*, *coping*, and *empathy*. Most studies (n = 11) used multiple-item measures of emotional *self-regulation* (e.g., regulation of effect, attention, and behavior) and included measures of self-control such as the Behavior Problems Index [93] and impulsivity such as the Millon Impulse Control Scale [94]. Two of these studies used measures of impulsivity specifically relating to condom use [95, 96] and one study used a single-item measure [19]. Three studies measured specific *coping* strategies (i.e., approach and/or avoidance coping). Two used multiple item measures of coping [97, 98] such as the Coping Response Inventory–Youth Form [99] and one used a single-item measure [19]. One study used a three-item measure of general *empathy* (i.e., caring about other's feelings) [100]. The majority of studies used self-report data while two studies used parent report [101, 102] and another used teacher report. Of the 9 studies that presented a Cronbach's alpha, the range of scores was .46–.88 with 4 alphas less than .70. Factor analysis was conducted in two studies [101, 103]. Seven studies used scales for which validity had been previously established and two studies reported no validity or reliability information.

Overall, there was insufficient evidence to indicate that *emotional competence* can be a protective factor for ASRH (see Table 3). We did not find two or more longitudinal studies that showed a protective association between any of the *emotional competence* subconstructs and any one ASRH outcome. We did count four findings from two longitudinal studies [101, 103] that showed a protective association for separate ASRH outcomes. We found no evidence of a risk association and five findings from three longitudinal studies that showed no association. Despite the current lack of evidence, these findings may be used to guide future research. We have summarized the key later in the text.

A combination of longitudinal and cross-sectional findings suggested a protective association between *self-regulation* and *ever having had sex*: two findings from one longitudinal study [103], plus three findings from two cross-sectional studies [19, 104]. White and Johnson [103] found a protective association between *self-regulation* and virginity status for both males and females in a predominantly White sample, whereas cross-sectional findings reporting a protective association were derived from samples with mixed ethnicities and both genders [19, 104]. In contrast with White and Johnson, Raffaelli and Crockett did not find an association between *self-regulation* and *ever having had sex* [101]. There are two possible explanations for these inconsistent findings. The samples for each study included different age ranges. To expand, Raffaelli and Crockett [101] assessed 12–13-year-olds at wave 1 and 16–17-year-olds at wave 2, whereas White and Johnson [103] assessed groups of 12-, 15-, and 18-year-olds at wave 1 and 15-, 18-, and 21-year-olds at wave 2. Additionally, Raffaelli and Crockett used a more comprehensive measure of *self-regulation* including indicators of effect, attention, and behavior regulation, whereas White and Johnson used a specific measure of impulsivity. Therefore, the differences in participants' ages and study measures may explain the inconsistencies.

One finding from a longitudinal study supported a protective association between *self-regulation* and both *number of sexual partners* and *overall sexual risk* [101]. However, findings for sexual risk were inconsistent. One finding from a longitudinal study by Cooper et al did not observe a longitudinal direct effect [98]. Cooper et al did observe a cross-sectional finding indicating a protective association between *self-regulation* and sexual risk behaviors. The participants in Cooper et al's study had greater age variation [13–19] than participants in Raffaelli and Crocket's study. Further, Cooper et al measured impulsivity rather than using a more comprehensive measure of *self-regulation*. Another longitudinal study found an indirect association between *self-regulation* and *overall sexual risk* [108]. Specifically, greater *self-regulation* was associated with less substance use, which in turn predicted less *overall sexual risk*.

We found less evidence to support a protective association between self-regulation and other ASRH outcomes. We found two longitudinal studies that indicated no association between *self-regulation* and *condom use* [101, 106]. We also found three cross-sectional findings from three different studies that indicated a protective association between *self-regulation* and *condom use*. DiClemente et al [106] did not find an association between self-regulation and condom use in longitudinal analyses, but they did observe a protective association in cross-sectional analyses. We did not find studies that indicated a protective or risk association between *self-regulation* and *early sexual debut*, *contraceptive use*, *contracting an STI*, or *pregnancy*.

Four studies met inclusion criteria for the *coping* and *empathy* subconstructs. Three studies used a *sexual risk index* outcome to measure sexual health and one study used a single item, *ever having had sex*. In one longitudinal study, Cooper et al found no association between *coping* and *sexual risk* [98]. However, the authors did find an indirect effect of *coping* on *sexual risk* through a higher order factor including general problem behaviors and a cross-sectional finding indicating a protective association between *coping* and *sexual risk* behaviors. Another cross-sectional study observed the same protective association [97]. The longitudinal study conducted by Cooper et al only measured avoidance coping, whereas the cross-sectional study by Steiner et al measured both approach and avoidance coping. In each study, we found protective associations, which indicated that higher levels of approach coping and lower levels of avoidance coping were associated with less sexual risk. We did not find studies that reported testing an association between coping and other sexual health outcomes.

Evans et al conducted a cross-sectional study that included a three-item measure of general *empathy* [100]. The authors

Table 3
Number of reviewed studies' findings related to the association between emotional competence and adolescents' sexual behaviors and intentions by subconstruct

Sexual behaviors by subconstruct	Nature of findings/relationship		
	Protective association	Risk factor association	No-association total
Self-regulation (three longitudinal and nine cross-sectional studies)			
Ever had sex	2[a] [103] 3[b] [19, 104]		1[a] [101] 2[b] [19]
Recent sex/current sexual activity	1[b] [105]		2[b] [104, 105]
Early sexual debut			1[a] [101]
Use of contraceptive			8[b] [103]
Use of condom	3[b] [96, 104, 106]		2[a] [101, 106]
No. sexual partners	1[a] [101]		3[b] [104, 105]
Sexual risk index	1[a] [101] 3[b] [98, 107]		1[a] [98]
Contracted an STI			1[b] [104]
Pregnancy/birth			1[b] [104]
Intentions	2[b] [95, 104]		1[b] [104]
Subtotal	4[a] 12[b]		5[a] 18[b]
Coping (three cross-sectional studies)			
Ever had sex			2[b] [19]
Sexual risk index	3[b] [97, 98]		2[a] [98]
Subtotal	3[b]		2[a] 2[b]
Empathy (one cross-sectional study)			
Sexual risk index	1[b] [100]		3[b] [100]
Subtotal	1[b]		3[b]
Total	4[a] 16[b]		7[a] 23[b]

Note: Numbers in brackets are reference to studies where findings were observed.
[a] Indicates the number of longitudinal findings.
[b] Indicates the number of cross-sectional findings.

found a protective association between empathy and sexual risk behaviors for White males and no association for Black males and White or Black females [100]. No studies that met criteria for inclusion examined the association between empathy and other ASRH outcomes.

Social and/or behavioral competence

A total of 27 studies (eight longitudinal and 19 cross-sectional) were identified that examined the association between social and/or behavioral competence and an ASRH outcome. No studies examined an indirect association.

The measures used to assess *social and behavioral competence* were varied. Most studies (n = 21) assessed levels of *communication with a partner about sex* with multiple-item scales assessing participants' communication with their partner about sexual histories, safe sex practices, and STI knowledge. Although measures of communication with a partner about sex were more general, four studies assessed *assertiveness with a partner* using measures of participants' reports of asking their partner to use a condom or other contraceptive or refusing sexual activity with their partner. Four studies looked at levels of *communication with peers regarding sex*, while two assessed *general social assertiveness*. The measures used within each of these four subconstructs were varied. Three studies used a single item to assess competence, whereas 11 studies used scales and reported the scale's psychometric properties. Of the 10 studies that presented a Cronbach's alpha, the range of scores was .62–.89; 88% of the alphas presented were greater than or equal to .70. Two studies conducted test–retest reliability. Four studies conducted factor analysis, and one referred to the establishment of content validity.

Table 4 shows the findings of direct association between ASRH outcomes and *social/behavioral competence*, including *partner* and *peer communication* and *assertiveness*. Overall, there was sufficient evidence to indicate that *social and behavioral competence* can be a protective factor for ASRH, with findings from at least two longitudinal studies demonstrating a protective association with one ASRH outcome (*use of contraceptive*). However, when we examined findings by subconstructs and specific outcomes, we found less consistent results. We summarized key findings below.

We found adequate evidence to support a protective association between *partner sexual communication* and *contraceptive use* with six findings from four longitudinal studies [24, 25, 111, 112] and five findings from three cross-sectional studies [112–114]. However, we also counted five findings from three longitudinal studies [24, 25, 112] that showed

Table 4
Number of reviewed studies' findings related to the association between social/behavioral competence and adolescents' sexual behaviors and intentions by subconstruct

Sexual behaviors by subconstruct	Nature of findings/relationship		
	Protective association	Risk factor association	No association
Partner sexual communication (six longitudinal and 18 cross-sectional studies)			
Ever had sex		1[a] [109]	
Recent sex/current sexual activity	1[a] [110]		
Early sexual debut			1[a] [109]
Use of contraceptive	6[b,c] [24, 25, 111, 112] 5[a] [112–114]		5[b,c] [24, 25, 112] 4[a] [112, 114, 115]
Use of condom	1[b] [116] 14[a] [110, 117–120, 122–126]		7[a] [109, 117–121]
Sexual risk index	1[a] [127]		1[b] [128]
Contracted an STI			1[a] [110]
Intentions	1[a] [123]	1[a] [109]	
Subtotal	7[b] 22[a]	2[a]	6[b] 13[a]
Partner assertiveness (one longitudinal and three cross-sectional studies)			
Use of condom	1[b] [129] 2[a] [119, 126]		
Intentions	1[a] [130]		
Subtotal	1[b] 3[a]		
Peer sexual communication (four cross-sectional studies)			
Ever had sex	2[a] [131]		1[a] [109]
Early sexual debut			1[a] [109]
Use of contraception	1[a] [131]		
Use of condom	1[a] [121]		2[a] [109, 126]
Pregnancy/birth	1[a] [131]		
Intentions			1[a] [109]
Subtotal	5[a]		5[a]
Social assertiveness (two cross-sectional studies)			
Ever had sex	1[a] [132]		1[a] [132]
Use of condom			3[a] [126, 132]
No. sexual partners			1[a] [132]
Subtotal	1[a]		5[a]
Total	8[b] 31[a]	2[a]	6[b] 23[a]

Note: Numbers in brackets are reference to studies where findings were observed.
[a] Indicates the number of cross-sectional findings.
[b] Indicates the number of longitudinal findings.
[c] 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).

no association. Longitudinal findings for a protective association and no association differed by gender. Specifically, five of the six protective longitudinal associations were found for females only. Two of the five findings of no association were observed for males only. In addition, one cross-sectional study reported two protective findings for females and two no-association findings for males. An examination of bivariate analyses among longitudinal studies with no-association findings showed a protective association between *partner communication* and ever having used contraception but no association with always having used contraception [25]. Two bivariate findings among females [112] showed that while discussion about contraception had a protective association, no association was found when general discussion about sex was measured.

There were very few longitudinal studies to support the association between partner sexual communication and other ASRH outcomes (ever had sex, recent sex/current sexual activity, early sexual debut, use of condom, sexual risk index, contracted an STI, and intentions). There was also insufficient evidence to draw conclusions about the role of partner assertiveness, peer sexual communication, and general social assertiveness in ASRH outcomes.

Discussion

In this review, we found sufficient evidence to support *cognitive competence* and *social/behavioral competence* as predictors of ASRH outcomes (see Table 5). We found protective associations between two *cognitive competence*

subconstructs and ASRH outcomes. *Academic ability or achievement* and *IQ* were associated with delaying sexual initiation (*ever had sex*), increases in the *use of contraceptives*, and decreases in *pregnancy*. One *social and behavioral competence* construct, namely, *partner sexual communication*, was associated with increases in the *use of contraceptives*. The findings for other *cognitive*, *social and behavioral* subconstructs and ASRH outcomes were either inconsistent or had insufficient evidence. There was insufficient evidence to support the association between *emotional competence* and ASRH outcomes, yet the detailed examination of studies in this review shows that positive associations with ASRH outcomes have been demonstrated in both longitudinal and cross-sectional research. No studies were identified that met inclusion criteria for moral competence.

The evidence to support *cognitive competence* and *social and behavioral competence* as protective factors for ASRH outcomes did provide some indication of subgroup difference (see Table 5). *Academic achievement* seems to be protective for both genders and for White, Black, and Latino youth for *ever had sex*, yet for only females regarding *contraceptive use*. Similarly, *academic achievement* was protective for males and females regarding *pregnancy*. Findings for *IQ* indicated a curvilinear relationship for *ever had sex*, *use of contraception*, and *pregnancy*. Specifically, studies indicated that youth with very high and very low IQs were less likely to have had sex and to become pregnant. Findings differed for the association between IQ and contraceptive use. The association between IQ and ever having used a contraceptive were protective for youth with higher IQs. In a curvilinear model, youth with very high IQs were less likely to report consistent contraceptive use. Partner sexual communication findings suggest that the subconstruct has a protective association with *use of contraception* for females only.

Strengths and limitations

There were several strengths of this review. First, the study included a broad search of nine large databases and scans of articles across a wide range of literatures and with a large set of related search terms. The study selection criteria further limited the review and analysis to studies with strong research methodology (i.e., longitudinal, adequate sample size). Our selection criteria included criteria to assess internal validity of existing research while also addressing external validity by discussing the generalizability of findings for each construct. Second, this review included consideration for subconstructs of domains of competence, which helped to organize and interpret the diverse ways in which these constructs have been operationalized in research. We focused on multivariate studies that controlled for a number of other variables in examining the relationship between competence and ASRH. While controlling for potential confounds is a strength, given the mixed findings, we suggest that future research seek to disentangle the causal structure of these variables, modeling direct and indirect pathways from competence to ASRH.

However, there are some notable limitations to this review. Although this study included a broad search, some relevant published studies were probably missed. Some subconstructs have been studied more extensively, such as indicators of *cognitive competence*, while studies of other constructs are more limited (e.g., *self-regulation* in *emotional competence*). Some constructs have a more extensive research history in general, such as indicators of *social and behavioral competence*, yet examinations of their association with ASRH outcomes were limited. Even though we focused on a PYD framework, studies did not always measure actual ''positive'' protective factors. Many study measures focused on risk factors; therefore, we interpreted the absence of risk when associated with an increased ASRH outcome as a protective finding. Some limitations are based on the variety of analytical methods used in studies. For example, although subgroup analyses were informative, they also stretched the limits of sample size, making it sometimes difficult to discern whether a finding of no association was a result of inadequate sample size. In addition, we required multivariate analyses yet there is a potential for variables to mask effects in multivariate models. Our findings are also limited in their generalizability as a function of the generalizability of individual studies reviewed; most of the research included in this study has used selected, nonrepresentative samples of youth.

Although we addressed the quality and diversity of measures used, we consider it a limitation that many studies did not provide adequate psychometric information. Further, some studies used single-item measures or used different respondents (youth, parent, and teacher). We noted measurement differences across findings to address this lack of measure consistency and psychometric weakness in the existing literature which limited our ability to draw definitive conclusions for some constructs. The use of poor measures is likely to mask some of the effects that are the focus of this study. In addition to psychometric limitations, the field needs to consider what strengths might be gained from using multi-informant measures of competencies.

A final limitation was that the review was limited to a qualitative description of the literature rather than a meta-analysis. Given the lack of earlier reviews examining a comprehensive array of *competence* subconstructs, a broader, more inclusive approach was deemed valuable, i.e., one that included promising leads and described the full range of relevant research. There are precedents for this approach in the literature (e.g., Goodson et al 2006, Buhi et al 2007) [133, 134]. Further, a key finding from the review is that the literature is relatively sparse in terms of the numbers of studies that examined comparable outcomes and use 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 literature, identify ways that future research can be strengthened, and provide guidance for intervention development.

Table 5
Summary of key findings for competence subconstructs

Competence subconstruct	Findings	
	Sufficient evidence for protective association	Comments on subgroups and measures
Cognitive competence: Academic ability or achievement	Ever had sex	Protective for males and females Protective for White, Black, and Latino youth
	Use of contraception	Protective for females Insufficient evidence to examine race/ethnicity effects Findings for contraceptive use versus condom use
	Pregnancy/birth	Protective for females and males Insufficient evidence to examine race/ethnicity effects Measures of self-reported grades and standardized test scores more likely than other academic achievement measures to show protective association
Cognitive competence: Intelligence quotient	Ever had sex	Protective for 13–15-year-old males and Black males Linear association for youth aged 15 and younger Curvilinear association for youth aged 15–21
	Use of contraception	Curvilinear association Some evidence of risk association Findings for ever used contraception rather than consistency of contraceptive use
	Pregnancy/birth	Curvilinear association
Social/behavioral competence: Partner sexual communication	Use of contraception	Protective for females

Future implications and conclusions

Our review found a preponderance of cross-sectional research as compared to longitudinal studies. We decided *a priori* not to use cross-sectional findings as part of our standard of evidence but rather to help elucidate potential relationships and trends among these constructs and ASRH outcomes. The large number of cross-sectional studies did not offer convincing evidence alone of a protective association and provided inconsistent results. To clarify further the strength and complex relations between each competence construct and ASRH outcomes, we believe longitudinal research with better measurement of constructs and more sophisticated models of causal structures are needed. Specifically, both the diversity of measures reported and the lack of psychometric information indicate the need for better quality measures with established psychometrics. Improved measures should also aid in providing conceptual clarity for each competence subconstruct (i.e., to provide consistency in how subconstructs are operationally defined such as impulsivity and self-regulation). Further, we suggest the use of longitudinal research, which employs an adequate sample size, examines both direct and indirect effects, and tests causal paths including tests of mediated and moderated associations.

There are some notable implications for future research for some subconstructs. First, there is a need to understand the causal structure of the relationship between *cognitive competence* and ASRH. Although bivariate associations seem to exist, and many of these associations survived as direct effects in multivariate models, more detailed understanding of the factors that mediate or moderate its effect is needed. With regard to *IQ* there is a need for additional research to investigate the apparent curvilinear association with age and health outcomes. There is also a need for further research among Latino, American Indian, and Asian youth to examine associations between *cognitive competence* and ASRH outcomes. Regarding *academic achievement*, there is a need for additional research to examine the potential differential association between youth-reported and parent- or teacher-reported measures. It is possible that the youth's perception of his/her academic ability or ranking is more related to ASRH outcomes than other adults' perceptions. Further research should be conducted to understand how these different measures relate to teen pregnancy and what other factors may mediate their association.

For social and behavioral competence, more research that explores the role of *partner assertiveness*, *peer sexual communication*, and *social assertiveness* are needed. In addition, more research is needed to examine the association between social and behavioral competence and ASRH outcomes other than contraceptive use. Additional longitudinal research that stratifies by gender and/or race is warranted; if the trend in findings for partner sexual communication and contraceptive use continues, it may be that it is only protective for females.

Future intervention research is also critically important (i.e., developing or enhancing strategies to promote ASRH). Given substantial evidence supporting a protective association between *cognitive competence* and ASRH, there is further need for intervention research to examine how best to enhance adolescent academic skills. Several youth development programs reporting positive ASRH outcomes have targeted *cognitive competence* via academic tutoring [135–137]; provision of a social and emotional skills curriculum focusing on problem solving [138]; or efforts to improve

the classroom climate (e.g., the use of more interactive teaching styles [138, 139]). Similarly, given the evidence supporting a protective association between *social and behavioral competence* and ASRH, there is further need for interventions research to examine how best to enhance social and behavioral skills. Several youth development programs reporting positive ASRH outcomes have targeted *social and behavioral competence*. In a review of PYD programs that promote sexual health, Gavin (L. Gavin; unpublished data) identified 15 programs with positive outcomes and each promoted *social competence,* while six also promoted *behavioral competence* outcomes. Programs sought to promote *social and/or behavioral competence* through social skills curricula, group discussions and activities related to social development tasks, and parent training on adaptive behavioral skills. Three studies have also highlighted the potential of early intervention on both *cognitive competence* and *social-behavioral competence*—the High/Scope Perry Preschool Program, the Abecedarian Project, and the Seattle Social Development Project [139, 140, 141] all used systematic curricula during the preschool or elementary school years to enhance cognitive language, social skills, and adaptive behavioral skills, resulting in sustained protective ASRH outcomes in young adulthood.

Although the evidence supporting a protective association between *emotional competence* and ASRH was inconclusive, there is further need for intervention research. Several youth development programs reporting positive ASRH outcomes have targeted *emotional competence* (L. Gavin; unpublished data) including the three programs focused on preschool and elementary school years described in the preceding paragraph. Some examples of strategies successful programs used (L. Gavin; unpublished data) to promote *emotional competence* include anger and stress management, teaching cognitive behavioral skills to increase empathy, stress reduction training, and social and emotional skills curricula. Therefore, research modeling the impact of intervention on mediating factors such as *emotional competence* subconstructs is essential to understand how interventions can promote the development of ASRH.

In summary, this review indicates that *competence* can be a protective factor for ASRH outcomes. PYD programs that provide a safe setting in which youth can learn and use social and cognitive skills may have a positive impact on sexual and reproductive health as well as other youth outcomes. Regarding future research directions, there is a critical need for additional measurement studies to develop valid and reliable measures for all youth subgroups and to conduct further normative and longitudinal research to examine the influence of *competence* across the developmental trajectory, including adolescence.

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Appendix

Boolean Terms

We used the Boolean terms AND, OR, NOT, and parentheses () to search for relevant terms. The AND operator directs a search to find both words that it separates. The OR operator directs a search to find either word that it separates. The NOT operator directs a search to exclude records that contain the word that follows. Parentheses () direct a search to group words or phrases with other operators.

Truncated Word Stems

We used truncated word stems which include variations of key search terms described below followed by an asterisk. This directs a search program to find words which contain the word stem. For example, for sexuality, sex* is a truncated word stem. Searching sex* would yield all terms that contain sex (e.g., sexuality, sexual).

Cognitive Competence Search Terms Included

Academic achievement, academic performance, intelligence (IQ), problem solving, thinking skills, decision making, self awareness, executive function, logical thinking, analytic thinking, abstract reasoning, self talk, planning, critical thinking, and goal setting.

Emotional Competence Search Terms Included

Emotional competence, mental health, adolescent mental health, adolescent self esteem, coping behavior, coping strategies, self awareness, impulse control, persistence, motivation, empathy, compassion, sympathy, self regulation, psychological, well-being, coping, joy, contentment, and love.

Social and Behavioral Competence Search Terms Included

Social competence, social development, social skills, social cues, interpersonal competence, interpersonal problems, psychosocial skills, positive peer groups, adolescent social adjustment, interpersonal coping, communication, conflict-resolution, self regulation, self control, verbal behavior, verbal communication, non-verbal communication, social control, and self-discipline. For moral competence search terms included: moral justice, morality, morals, moral reasoning, moral commitment, moral responsibility, respect, responsibility, honesty, trustworthy, rules, cultural respect, social justice, character development, ethics, values, empathy, altruism, and compassion.