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Development and Validation of the Sexual and Reproductive Empowerment Scale for Adolescents and Young Adults

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Abstract

Purpose: We developed and validated a measure that assesses the latent construct of sexual and reproductive empowerment among adolescents and young adults. A specific measure for this group is critical because of their unique life stage and circumstances, which often includes frequent changes in sexual partners and involvement from parents in decision-making.

Methods: After formative qualitative research, a review of the literature, and cognitive interviews, we developed 95 items representing nine dimensions of sexual and reproductive empowerment. Items were then fielded among a national sample of young people aged 15–24

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Supplementary Data

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years, and those who identified as sexually active completed a 3-month follow-up survey. We conducted psychometric analysis and scale validation.

Results: Exploratory factor analysis on responses from 1,117 participants resulted in the Sexual and Reproductive Empowerment Scale for Adolescents and Young Adults, containing 23 items captured by seven subscales: comfort talking with partner; choice of partners, marriage, and children; parental support; sexual safety; self-love; sense of future; and sexual pleasure. Validation using logistic regression demonstrated that the subscales were consistently associated with sexual and reproductive health information and access to sexual and reproductive health services measured at baseline and moderately associated with the use of desired contraceptive methods at 3-month follow-up.

Conclusions: The Sexual and Reproductive Empowerment Scale for Adolescents and Young Adults is a new measure that assesses young people's empowerment regarding sexual and reproductive health. It can be used by researchers, public health practitioners, and clinicians to measure sexual and reproductive empowerment among young people.

Keywords

Sexual health; Reproductive empowerment; Young people; Adolescents; Young adults; AYA; Scale development; Autonomy; Self-efficacy; Parental support; Sexual safety; Self-love; Sense of future; Sexual pleasure

Many people have their first sexual and reproductive experiences in adolescence and young adulthood [1]. Adolescents and young adults (AYAs), defined here as those aged 15–24 years, have these experiences during a critical time for psychological, social, cognitive, and physical development [2]. During this stage of growth, AYAs create their own identity and establish autonomy, responsibility, and independence. At the same time, they are negotiating interpersonal relationships with peers, friends, parents, and guardians. As described by Bronfenbrenner's Ecological Model [3], individuals are situated within a number of nested environments or systems. Beyond individuals in their immediate environment, AYAs are also impacted by macrolevel factors such as institutions (i.e., media, school, and religious), public policy, community, and social norms. Gender norms are one type of social norm that may impede sexual and reproductive well-being [4,5].

AYAs face multiple barriers to sexual and reproductive well-being. These barriers include lack of autonomy [6], constrained finances [7], restrictions on mobility and movement [8], limited previous life experience and knowledge, reduced access to health care [2], and confidentiality concerns [9]. Their ability to navigate these barriers to avoid unwanted sex or marriage, unintended pregnancy, undesired childbearing, and sexually transmitted infections may depend on their level of sexual and reproductive empowerment. We use Kabeer's definition of empowerment: "the expansion of people's ability to make strategic life choices in a context where this ability was previously denied to them [10]."

Gender inequality is a major determinant of sexual and reproductive health (SRH) outcomes for girls and young women [11]. Research has also found that norms of masculinity that reinforce male power can negatively influence SRH outcomes among boys and young men [12]. In addition, because of social stigma and heteronormative attitudes, AYA who identify

as gay, lesbian, bisexual, or queer/questioning have unique barriers to achieving sexual and reproductive well-being [13]. It is, therefore, essential to understand the relative levels of power among subgroups of AYA to develop appropriate interventions.

Current approaches to improving SRH outcomes among AYA have been limited by a focus on individual behavior with little attention on factors that contribute to this behavior [14]. These studies are often limited by frameworks that assume personal control over sexual and reproductive behaviors. They do not account for the macrolevel factors, such as social norms, that influence one's ability to make strategic life choices [15]. Research consistently demonstrates that empowerment is an important determinant of SRH and well-being [16–18], yet there are no sexual and reproductive empowerment measures specifically for young people. Similarly, measures are available to assess a young person's autonomy and developmental assets [19–21], but these do not incorporate sexual and reproductive topics.

Recognizing that sexual and reproductive empowerment represents many domains, we sought to develop a multidimensional measure that can uniquely assess the latent construct of sexual and reproductive empowerment for AYAs. In addressing the unique characteristics of this age group, we aimed for a measure that is applicable to all genders, sexual identities, and any amount of previous sexual activity. Such a measure would allow us to describe the underlying domains that most contribute to and shape empowerment, as well as to assess the extent to which AYAs are empowered to achieve their desired sexual and reproductive outcomes.

Methods

Our scale development process was guided by published recommendations [22,23] and was conducted in six stages: (1) formative qualitative research; (2) generation of domains, dimensions, and item pool; (3) cognitive interviews; (4) baseline and follow-up survey administration; (5) psychometric analysis; and (6) scale validation. All parts of the study were approved by the Institutional Review Board of the University of California, San Francisco (#14–14064, #16–21267, #18–25005).

Formative qualitative research

To understand how gendered power and roles in intimate partner relationships impact adolescents' sexual and reproductive empowerment, we conducted in-depth interviews with 40 young men and women of diverse race/ethnicities, aged 15–24 years, at UCSF's New Generation Adolescent Health Center in San Francisco, CA. Through these interviews, we aimed to understand the power dynamics between the informant and each of their partners, the level of gendered norms in their relationships, and what factors contributed to each person's level of power in their relationships. We also explored informants' sense of power over their reproductive experiences such as contraceptive use, pregnancy, childbirth, and abortion, and the options they have or would have. The methods and findings from these interviews were published elsewhere [24]. The analyses of these responses were considered when developing the domains, dimensions, and item pool.

Generation of domains, dimensions, and item pool

Next, we sought expert input through formal group sessions conducted with reproductive health researchers and undergraduate students. Sessions focused on domains and dimensions that should be included in an SRE scale. We also conducted a review of sociological and theoretical literature related to gender and power particularly among AYAs [25–30] and existing measures developed for AYAs [19–21,30–41].

We developed draft domains and dimensions that fit under the overarching construct of sexual health and reproductive empowerment (Table 1). We then generated items that fit under each of the dimensions using deductive and inductive methods. Although the focus of the present study was to develop the items and validate them with a diverse sample of U.S. youth, items were developed to be inclusive of a wide range of AYAs in terms of gender identity, sexual orientation, partnership status, sexual activity experience, and other characteristics. The initial item pool was purposely broad—consisting of three to four times as many items as could be included in the final scale. The final goal was to develop a measure that included <20 items to facilitate incorporation into survey instruments or clinical tools.

The initial item pool contained 111 items that aimed to measure 10 domains of sexual and reproductive empowerment. Response choices included a 5-point scale of agreement, ranging from “not at all true” to “extremely true.” In March 2016, we convened a meeting of AYA health experts to add, subtract, and edit the specific items to improve content validity and face validity.

Cognitive interviews

Between May and December 2017, the first author tested the 111 items through cognitive interviews with thirty 15- to 24-year-olds living throughout the U.S. The methods for these interviews are described elsewhere [42]. The interviews informed whether AYAs interpreted the items as intended and ensured that that items were worded at a level that they could understand [43]. The cognitive interviews led to the removal of 16 unclear items, revisions to and additions to the item pool and participant instructions, and reduced the domains from 10 to 9, with two domains (8. education and knowledge/awareness and 9. access to health care) combined into ‘access to information and health care.’ The final item pool included 95 items.

Baseline and follow-up survey administration

We contracted with the National Opinion Research Center at the University of Chicago to recruit and survey the sample using their Ameri Speak Panel. Ameri Speak is a probability-based panel in which households are recruited by random, probability-based selection from a documented sample list (National Opinion Research Center’s National Frame) [44]. Minors (aged <18 years) were recruited via parents enrolled in the panel who had to provide permission for their child’s participation. All AYAs (aged 15–24 years) then provided consent to complete the online survey. The Ameri Speak Panel has previously been used in several health-related studies [45,46].

The baseline survey was implemented in August/September 2018. In addition to the 95-item pool, the survey included questions on participants' sociodemographic characteristics, current sexual activity, and current and desired contraceptive use (including condoms). All participants who reported ever having vaginal sex (defined as a penis in a vagina) at baseline received a follow-up survey 3 months later with questions on contraceptive use and unintended pregnancies in the previous 3 months. Those who had oral or anal sex also received the follow-up survey with the rationale that they may have had vaginal sex by follow-up.

Psychometric analysis

We conducted exploratory factor analysis (EFA) from the responses to the 95 items in the item pool to determine whether separate domains underlie the overall construct of sexual and reproductive empowerment. We first checked the assumption of factorability that items cluster well together into factors by producing a correlation matrix and assessed the presence of correlation coefficients between items $>.3$ [22]. To determine whether the sample was adequate for factor analysis, we conducted the Kaiser–Meyer–Olkin test seeking an acceptable degree of common variance among the variables (values $>.6$) [47]. Participants were retained in the EFA even if they were missing on some scale items as long as they were not missing on all scale items (missingness by item ranged from 3 to 24).

Once the assumptions were reviewed and met, we conducted a three-step EFA process to accommodate the large number of initial items. For all steps of the EFA, we used principal components analysis with oblique (promax) rotation to allow for the naturally occurring correlation between factors and a factor loading threshold of $.4$ as the criterion to retain items. As the number of factors per domain was unknown, we used EFA rather than confirmatory factor analysis. We determined the number of factors to retain within each factor analysis by examining a scree plot [48,49] and by identifying the distinct characteristics of each factor [50].

In the first step of EFA, we analyzed each of the nine domains separately to further refine the items within a domain and reduce the item pool. Conducting EFA by domain allowed for the possibility of additional factors to be extracted if there were secondary factors present. This step generated nine individual scree plots, which we reviewed to determine where the slope dropped. We used this drop point as the criteria for determining the number of factors (and their corresponding items) to retain within each domain.

In the second step of EFA, we included all items retained after the first step together in the analysis. We removed many items at this step to reduce redundancy, prioritize generalizability, and promote consistency with the underlying theory for each domain.

In the last step, to finalize the scale items and test for possible interfactor correlation, we repeated the EFA including only the items that remained in the analysis after the first and second steps. This step of EFA allowed for items to cross-load on other factors across multiple subscales. If they did not cross-load but produced factor loading values higher than the threshold, it would support the inclusion of all the remaining items in the final scale. Once we identified the final items and their parent factors, we calculated the mean, standard

deviation, and range of subscale scores and assessed internal consistency and reliability of subscales. We conducted all analyses in Stata 15.1 SE (Stata-Corp LLC, College Station, TX) and, when possible, used svy commands to incorporate the complex sample design (e.g., probability sampling representative of the U.S. population).

Validation

After the subscales were finalized, we assessed differences by sociodemographic characteristics. To assess validity, we explored whether the SRE subscales were associated with related outcomes in both the baseline and follow-up data separately by gender. We used logistic regression to examine the association between each subscale and two baseline indicators: (1) access to SRH information; and (2) access to SRH services. We chose these baseline indicators for the validation tests because the literature demonstrates strong associations between sexual and reproductive well-being and both indicators [51]. We hypothesized that being more empowered, that is, having greater autonomy, voice, self-efficacy, and social support, may enable a person to seek out information or services about contraception or protection against sexually transmitted infections when needed or wanted. As such, we would also expect to see an association between the SRE scale (and subscales) and both access to SRH information and access to SRH services. Each indicator was developed by summing the responses from five related items with high internal consistency. The indicator of access to SRH information ranged from 0 to 20 (median = 14) and had a Cronbach's alpha score of .80. The indicator for access to SRH services ranged from 0 to 20 (median = 14) and had a Cronbach's alpha score of .78. Then, because these scores were not normally distributed, we dichotomized them at the median.

We then used logistic regression to examine the predictive validity of SRE subscales on desired contraceptive use by gender at follow-up among young women and men who had any type of sex (vaginal, oral, or anal). We chose this inclusive denominator with the understanding that given AYA sexual relationships, those who have had one type of sex may imminently engage in another type regardless of their reported sexual orientation. In addition, this outcome measure was developed to capture desire and aspiration and not necessarily require current contraceptive use or sexual activity. The survey asked all participants, including those not sexually active and those currently using a contraceptive method, "If you could use any birth control method you wanted, what method(s) would you use?" We compared these responses to the method currently used to develop a dichotomous outcome variable. Those who said they did not want to be using a method and were not currently using one were counted as using their desired method. We used logistic regression to test the associations between the seven subscale scores, as well as the full SRE scale score and this outcome.

Results

A total of 3,597 AYAs were invited to complete the baseline survey (489 aged 15–17 years and 3,108 aged 18–24 years). Of the 489 minors invited to complete the survey, 40 did not receive permission from their parent to participate. A total of 1,117 AYAs (31% of those invited) completed the baseline survey.

Participants were racially and ethnically diverse, with 22% identifying as Hispanic and 14% as black or African American (Table 2). One third of participants were aged <18 years, and the sample was almost evenly split by gender, with about 1% reporting nonbinary gender. Just more than half of the participants (53%) had ever had vaginal sex. About 58% of participants reported ever having had any type of sex and, therefore, were eligible for the follow-up survey; 71% of those completed the follow-up survey 3 months after baseline.

After item reduction (Appendix A), the final scale was composed of seven factors or subscales. The correlation matrix for the factors showed only moderate correlation (range: .1–.5), thus supporting the notion that the subscales are generally independent constructs. All subscales had Cronbach's alpha scores >.7, and all items had rotated factor loadings >.5, indicating good internal consistency reliability and robust factor–variable associations. Table 3 presents the final 23 items in the SRE scale, as well as each subscale's Cronbach's alpha score, mean, standard deviation, and range.

Table 4 presents the SRE subscales by sociodemographic characteristics. There were many statistically significant associations between the sample characteristics and the SRE subscales in the expected direction, supporting construct validity of the subscales. Of note, younger participants scored lower on the sexual pleasure subscale (beta = -1.73 ; $p < .001$). Females scored higher on the comfort talking with partner subscale (beta = $.64$; $p = .015$) and scoring lower on the sexual safety subscale (beta = $-.88$; $p = .011$). Nonbinary or transgender AYA also scored lower on the sexual safety subscale (beta = -4.50 ; $p = .022$). Participants identifying as gay/lesbian scored lower on the parental support (beta = -1.66 ; $p = .025$), sexual safety (beta = -1.52 , $p = .008$), and self-love (beta = -1.31 ; $p = .044$) subscales.

To assess how well each of the subscales was associated with the two hypothesized related constructs (access to SRH information and access to SRH services) measured at baseline, we constructed logistic regression validation tests by gender, excluding 15 participants who identified as transgender or nonbinary because of small sample size (Table 5). Among males, three of the seven subscales were significantly associated with one or both of the outcomes. Among females, five of the seven subscales were significantly associated with one or both of the outcomes, although self-love was inversely associated with access to SRH services. The full SRE scale was significantly associated with both outcomes among male and female participants.

The analysis indicates that only the subscale of sexual safety was significantly associated with the desired contraceptive method at follow-up for males, but it was unexpectedly inversely associated (Table 5). Among females, the subscales of sexual safety, comfort talking with partner, and sexual pleasure were significantly associated with the follow-up outcome in the expected direction. Notably among females, a 1-point increase in the full SRE scale was associated with a 6% increase in the odds of using a desired contraceptive method at follow-up (adjusted beta = 1.06 , 95% confidence interval = 1.004 – 1.10 ; $p < .001$).

Discussion

We describe the SRE scale for AYA, a new measure of sexual health and reproductive empowerment for those aged 15–24 years. Supporting validity of the scale, many sociodemographic characteristics had expected associations with subscales. Females scored higher on the communication subscale but lower on the sexual safety subscale. Similarly, younger AYA scored lower on the sexual pleasure subscale, likely because they had less sexual experience than older AYA and/or because it is less socially acceptable for them to voice support for these items.

The baseline validation indicated that the subscales were associated with related constructs. Predictive validity of outcomes at 3 months was less consistently demonstrated particularly among males, but this could be because at follow-up, the model included only those who had ever had any type of sex, reducing the statistical power to reach significant associations. To assess validity, a variety of sexual or reproductive health-related outcomes could have been used. We chose to look specifically at desired contraceptive use over current use, as it better captures choice than current contraceptive use, given that some young people may be using a method they do not want to be using [52,53]. Consistent with principles of empowerment, the ideal outcome is the desired method use, even if that is no method at all [54].

The SRE scale fills a gap in the literature, given the dearth of sexual and reproductive empowerment measures for AYAs. It can be used by researchers and program managers to assess sexual and reproductive empowerment before and after a specific intervention, such as sexuality education programs or skill-building curricula. In addition, it has clinical applicability; AYAs could complete it just before a primary care visit, and the results could aid health care providers in counseling young people (Appendix B provides permissions and administration instructions, and Appendix C provides the final scale items).

In contrast to most of the existing measures, the SRE scale provides an opportunity to assess sexual and reproductive empowerment among boys and men, as well as girls and women. Doing so enabled us to detect the surprising finding that among participants identifying as male, scoring higher on the sexual safety subscale was associated with lower odds of using one's desired contraceptive method at follow-up. This finding may be explained in that while men may feel empowered sexually, they may not have as much control over their desired method use, given the preponderance of female-controlled contraceptive methods.

The assumption underlying existing work has been that boys and men are already empowered or that they are responsible for girls' and women's SRH outcomes. As we and other researchers have shown, boys and men also face barriers to SRH and programs that include boys and men with a gender-sensitive or gender-transformative approach are more effective in producing SRH-related behavior change [55]. Thus, the SRE scale can aid researchers who are developing gender-sensitive and transformative interventions to evaluate the impact of their programs on different dimensions of empowerment by gender.

Ideally, the users of the SRE scale would include all 23 items in their instruments to capture multidimensionality. Because the items are structured similarly, we found that AYAs can

answer all 23 items in <2 minutes on average. Given the comprehensive nature and strong performance of the full 23-item scale, researchers could use the full scale as a composite measure. Nevertheless, the seven subscales are sufficiently independent of each other (with low interfactor correlations), enabling researchers constrained by the number of items to choose specific subscales to include in their instruments and still obtain generally satisfactory performance from those subscales.

We encourage users, particularly those outside the U.S., to adapt, translate, and test items for their specific context. Some users of the measure may be pressured to exclude items deemed sensitive, such as those in the sexual pleasure subscale; however, we recommend including all items and subscales to capture the multidimensionality of the latent construct. In addition, sexual pleasure is consistent with the World Health Organization's definition of sexual health: "Sexual health requires a positive and respectful approach to sexuality and sexual relationships, as well as the possibility of having pleasurable and safe sexual experiences, free of coercion, discrimination and violence" [56]. U.S. based research demonstrates that young people whose sexual desires are supported are more sexually assertive, are more likely to obtain contraceptive methods, and communicate about sexuality [57–59]. Furthermore, experts are urging that sexual pleasure be included in comprehensive sexuality education [60]. Thus, we encourage users to advocate for keeping these items in survey modules.

The measure has a few limitations. First, although items were intended to be universally applicable, they were only validated within a nationally representative U.S. context and thus may not be fully applicable in international contexts. Given the need for measures for young people in the global south, we support testing in a variety of countries after adaptation and translation for local contexts. Second, by using a panel, there may be some selection bias in that AYA (and parents of those aged 17 years) who are more computer-savvy and educated and who likely have greater access to technology, literacy, and willingness to participate in studies may be overrepresented. These characteristics may be associated with acceptability of SRH issues. Research using panels such as Ameri Speak often suffers from low response rates, which may threaten external validity, if people from lower socioeconomic status groups disproportionately decline to participate. Weighting, although not a perfect solution, aims to ameliorate such bias of missing underrepresented groups. In addition, despite such selection bias, we observed substantial variability in the measure. Third, this analysis did not assess measurement invariance—that is, whether observed scores can be meaningfully compared across genders or racial/ethnic groups. For meaningful assessments, one would need larger samples of individuals from each comparison group. Despite the large overall sample, our data set did not have sufficient numbers of individuals from all racial/ethnic groups to conduct this analysis, but future studies should conduct subgroup analyses.

One of the strengths of this scale is that the items can be self-administered in a confidential setting, which may help with disclosure on sensitive topics. In addition, the scale was developed using a large sample size based on a panel of respondents that is representative of young people in the U.S. The sample was racially/ethnically diverse and included gender nonbinary, trans, lesbian, gay, bisexual, and questioning youth.

The results reported here represent the first steps to validate the measure. Next steps will feature replication and testing of its factor structure in new samples using confirmatory factor analysis and item response modeling/item response theory as well as assessments of measurement invariance and multiple group assessment of the broad applicability of its factor structure, once data have been collected in different regions and settings [61].

Sexual and reproductive empowerment is influenced by many complex domains and shaped by a multitude of factors at structural levels. The SRE scale for AYA provides a robust approach to assessing how those structural factors impact individual-level empowerment and its contribution to SRH outcomes. Validated instruments such as these are essential to developing evidence-based solutions that support AYA's reproductive health and well-being.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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IMPLICATIONS AND CONTRIBUTION

Understanding the emotional and socioecological context and influences on adolescents and young adults' lives, particularly as it relates to sexual and reproductive empowerment, are key to improving the delivery of more effectively tailored services. The Sexual and Reproductive Empowerment Scale for Adolescents and Young Adults can help researchers, practitioners, and clinicians ascertain factors that are often overlooked in health research. The scale can also help assess the potential impact of interventions aimed to support young people in achieving their desired contraceptive and pregnancy outcomes. Future research should consider adaptations for global contexts.

Table 1

Initial draft of domains and dimensions in the development of the Sexual and Reproductive Empowerment scale

Domain	Dimensions
1. Bodily esteem, awareness, and autonomy	<ul style="list-style-type: none"> a. Prioritizes one's physical self b. Has body awareness and esteem c. Has a sense of bodily integrity and autonomy/ownership d. Expects sexual activity to be pleasurable
2. Recognition of voice and opinions	<ul style="list-style-type: none"> a. Knows they have a voice b. Knows their own opinions and feels confident expressing them c. Believes their own opinions matter
3. Voice	<ul style="list-style-type: none"> a. Is comfortable expressing opinions to adults, peers b. Is able to voice opinions or speak out even when in the minority c. Feels capable of having an active discussion with a health care provider/being part of decision-making d. Is able to resist pressure from others when they want to
4. Self-efficacy	<ul style="list-style-type: none"> a. Knows what they want/do not want in their sexual and reproductive life b. Feels able to choose if and what they want in their sexual and reproductive life c. Has the freedom to choose intimate partners/spouse d. Has the freedom to determine, choose actions e. Has the ability to contribute to decisions about one's own life
5. Future orientation	<ul style="list-style-type: none"> a. Has ideas/vision of their future life b. Has role models/mentors c. Has thought about (timing of) future reproduction
6. Social support	<ul style="list-style-type: none"> a. Has family who accept and care about you b. Has trusted family/friends to talk to when faced with a problem c. Has family/friends help you when you have a problem d. Has caregivers who trust them e. Has a judgment-free support system f. Has someone to talk to about physical and developmental changes or romantic relationships
7. Safety/protection	<ul style="list-style-type: none"> a. Feels safe in one's environment (home, neighborhood, school) Feels safe in one's daily activities
8. Education and knowledge/awareness	<ul style="list-style-type: none"> a. Has knowledge of basic human rights b. Knows where/how to access health services c. Has information or know where to access information/in control of accessing information d. Knows of some contraceptive methods/condoms e. Is aware of civic engagement
9. Access to health care	<ul style="list-style-type: none"> a. Has access to safe contraception/reproductive health care services b. Has access to safe abortion care if it were needed/ wanted
10. Access to money/resources	<ul style="list-style-type: none"> a. Has access to money/resources when needed b. Has access to an adult who will help when faced with a problem

Table 2

Sample characteristics at baseline, weighted percentages, and frequencies (N = 1,117)

Characteristic	%	n
Age		
15–17	35.8	400
18–19	17.3	194
20–21	18.4	206
22–24	28.5	318
Gender		
Male	49.3	551
Female	49.4	552
Transgender/nonbinary	1.3	15
Sexual orientation		
Heterosexual	81.6	912
Homosexual	5.8	65
Bisexual	10.3	115
Other (asexual/missing)	2.3	26
Race/ethnicity		
Non-Hispanic white	53.9	602
Non-Hispanic black	14.1	157
Hispanic	21.7	243
Non-Hispanic Asian	5.4	60
Non-Hispanic other/multiracial	5.0	56
Education (highest completed)		
Less than high school	41.2	460
High school equivalent	17.5	195
Some college/associate degree	28.5	319
College degree or higher	12.8	143
Employment status		
Full time ^a	28.2	315
Part time	25.5	285
Unemployed, looking	14.3	159
Unemployed, not looking	32.0	358
School status		
Full time	56.9	635
Part time	8.4	94
Not in school	34.7	387
Marital status		
Single	77.2	862
Not married, living with partner	13.4	150
Married	8.0	90

Characteristic	%	n
Separated/divorced	1.4	15
Relationship status		
In a relationship	40.5	453
Not in a relationship	58.8	656
Missing status	.7	8
Ever oral sex		
Yes	52.9	591
No	44.6	498
Don't know	1.5	17
Missing	1.0	11
Ever anal sex		
Yes	22.8	255
No	75.0	837
Don't know	1.1	13
Missing	1.1	12
Ever vaginal sex		
Yes	52.7	589
No	43.8	489
Don't know	1.7	19
Missing	1.8	21

Within variable percentages and ns may not sum to 100 and 1,117, respectively, because of rounding.

^aFull-time employment status includes self-employed and military.

The 23 items and their corresponding rotated factor loadings across the seven subscales of the SRE scale

Factor/ subscale	Alpha	Mean	Standard deviation	Range ^a	n	Item	Rotated factor loading ^b
Comfort talking with partner	.843	9.58	2.57	0–12	1,094	1. If I had a romantic partner, I would feel comfortable talking about whether or not I want to have children with them.	.8843
						2. If I had a sexual partner, I would feel comfortable telling that person if I wanted to use a method to protect against infection or pregnancy, even when they did not want to.	.8752
						3. If I had a romantic partner, I would feel comfortable voicing disagreements with them.	.8289
Choice of partners, marriage, and children	.814	10.18	2.35	0–12	1,103	1. I can freely choose if I get married.	.8845
						2. I can freely choose who I marry.	.8610
Parental support	.832	12.09	3.70	0–16	1,107	3. I have the power to control if and when I have children.	.7776
						1. I have a parent or guardian who would help me with my problems and troubles if I needed.	.8696
						2. I have a parent or guardian who accepts me as I am.	.8615
Sexual safety	.734	11.98	3.25	0–16	1,108	3. I have a parent or guardian who trusts me to make the right decisions.	.8115
						4. I have a parent or guardian who helps me achieve my goals in life.	.6919
						1. I am able to do the things I want to do without worrying about my safety.	.8732
						2. Walking down the street, I feel like my body is my own.	.7715
Self-love	.710	12.32	2.62	0–16	1,100	3. I do not feel afraid that I will be forced to do something sexually when I do not want to.	.6604
						4. I feel safe in my current living situation.	.6067
						1. I like myself.	.8222
						2. I am worthy of love.	.7344
Sense of future	.801	5.00	1.93	0–8	1,111	3. I know my body well.	.6838
						4. My body belongs to me.	.5421
						1. I can imagine what my future will be like.	.8665
						2. I have an idea of how I can eventually reach my goals.	.8327
Sexual pleasure	.745	8.45	2.74	0–12	1,102	1. My sexual needs or desires are important.	.8544
						2. I think it would be important to focus on my own pleasure as well as my partner's during sexual experiences.	.8355
						3. I expect to enjoy sex.	.7074

Factor/ subscale	Alpha	Mean	Standard deviation	Range ^a	n	Item	Rotated factor loading ^b
SRE scale	.880	69.60	12.40	0–92	1,115 ^c	23 items	N/A

N/A = not applicable; SRE = Sexual and Reproductive Empowerment.

^aResponse choices were not at all true, a little true, moderately true, very true, and extremely true.

^bRotated factor loading represents how the item is weighted for each factor and the correlation between the item and the factor.

^cTwo participants excluded because they were missing on all 23 scale items.

Table 4

Unstandardized beta coefficients from multivariable models, by sociodemographic and other characteristics, according to SRE subscales

Subscale of sexual reproductive empowerment scale for adolescents and young adults							
	Comfort talking with partner (n = 1,099)	Choice of partners, marriage, and children (n = 1,114)	Parental support (n = 1,115)	Sexual safety (n = 1,110)	Self-love (n = 1,116)	Sense of future (n = 1,113)	Sexual pleasure (n = 1,112)
Age (years)							
15–17	-.23	-.06	.75	.01	.42	.10	-1.73***
18–19	.89*	-.29	-.24	-.97*	-.17	-.25	-.58
20–21	.44	.67**	.68	.30	.37	.13	.07
22–24 (ref)	-	-	-	-	-	-	-
Gender							
Female	.64*	.30	.06	-.88*	-.10	.03	-.32
Male (ref)	-	-	-	-	-	-	-
Transgender/nonbinary	-1.02	.25	-1.26	-4.50*	-2.54	-1.94	-1.36
Sexual orientation							
Heterosexual (ref)	-	-	-	-	-	-	-
Gay/lesbian	-.84	-.82	-1.66*	-1.52**	-1.31*	-.80	-.19
Bisexual	.15	.22	-.98*	-.29	-.25	-.14	.28
Other (asexual/missing)	-.23	-.81	-.74	1.05	.24	.91	.25
Race/ethnicity							
White, NH (ref)	-	-	-	-	-	-	-
Black, NH	.72	-.11	-.26	-.56	1.71***	.80**	.06
Hispanic	.19	-.25	-.36	-.63	.21	.08	-.10
Asian, NH	.03	-1.57***	-.46	-.62	.39	-.07	-.13
Other/multi, NH	-.03	.27	-.19	-.65	1.03**	.43	-.72
Employment status							
Full time ^a	-.03	-.12	.14	-.24	.20	.17	.30
Part time	.43	-.01	-.43	-.03	-.01	.30	.20
Unemployed, looking	.28	-.67*	-.95*	-.77	.00	-.10	.09

Subscale of sexual reproductive empowerment scale for adolescents and young adults

	Comfort talking with partner (n = 1,099)	Choice of partners, marriage, and children (n = 1,114)	Parental support (n = 1,115)	Sexual support (n = 1,110)	Sexual safety (n = 1,116)	Self-love (n = 1,113)	Sense of future (n = 1,113)	Sexual pleasure (n = 1,112)
Unemployed, not looking (ref)	-	-	-	-	-	-	-	-
School status								
Full time (ref)	-	-	-	-	-	-	-	-
Part time	-.07	-.29	-.82	-.65	-.73*	-.40	-.40	-.58
Not in school	-.15	-.21	-1.15**	-.67	-.65*	-.68**	-.68**	-.29
Relationship status								
In a relationship	.34	.16	-.42	.37	.56*	.74***	.74***	1.09***
Not in a relationship (ref)	-	-	-	-	-	-	-	-
Missing	-2.62	-2.40	-4.53*	-2.57	-2.87	-4.2	-4.2	-2.02

NH = non-Hispanic; SRE = Sexual Reproductive Empowerment.

* Significant at $p < .05$;

** $p < .01$;

*** $p < .001$.

^a Full-time employment status includes self-employed and military.

Table 5

Adjusted odds ratios and 95% confidence intervals from multivariable models with SRE factor/subscale scores and SRE scale with two baseline validation factors (among all respondents) and use of desired contraceptive method at follow-up (among respondents who had ever had any type of sex at baseline), by gender

Factor/subscale	Baseline validation factors						Follow-up outcome					
	Access to sexual and reproductive health information ^d			Access to sexual and reproductive health services ^b			Use of desired contraceptive method			Use of desired contraceptive method		
	Male (n = 550)	Female (n = 546)	p	Male (n = 548)	Female (n = 546)	p	Male (n = 234)	Female (n = 220)	p	Male (n = 234)	Female (n = 220)	p
Comfort talking with partner	1.51 (1.31–1.73)	1.38 (1.19–1.60)	***	1.44 (1.25–1.66)	1.25 (1.08–1.45)	**	1.00 (.84–1.19)	1.32 (1.10–1.57)	**	1.00 (.84–1.19)	1.32 (1.10–1.57)	**
Choice of partners, marriage, and children	1.07 (.90–1.26)	1.07 (.89–1.28)		1.06 (.88–1.28)	1.07 (.90–1.27)		1.16 (.92–1.46)	1.07 (.86–1.33)		1.16 (.92–1.46)	1.07 (.86–1.33)	
Parental support	1.28(1.16–1.41)	1.10(1.02–1.18)	*	.95 (.86–1.06)	1.00 (.91–1.09)		.99 (.88–1.11)	1.08 (.97–1.19)		.99 (.88–1.11)	1.08 (.97–1.19)	
Sexual safety	1.04 (.93–1.16)	1.17 (1.05–1.30)	**	.98 (.86–1.12)	1.18 (1.07–1.30)	***	.81 (.70–.92)	1.14(1.00–1.30)	*	.81 (.70–.92)	1.14(1.00–1.30)	*
Self-love	1.19(1.07–1.32)	.99 (.88–1.11)	***	1.10 (.95–1.27)	.84 (.75–.95)	**	.98 (.81–1.20)	.97 (.85–1.11)		.98 (.81–1.20)	.97 (.85–1.11)	
Sense of future	1.19(1.00–1.41)	1.11 (.94–1.32)		.97 (.81–1.16)	1.25 (1.00–1.57)		1.16 (.95–1.42)	.80 (.60–1.07)		1.16 (.95–1.42)	.80 (.60–1.07)	
Sexual pleasure	.93 (.81–1.08)	.99 (.90–1.08)		1.09 (.94–1.27)	1.35 (1.21–1.49)	***	1.02 (.85–1.22)	1.23 (1.02–1.50)	*	1.02 (.85–1.22)	1.23 (1.02–1.50)	*
SRE scale	1.15(1.12–1.18)	1.10(1.08–1.13)	***	1.07 (1.03–1.10)	1.08 (1.06–1.11)	***	.98 (.95–1.02)	1.06(1.04–1.10)	***	.98 (.95–1.02)	1.06(1.04–1.10)	***

Models do not include 15 participants identifying as transgender or nonbinary gender.

aOR = adjusted odds ratio; CI = confidence interval; SRE = Sexual Reproductive Empowerment.

* Significant at *p* .05;

** *p* .010;

*** *p* .001.

^aItems included in measure: “I feel prepared by the adults in my life to make fully informed sexual decisions.”; “If I had questions about sex, sexually transmitted infections, or methods to prevent pregnancy, I have a trusted adult I could speak with.”; “I feel satisfied with the sexual health education I received in school or through other programs.”; “I have the ability to get to a place to get general health care.”; and “I feel confident about the level of knowledge I have to make choices about my own sexual and reproductive health.”

^bItems included in measure: “If my friend or relative wanted an abortion, I would help or support them.”; “If my friend or relative wanted an abortion, I know where they could go.”; “If my friend or relative wanted a method to prevent pregnancy, I know where they could go.”; “I feel confident that I could get condoms if I wanted to use them.”; and “I would know where to go if I wanted information on how to prevent a pregnancy or an infection.”