Validation of the worry about sexual outcomes scale for use in STI/HIV prevention interventions for adolescent females

Jessica M. Sales¹*, Josh Spitalnick¹, Robin R. Milhausen¹, Gina M. Wingood², Ralph J. DiClemente², Laura F. Salazar¹ and Richard A. Crosby³

Abstract

This study examined the psychometric properties of a new scale to measure adolescents’ worry regarding outcomes of risky sexual behavior (i.e. sexually transmitted infections, including HIV [STI/HIV], and unintended pregnancy). The 10-item worry about sexual outcomes (WASO) scale, resulting in two subscales STI/HIV worry and pregnancy worry, was administered to a sample of 522 African-American female adolescents ranging in age from 14 to 18, residing in the southeast United States and participating in a sexual risk reduction intervention. The WASO demonstrated internal consistency across multiple administrations and yielded satisfactory construct validity. Worry was found to negatively correlate with sexual communication self-efficacy (with a new male partner and a steady male partner), frequency of sexual communication with male partner, attitudes about condom use and social support; worry was positively correlated with perceived barriers to condom use, condom negotiation, locus of control and depression. Overall, the results indicate that the WASO is a reliable and valid measure of assessing adolescents’ worry about STIs, HIV and pregnancy. The WASO represents a brief self-administered instrument that can be easily integrated into sexual risk reduction assessments and interventions. Future studies employing the WASO might consider testing it with more diverse samples in terms of gender, race/ethnicity, age and sexual orientation.

Introduction

Despite innovations in prevention interventions targeting the reduction of risky sexual behavior, a substantial proportion of adolescents and young adults continue to engage in behaviors that increase their risk for contracting and spreading sexually transmitted infections (STIs), including HIV [1–3]. A recent study found that while 47% of high school students had ever had sexual intercourse, 14% of high school students have had sexual intercourse, 14% of high school students have had four or more sexual partners [4]. Moreover, in another study, approximately one-third of sexually active adolescent males and one-half of sexually active adolescent females attending high school reported not using a condom at last intercourse [1]. This pattern of behavior is of heightened concern as the frequency of adolescent sexual intercourse in the United States has increased while the average age of first intercourse has gradually decreased over the last two decades [5, 6].

In the United States, the risk of acquiring an STI among teenagers is higher than among adults [7]. Approximately one-quarter of new STI infections, almost 4 million, are diagnosed among teens [7, 8]; moreover, ~1700 newly diagnosed cases of AIDS were reported in people between the ages 13 and 24 years in 2003 [9]. Indeed, about one-half of all new diagnoses of AIDS occur in people younger than 25

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years, and about one-quarter of these occur in youth under 22 years [10]. One additional consequence of STI/HIV-associated risk behavior (i.e. unprotected vaginal sex) is unplanned pregnancies; each year, ~1 million teens between the ages of 15–19 become pregnant, with the vast majority (78%) of these pregnancies being unplanned [11–13]. Overall, these statistics underscore the need for ongoing sexual health research, specifically evidence-based interventions and evaluations with adolescents.

Researchers have identified gender and racial/ethnic differences with regard to the impact of STIs and HIV on adolescents. For example, compared with males, females are not only more physiologically susceptible to both viral and non-viral STIs, including HIV, but the effects of STIs often are associated with adverse sequelae (i.e. pelvic inflammatory disease), are more problematic to treat and are more costly [14–18]. However, the risk of STI/HIV infection is not uniform among adolescents. One population at markedly higher risk is African-American female adolescents [19, 20].

African-American adolescent females have higher infection rates of Chlamydia and gonorrhea as compared with Caucasian adolescent females [21, 22], with studies reporting that among females aged 15–19 years, African-Americans have almost seven times the rate of Chlamydia when compared with Caucasian females [23]. African-American females are also 23 times more likely than Caucasian women to have AIDS [24]; similarly, African-American adolescent females have been shown to be at greater risk of acquiring HIV/AIDS when compared with Caucasian or Latina adolescent females [15, 25–27]. A recent study of nationally representative data [28], however, found that African-American young adults remain at high risk for acquiring STIs even when their behaviors are normative and without notable risk, a finding that is in contrast to Caucasian young adults whose risk for acquiring STIs increases primarily in the context of risky sex. This finding suggests that among African-Americans, factors beyond sexual behaviors (normative or risky) at the individual level place them at risk for negative outcomes of sexual behavior. Therefore, it is even more imperative that researchers better understand what contributes to the increase in risk associated with adolescent African-Americans beyond just the behaviors themselves. In doing so, interventions can begin to emphasize interpersonal, social and community-based factors that are particularly salient to the African-American community, factors such as knowing/not knowing your partner’s infection status, the stigma associated with asking your partner about his or her sexual history or fears associated with asserting ones self to make healthy sexual decisions.

Although a myriad of factors have been suggested to be associated with adolescent sexual risk taking (e.g. parental monitoring, parental communication and condom negotiation skills), one construct that has begun to receive attention in the theoretical and empirical literature is adolescents’ worry about contracting STIs/HIV or becoming pregnant. For instance, in a study assessing the relationship between anxiety about STIs/HIV and perceived risk for infection among adolescents, STI/HIV worry was significantly correlated with perceived risk for contracting STIs/HIV and not condom use or number of lifetime partners [29]. Additionally, specific to African-American females, ambiguity regarding pregnancy was associated with a likelihood of becoming pregnant [30]. Thus, given that STI and pregnancy are outcomes of risky sexual behavior, we combined both into one scale assessing worry related to these two specific outcomes resulting from sexual risk taking.

From a theoretical perspective, worry is conceptualized as a component of the construct of ‘perceived threat’ [31] and is included in prominent theories such as theory of reasoned action [32, 33] and the health belief model [34, 35]. Following from these theories, individuals who engage in protective practices, such as condom use, will perceive themselves to be at less risk for health-threatening conditions like STIs or HIV thereby decreasing their worry associated with contracting these conditions. Although STI/HIV worry has only recently been used to explore its association with adolescent risky sexual behavior, overall, few efforts have been made to develop and validate a psychometrically sound instrument. Indeed, Sheeran et al. [36] in
their meta-analysis noted that most studies assessing STI/HIV worry only employed a single item to measure this construct, which may not adequately capture the various facets of worry associated with sexual behavior. Further, there were few attempts to demonstrate reliability or validity of these assessment items. Moreover, the studies incorporating STI/HIV worry often did not include ethnically diverse samples.

Thus, given the potential value of worry as one factor associated with adolescents’ sexual risk taking, and the need to curtail the growing STI/HIV epidemic in African-American adolescent females who remain at risk for acquiring STIs/HIV or having unwanted pregnancies even when engaging in presumed safe sexual behavior (see Hallfors et al. [28]), the validation of an instrument assessing worry regarding outcomes of risky sexual behavior is important for its potential utility in the evaluation of STI/HIV prevention programs for high-risk adolescent females. To address this need, this study evaluated the psychometric properties of a scale to measure level of worry regarding the possibility of being infected with STI/HIV or becoming pregnant among African-American adolescent females, a demographically specific population considered at risk for acquiring STIs/HIV and having unplanned pregnancies. For the purpose of this study, worry was defined as the degree of worry an individual associates with either self or partner-specific outcomes, such as STIs, HIV or pregnancy, resulting from engaging in unprotected sexual behavior in the past 6 months.

**Methods**

**Item development**

The worry about sexual outcomes (WASO) scale was developed by two of the authors (R.J.D. and G.M.W.). A review of the empirical literature was conducted to ascertain domains pertinent to worry regarding health consequences resulting from risky sexual behavior. Three topics were frequently noted in the literature with regard to worry pertaining to the sexual outcomes of risky sexual behavior pregnancy, STI and HIV. In addition, five focus groups of African-American adolescent females (N = 40) were conducted to determine whether or not these three topics were indeed worry producing. Health educators specializing in sexual health also evaluated the significance of these three topic areas to adolescent females’ sexual behavior. The results from the focus groups and from the health educator evaluations indicated that these three topic areas were applicable to adolescent females and were relevant to worry stemming from risky sexual behavior, as well as to sexual health. Thus, 18 items were created (all items are available from the authors upon request). To assess face validity, the initial items were submitted to six health educators who had expertise in sexual health among African-American girls. The health educators were asked to evaluate each item in terms of relevance. Fifteen adolescents who met the inclusion criteria (female, sexually active, African-American, 14–18 years of age) were recruited to complete the preliminary version of the measurement tool. Based on their suggestions, the items were revised to enhance reading comprehension. Items were also subjected to computer analyses to determine their reading level. Reliability analyses were conducted and items that seemed to assess the same construct (correlated at the 0.90 level or above) and items that decreased the internal consistency, as assessed by Cronbach alpha, were deleted, leaving a 10-item scale.

**Participants**

The participants in the current study were part of a larger evaluation study of a randomized controlled HIV prevention intervention for African-American adolescent females. The study was conducted at The University of Alabama at Birmingham and their Institutional Review Board (IRB) approved the study protocol prior to implementation. From December 1996 through April 1999, recruiters screened self-identified African-American adolescent girls seeking services at four community health agencies. Eligibility criteria included being: African-American, female, 14–18 years of age and being heterosexually sexually active (reporting penile–vaginal intercourse in the previous 6 months).
Of the 1130 adolescent women screened by recruiters, 53.9\% (N = 609) met eligibility criteria. Participants provided written informed consent. Parental consent was waived by the IRB. Of the eligible adolescents, 86\% (N = 522) agreed to participate in the study. Of these, 271 were in the control arm of the study at baseline, 243 were retained for the 6-month follow-up, and 241 completed the 12-month follow-up assessment.

Data collection

In order to follow the schedule of data collection for the parent study, data collection occurred at baseline and at 6- and 12-month follow-up. Data were collected from two sources, a self-administered survey and a private, personal interview. First, participants completed a self-administered questionnaire assessing sociodemographic information and psychosocial mediators of HIV-preventive behaviors, including the WASO. Subsequently, due to the sensitive nature and complexity of the questions pertaining to sexual behavior, a trained African-American female interviewer administered a quantitative interview that assessed adolescents’ sexual behaviors.

The WASO scale

The WASO is composed of 10 items that assess adolescents’ frequency of worrying about vaginal sexual health outcomes. The items share the same stem: ‘In the past 6 months, how often did you worry that …’. Sample items include (i) you might get the HIV virus, (ii) you might already have the HIV virus, (iii) you might get an STI, (iv) your partner might become infected with an STI and (v) you might get pregnant. See Table I for the full scale. Each item required a response based on a four-point Likert-type scale: 1 (never), 2 (sometimes), 3 (often) and 4 (always). All items were coded so that higher values indicated more frequent worrying about these health outcomes.

Establishing the validity of the WASO

Additional data were collected to determine construct validity of the WASO. Part of determining the construct validity of a measure is to assess concurrent validity. Concurrent validity refers to the degree to which the measure of a construct is related to other measures that, theoretically or empirically, it should be related. To assess concurrent validity for the WASO scale, we tested the relationship between the WASO and measures of constructs previously demonstrated to be related to worry about sexual health outcomes [37, 38]. Specifically, the constructs selected were frequency of sexual communication with partner, sexual communication self-efficacy (boyfriend and new partner), attitudes about condom use, perceived barriers to condom use, sexual negotiation, locus of control, social support and depression. We also selected measures of sexual behaviors that have been shown empirically to be related to WASO such as condom use at last sex, consistent condom use over the previous 30 days over the previous 6 months and frequency of vaginal intercourse in the past 30 days. It was hypothesized that WASO scores would be significantly correlated with these constructs and behavioral outcomes, providing evidence of concurrent validity [37, 38]. Specifically, we hypothesized that the WASO scores would be negatively associated with frequency of sexual communication with partner, sexual communication self-efficacy (boyfriend and new partner), attitudes about condom use, perceived barriers to condom use, condom negotiation, locus of control, social support and depression. We also hypothesized that the WASO scores would be positively associated with perceived barriers to condom use, condom negotiation, external locus of control (i.e. one’s belief that they have little control over their life), depression and frequency of vaginal sex in past 30 days (steady and non-steady partners).

<p>| Table I. Factor structure for the 10-item WASO scale |</p>
<table>
<thead>
<tr>
<th>Factor</th>
<th>Eigenvalue</th>
<th>% of variance</th>
<th>Cumulative %</th>
</tr>
</thead>
<tbody>
<tr>
<td>STI/HIV worry</td>
<td>4.75</td>
<td>47.45</td>
<td>47.45</td>
</tr>
<tr>
<td>Pregnancy worry</td>
<td>1.70</td>
<td>17.02</td>
<td>64.48</td>
</tr>
</tbody>
</table>
Measures

The following measures were used for the selected constructs and behaviors to establish concurrent construct validity of the WASO.

Partner communication scale

The partner communication scale is composed of five items that assess adolescents’ frequency of communicating with a male sex partner [39]. Specifically, adolescents were asked ‘During the past 6 months, how many times have you and your partner discussed: (i) how to prevent pregnancy, (ii) how to use condoms, (iii) how to prevent the AIDS virus, (iv) how to prevent STIs and (v) their male partner’s sex history. Each item required a response based on a four-point Likert-type scale: 0 (never), 1 (sometimes/1–3 times), 2 (often/4–6 times) and 3 (a lot/seven or more times). All items were coded so that higher values indicated more frequent sexual communication. Cronbach’s alpha for the scale was 0.80.

Sexual communication self-efficacy (new partner and boyfriend)

Sexual communication self-efficacy was assessed separately for both a new partner and for a boyfriend by a seven-item scale that used different stems [40]. Sample items included ‘With a new partner (someone you are having sex with for the first time) how hard is it for you to ask how many sex partners he has had?’ and ‘With a boyfriend or steady partner (that you’ve had sex with before) how hard is it for you to ask if he would use a condom?’ Each item was answered with a four-point Likert-type scale: 0 (never), 1 (sometimes/1–3 times), 2 (often/4–6 times) and 3 (a lot/seven or more times). All items were coded so that higher values indicated more frequent sexual communication. Cronbach’s alpha for each administration of the scale was 0.79 (new partner) and 0.81 (boyfriend).

Condom negotiation scale

Adolescent’s perceived fear of negotiating condom use with sexual partners was assessed with the condom negotiation scale [41]. This scale is composed of seven items. The items shared the same stem: ‘I have been worried that if I talked about using condoms, my boyfriend or sex partner would…’ The items were (i) … ignore my request, (ii) … threaten to hit me, (iii) … threaten to leave me, (iv) … swear at me, or call me ugly names, (v) … hit, push or kick me, (vi) leave me and (vii) go out with other girls. Items were answered along a five-point Likert-type response format: 0 (never), 1 (rarely), 2 (sometimes), 3 (most of the time) and 4 (always). All items were coded so that higher values indicated more fear of negotiating condom use. Cronbach’s alpha for the scale was 0.77.

Barriers to condom use

Adolescent’s perceived partner-related barriers to condom use were assessed using the 26-item condom barriers scale [42]. Sample items include ‘My partner won’t use a condom’, ‘I can never find a condom right before sex’ and ‘I get embarrassed to buy condoms or ask for them’. Each item was answered with a five-point Likert-type continuum, ranging from ‘strongly disagree’ to ‘strongly agree’. Responses were coded so that higher scores indicated a greater perception of barriers to condom use. Cronbach’s alpha for the scale was 0.87.

Attitudes about condom use

Adolescents’ attitudes about condoms were assessed with a eight-item scale (modified version of the adolescent condom attitude scale [43]). Sample scale items include (i) people who carry condoms are just looking for sex, (ii) condoms protect against STI’s and (iii) people who carry condoms would have sex with anyone. Each item was measured on a five-point Likert rating scale, with responses ranging from one (very hard) to four (very easy). Responses were coded so that higher scores reflected more positive attitudes about condoms. Cronbach’s alpha for the scale was 0.68.

Locus of control

Locus of control was measured by a six-item scale. Three items referred to general locus of control (e.g. ‘I am not in control of my life’) and three items referred to sex-specific locus of control (e.g. ‘My
boyfriend controls whether or not we have sex.’). Each item was measured on a five-point Likert-type scale, with responses ranging from never to always. Responses were coded so that higher scores indicated an external locus of control. Cronbach’s alpha for the scale was 0.66.

Social support

Perceived social support was assessed with a 12-item scale developed by Zimet et al. [44]. Sample scale items include (i) my family really tries to help me, (ii) I get the emotional help and support I need from my family, (iii) I can talk about my problems with my friends and (iv) I can count on my friends when things go wrong. Adolescents indicated their level of agreement or disagreement with each statement on a five-point Likert rating scale, with responses ranging from one (strongly disagree) to five (strongly agree). Responses were coded so that higher scores reflected higher levels of perceived social support by the adolescent. Cronbach’s alpha for the scale was 0.85.

Depression

Depression was assessed with the eight item, Center for Epidemiological Studies-Depression Scale (CES-D) [45]. The CES-D assesses presence of depressive symptoms in the past 7 days and has been shown to be a valid measure of depression in diverse populations, including African-Americans [46, 47]. Sample items included ‘During the past week I thought my life had been a failure,’ ‘During the past week my sleep was restless’ and ‘During the past week I had crying spells’. Each item was answered with a four-point Likert-type scale with responses ranging from 0 (<1 day) to 3 (5–7 days). Responses were coded so that higher scores indicated higher levels of depressed mood. Cronbach’s alpha for the scale was 0.82.

Condom use

Three measures of condom use were selected. First, condom use during the last episode of vaginal sex with steady and non-steady partner was assessed. Condom use at last sex is an appropriate outcome measure because it is less susceptible to memory error [48]. Participants were asked (i) ‘Did you use a condom the last time you had vaginal sex with your boyfriend or steady partner’ and (ii) ‘Did you use a condom the last time you had vaginal sex with a partner other than your boyfriend or steady partner?’ Response choices were yes (1) or no (0). Second, condom use during the previous 30 days was assessed. This, too, is an adequate measure of condom use as it preserves the ratio nature of the data, as suggested by Crosby [49], by calculating the number of times condoms were used divided by the number of times the participant had intercourse. The participants were asked four items: ‘How many times did you have vaginal sex with your boyfriend or steady partner in the last 30 days?’ and ‘How many times did you have vaginal sex with a partner other than your boyfriend or steady partner in the last 30 days?’ Following this question participants were asked: ‘How many of these times did you use a condom?’ Finally, condom use during the previous 6 months was assessed. Similar to condom use during the past 30 days, the ratio nature of the data was preserved by calculating the number of times condoms were used in the previous 6 months divided by the number of times the participant had intercourse with steady and non-steady partners during that time period. Sample sizes for analyses with non-steady partners were smaller than those for steady partners as fewer participants had non-steady partners during the recall periods.

Frequency of vaginal sex in past 30 days

Frequency of vaginal sex in the past 30 days with both steady and non-steady partners was included as another measure risky sexual behavior. Frequency of vaginal sex in the past 30 days was measured with two items, ‘How many times did you have vaginal sex with your boyfriend or steady partner in the last 30 days?’ and ‘How many times did you have vaginal sex with a partner other than your boyfriend or steady partner in the last 30 days?’

Data analysis

Several sets of statistical analyses were conducted to examine the psychometric properties of the
WASO. Statistical analyses were performed using Statistical Package for the Social Sciences (SPSS) 12.0.1 software. The WASO measure was submitted to a Flesch–Kincaid computer analysis of its readability in order to determine the average reading level of the scale. Principle component factor analysis with varimax rotation was conducted to determine whether separate domains existed within the initial 10-item scale of WASO. Items loading on factors were summed to create subscale scores for the measure. Baseline data for the entire sample (i.e. both intervention and comparison groups) were used for internal consistency analyses, as well as convergent construct validity; however, to avoid possible contamination attributable to participating in the intervention, only the control group data were used for the test–retest reliability analyses. Internal consistency was evaluated for the WASO by computing Cronbach’s alpha for the scale using the entire sample at baseline, 6- and 12-month follow-up. Cronbach’s alpha measures how well a set of items (or variables) measures a single unidimensional latent construct. When data have a multidimensional structure, Cronbach’s alpha will usually be low (closer to 0.00), and when they have a unidimensional structure, the alpha will be high (closer to 1.00). Test–retest correlations were calculated with the control group participants at baseline, 6- and 12-month follow-up periods to explore the extent to which an individual’s score remained consistent across testing periods. At the 6- and 12-month follow-up, 243 and 241 participants were in the control arm of the study, respectively. Concurrent construct validity was assessed by calculating Pearson correlations between the WASO and appropriate measures as a means to examine the degree of association between the WASO and other scales we believed it should or should not be related to.

Results

Sample characteristics
Participants (N = 522) were African-American, female, single (never married) and had a mean age of 16 years [standard deviation (SD) = 1.2]. Most (81%) were enrolled in school full time and were at the appropriate grade level for their age. The remaining participants were equally split between attending school part time and not attending school. The majority (83%) was currently in relationships.

Factor analysis
The WASO was subjected to a principle components factor analysis with Varimax rotation. An a priori criterion for retaining a factor in the solution was an eigenvalue greater than one. Items would be retained in the factor solution if they had communalities of >0.40, factor loadings of >0.50, inter-item correlations of <0.90 and if they did not load on multiple factors or create single-item factors. The 10 items met all factor and item criteria. The factors and their eigenvalues are presented in Table I. Table II presents the individual items that loaded on each factor.

Descriptive statistics
Scores on the total scale ranged from 10 to 40 with a mean score of 16.81 (SD = 6.43). Scale scores
were within the normal range for skewness (skewness statistic = 1.36) and also for kurtosis (kurtosis = 1.58). Scores on the STI/HIV worry subscale ranged from 8 to 32 with a mean score of 15.52 (SD = 5.96), were normally skewed (skewness statistic = 1.35) and within the normal range for kurtosis (kurtosis statistic = 1.45). Scores on the pregnancy worry subscale ranged from 2 to 8 with a mean score of 4.43 (SD = 2.03). pregnancy worry subscale scores were within the normal range for skewness (skewness statistic = 0.48) and kurtosis (kurtosis statistic = −1.07). See Table III for frequency of responses to each scale item.

### Psychometric evaluation

#### Readability

The literacy level based on the Flesch–Kincaid assessment was 5.3, indicating that a person would need to have reached the fifth grade to understand the text. The Flesch Reading Ease score was 79.3 (scores range from 0 to 100, with higher scores indicating the text is easier to read).

#### Internal consistency of the WASO

Cronbach’s alphas for the total measure and the subscales at baseline, 6- and 12-month follow-up are reported in Table IV. Cronbach’s alphas for the STI/HIV worry subscale and the pregnancy worry subscale at all time points indicated the subscales had acceptable reliability (i.e. >0.70, range: 0.71–0.92).

#### Test–retest reliability

While short time intervals are commonly used to assess reliability, a more stringent (conservative) test is the assessment of reliability over a protracted time period. In this case, we assessed reliability over 6-month intervals. Control group baseline scores on the WASO were significantly correlated with scores at 6-month follow-up ($r = 0.38, P < 0.01$) and with scores at 12-month follow-up ($r = 0.27, P < 0.01$). Further, scores at 6-month follow-up were significantly correlated with scores at 12-month follow-up ($r = 0.44, P < 0.01$).

#### Concurrent construct validity

The WASO was correlated significantly with other measures in the predicted direction. Table V displays the correlation coefficients pertaining to these analyses. Specifically, frequency of worry about aversive sexual outcomes was negatively associated with sexual communication self-efficacy (with new partner and steady partner), frequency of sexual communication with partner, negative attitudes about condom use and social support. Additionally, it was positively associated with barriers to condom use, fear of condom negotiation, external locus of control and depression. The STI/HIV worry subscale correlations mirror the findings for the overall scale score. The pregnancy worry subscale was only negatively associated with frequency of sexual communication with partner and positively

<table>
<thead>
<tr>
<th>Item</th>
<th>STI/HIV worry</th>
<th>Pregnancy worry</th>
</tr>
</thead>
<tbody>
<tr>
<td>How often do you worry that you might get the HIV virus?</td>
<td>0.591</td>
<td>0.238</td>
</tr>
<tr>
<td>How often do you worry that you might already have the HIV virus?</td>
<td>0.663</td>
<td>0.197</td>
</tr>
<tr>
<td>How often do you worry that your sex partner may be infected with the HIV virus?</td>
<td>0.791</td>
<td>−0.005</td>
</tr>
<tr>
<td>How often do you worry that your partner may become infected with the HIV virus?</td>
<td>0.799</td>
<td>0.037</td>
</tr>
<tr>
<td>How often do you worry that you might get an STI?</td>
<td>0.796</td>
<td>0.214</td>
</tr>
<tr>
<td>How often do you worry that you might already have an STI?</td>
<td>0.760</td>
<td>0.198</td>
</tr>
<tr>
<td>How often do you worry that your partner may be infected with an STI?</td>
<td>0.869</td>
<td>0.076</td>
</tr>
<tr>
<td>How often do you worry that your partner may become infected with an STI?</td>
<td>0.821</td>
<td>0.163</td>
</tr>
<tr>
<td>How often do you worry that you might get pregnant?</td>
<td>0.225</td>
<td>0.843</td>
</tr>
<tr>
<td>How often do you worry that you might already be pregnant?</td>
<td>0.056</td>
<td>0.882</td>
</tr>
</tbody>
</table>
associated with barriers to condom use, external locus of control and depression. However, note that, while not significant, all other associations with this subscale were in the expected direction. The lack of significance between pregnancy worry and those scales might be because these scales are related to condom use, which is not perceived as necessary for preventing pregnancy if they are using the contraceptive pill. Further, negotiation skills might not be as necessary for preventing pregnancy if using the contraceptive pill because the individual can take care of the risk themselves.

The WASO was negatively correlated with condom use at last vaginal sex with steady partners, condom use during the previous 30 days with steady partners and condom use with steady partner over the previous 6 months. Again, the STI/HIV worry subscale mirrored the findings for the overall scale score. The pregnancy worry subscale was also negatively correlated with aforementioned condom use variables. Additionally, pregnancy worry scores were positively correlated with frequency of vaginal intercourse with steady and non-steady partners in the previous 30 days.

**Discussion**

This study represents one of the first investigations to report the psychometric properties of an instrument designed to assess adolescent females’ worry regarding the adverse outcomes associated with risky sexual behavior (i.e. STIs/HIV and pregnancy). The WASO is a 10-item scale that requires a fifth grade reading level, allowing it to be used with a wide variety of populations. The reliability and validity of this scale was examined among a sample of African-American adolescent females who were assessed at three time points over the course of 12 months. As indicated by its satisfactory internal consistency and significant test-retest reliability at 6- and 12-month follow-up, the WASO demonstrated satisfactory reliability.

Tests for concurrent validity also support the WASO’s construct validity. Limited empirical data exists with regard to the relationship between worry about STI/HIV or pregnancy, specifically, and sexual risk-related factors. However, concurrent validity of the WASO was demonstrated by its significant correlations with sexual risk-related factors.
Validation of the worry about sexual outcomes scale

Table V. Correlations between the WASO and selected measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>Total worry scale</th>
<th>STI/HIV worry subscale</th>
<th>Pregnancy worry subscale</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$r$ ($P$ value)</td>
<td>$r$ ($P$ value)</td>
<td>$r$ ($P$ value)</td>
</tr>
<tr>
<td>Sexual communication self-efficacy (new partner) ($n = 518$)</td>
<td>-0.15 ($P &lt; 0.01$)</td>
<td>-0.16 ($P &lt; 0.01$)</td>
<td>-0.02 ($P = 0.72$)</td>
</tr>
<tr>
<td>Sexual communication self-efficacy (boyfriend) ($n = 518$)</td>
<td>-0.19 ($P &lt; 0.01$)</td>
<td>-0.19 ($P &lt; 0.01$)</td>
<td>-0.05 ($P = 0.24$)</td>
</tr>
<tr>
<td>Partner communication frequency ($n = 519$)</td>
<td>-0.16 ($P &lt; 0.01$)</td>
<td>-0.16 ($P &lt; 0.01$)</td>
<td>-0.09 ($P = 0.03$)</td>
</tr>
<tr>
<td>Attitudes about condom use ($n = 518$)</td>
<td>-0.09 ($P = 0.04$)</td>
<td>-0.09 ($P = 0.04$)</td>
<td>-0.03 ($P = 0.49$)</td>
</tr>
<tr>
<td>Barriers to condom use ($n = 515$)</td>
<td>0.20 ($P &lt; 0.01$)</td>
<td>0.19 ($P &lt; 0.01$)</td>
<td>0.15 ($P &lt; 0.01$)</td>
</tr>
<tr>
<td>Condom negotiation scale ($n = 518$)</td>
<td>0.12 ($P = 0.01$)</td>
<td>0.12 ($P = 0.01$)</td>
<td>0.08 ($P = 0.07$)</td>
</tr>
<tr>
<td>Social support ($n = 509$)</td>
<td>-0.13 ($P &lt; 0.01$)</td>
<td>-0.13 ($P &lt; 0.01$)</td>
<td>-0.04 ($P = 0.38$)</td>
</tr>
<tr>
<td>Locus of control ($n = 513$)</td>
<td>0.21 ($P &lt; 0.01$)</td>
<td>0.21 ($P &lt; 0.01$)</td>
<td>0.10 ($P = 0.02$)</td>
</tr>
<tr>
<td>Depression ($n = 512$)</td>
<td>0.21 ($P &lt; 0.01$)</td>
<td>0.21 ($P &lt; 0.01$)</td>
<td>0.16 ($P &lt; 0.01$)</td>
</tr>
<tr>
<td>Frequency of vaginal sex previous 30 days (steady partner) ($n = 475$)</td>
<td>0.02 ($P = 0.71$)</td>
<td>-0.01 ($P = 0.82$)</td>
<td>0.21 ($P &lt; 0.01$)</td>
</tr>
<tr>
<td>Frequency of vaginal sex previous 30 days (non-steady partner) ($n = 91$)</td>
<td>0.07 ($P = 0.49$)</td>
<td>0.03 ($P = 0.82$)</td>
<td>0.23 ($P &lt; 0.01$)</td>
</tr>
<tr>
<td>Condom use last vaginal sex (steady partner) ($n = 475$)</td>
<td>-0.12 ($P = 0.01$)</td>
<td>-0.10 ($P = 0.03$)</td>
<td>-0.18 ($P &lt; 0.01$)</td>
</tr>
<tr>
<td>Condom use last vaginal sex (non-steady partner) ($n = 91$)</td>
<td>-0.15 ($P = 0.16$)</td>
<td>-0.16 ($P = 0.13$)</td>
<td>-0.17 ($P = 0.10$)</td>
</tr>
<tr>
<td>Condom use vaginal sex previous 30 days (steady partner) ($n = 321$)</td>
<td>-0.15 ($P = 0.07$)</td>
<td>-0.13 ($P = 0.02$)</td>
<td>-0.23 ($P &lt; 0.01$)</td>
</tr>
<tr>
<td>Condom use vaginal sex previous 30 days (non-steady partner) ($n = 49$)</td>
<td>-0.24 ($P = 0.11$)</td>
<td>-0.25 ($P = 0.09$)</td>
<td>-0.04 ($P = 0.78$)</td>
</tr>
<tr>
<td>Condom use vaginal sex previous 6 months (steady partner) ($n = 474$)</td>
<td>-0.12 ($P = 0.01$)</td>
<td>-0.10 ($P = 0.03$)</td>
<td>-0.20 ($P &lt; 0.01$)</td>
</tr>
<tr>
<td>Condom use vaginal sex previous 6 months (non-steady partner) ($n = 89$)</td>
<td>-0.16 ($P = 0.14$)</td>
<td>-0.18 ($P = 0.10$)</td>
<td>-0.16 ($P = 0.14$)</td>
</tr>
</tbody>
</table>

(e.g. sexual communication self-efficacy, barriers to condom use and attitudes about condom use) that have been shown to be related to perceived threat, the construct that has been described to subsume STI/HIV and pregnancy worry [28]. Additionally, the WASO was significantly correlated with measures of sexual behavior, such as condom use and condom negotiation, suggesting that the more one worried about contracting STI/HIV or becoming pregnant, the less likely they were to have used a condom or negotiate using a condom during their most recent vaginal sex or sex within the last 6 months. Also noteworthy is the finding that pregnancy worry scores were positively correlated with frequency of vaginal intercourse with steady and non-steady partners in the previous 30 days. Together, these findings are consistent with the empirical literature, suggesting that those who worry about contracting STIs, HIV or pregnancy are actually engaging in fewer self-protective behaviors (e.g. obtaining an HIV test and negotiating condom use) or safer sex behaviors (e.g. condom use behavior) [51–54]. Overall, the tests of the WASO’s psychometric properties provide empirical support for its use in future investigations of sexual health-related behavior.

Despite the demonstrated utility of the WASO, the interpretation of results is limited in several ways. First, the WASO has only been used with African-American adolescent females. It is unclear whether the findings observed are generalizable to other racial/ethnically diverse populations, males or different age ranges. Second, only low to moderate test–retest reliability coefficients were found for the WASO ($r = 0.38$ between baseline and 6-month follow-up and $r = 0.27$ between baseline and 12-month follow-up). Although we would expect test–retest reliability to decay over time, we conducted a more stringent test–retest reliability assessment of the WASO over six-month time intervals. Given the long follow-up intervals, the observed correlations are satisfactory. As data for this scale validation were collected as part of a larger HIV prevention intervention, data collection time points were established in order to best evaluate the intervention. Future research on the test–retest reliability of the
WASO should also include a shorter time period between administrations. Finally, the scale comprises only 10 items. When considering the totality of items that theoretically likely tap into this component, there may be other aspects of WASO that are relevant but were not included in the WASO. For example, young women may worry about pain associated with intercourse or other physical discomforts associated with sex. However, the brief nature of the WASO may facilitate its use in a variety of research and practice settings.

Implications
Given the evidence that points to a relationship between increased worrying about contracting STI/HIV or becoming pregnant and engaging in high-risk sex practices, the WASO has particular merit in sexual health education and intervention programs. Utilization of the WASO in clinical assessments or observational investigations would help to provide further evidence for the relationships reported in this investigation (i.e. higher worry associated with less consistent condom use and more frequent episodes of vaginal sex). Additionally, the WASO could be advantageous in prevention intervention programs by determining whether increasing safer sex behavior translates into reduced worry about contracting STI/HIV or becoming pregnant. Given that the goal of many sexual health education programs or clinical interventions with adolescents focuses on implementing safer sexual practices (e.g. consistent condom use), which if adopted by the participant should result in the reduction of worry associated with contracting an STI/HIV or becoming pregnant, the WASO could possibly be used as an additional measure to evaluate participants’ change post-intervention. Moreover, given that increased worry was associated with engaging in risky sexual behaviors, the use of the WASO prior to participation in sexual health programs could provide, in addition to other questions assessing sexual attitudes, beliefs and behaviors, a rough proxy for risk both prior to and after intervention. Thus, the use of the WASO in both clinical and research settings has much potential value based on the fact that, to date, it represents the only validated instrument designed to assess worry about contracting STIs/AIDS and becoming pregnant with a specific at-risk population (i.e. African-American adolescent females). Its short length, breadth of questions and easily administered format make it an excellent assessment tool for anyone, clinician or researcher, to utilize.

In summary, in spite of the limitations noted, the present study demonstrates the WASO to be a reliable and valid measure of worry regarding sexual outcomes for African-American adolescent females. Future investigations utilizing the WASO, however, should include samples that are more diverse in terms of race/ethnicity, gender, age and sexual orientation to corroborate and extend its applicability.

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Conflict of interest statement
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References


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