Validity of scales measuring the psychosocial determinants of HIV/STD-related risk behavior in adolescents


Abstract

We examined the content, construct and concurrent validity of scales to assess beliefs and self-efficacy related to adolescents’ sexual risk behavior. We addressed content validity in the scale development process by drawing on literature and theory, and by pre-testing items with focus groups. We used confirmatory factor analysis of two models, an intercourse involvement model and a condom use model, to assess construct validity. The final intercourse involvement model included three scales: norms about sexual intercourse, attitudes about sexual intercourse and self-efficacy in refusing sex. The final condom use model included five scales: norms about condoms, attitudes about condom use, self-efficacy in communicating about and buying/using condoms, and perceived fewer barriers to condom purchase and use than did inconsistent condom users.

Introduction

The evaluation of theory-based health education programs requires valid measurement instruments to assess a program’s impact on the theoretical mediating variables. Failing to develop and use instruments that are valid and reliable can cause spurious findings. We assessed the content, construct and concurrent validity of the Sexual Risk Behavior Beliefs and Self-efficacy (SRBBS) scales that measure psychosocial mediating variables used to evaluate Safer Choices, a high school-based intervention to prevent HIV, STDs and unintended pregnancies. The intervention was developed and evaluated jointly by The University of Texas Center for Health Promotion Research and Development and Education, Training and Research (ETR) Associates, with support provided by the Centers for Disease Control and Prevention.

The Safer Choices intervention is based on Social Cognitive Theory (SCT; Bandura, 1986), social influences models (SIM; McGuire and Papageorgis, 1961; McGuire, 1972; Fisher, 1988) and models of school change (Marsh et al., 1988). The uniqueness of the multiple-component intervention is its focus on school-wide change and the influence of the school environment on student behavior. We evaluated the intervention using a randomized trial in which schools were randomly assigned to either the multiple-component interven-
tion or a control condition. A complete description of the project is published in Coyle et al. (1996).

The psychosocial variables we measured were attitudes, norms, self-efficacy and barriers to condom use. These variables were derived from three theories of behavior that predict sexual risk-taking behavior: Theory of Reasoned Action (TRA; Fishbein and Ajzen, 1975), SCT (Bandura, 1986) and Health Belief Model (HBM; Rosenstock, 1974).

The TRA posits that an individual’s behavior can be predicted by his or her intentions to engage in the behavior, and that attitudes and norms regarding the behavior predict these intentions. Attitudes encompass the perceived consequences of a behavior weighted by the value an individual places on the consequences (positive or negative). Norms consist of the attitudes of important persons (e.g. peers, parents, siblings and teachers) toward the behavior, weighted by the individual’s motivation to comply with each person.

SCT holds that behavior is determined by the interaction of personal, environmental and behavioral influences. It differs from behaviorist learning theories in that it includes a cognitive component. That is, individuals can do more than react to an environmental stimulus; they can form mental representations, and think about the stimulus and their behavior. Self-efficacy, one of the cognitive factors emphasized in this theory, is the individual’s confidence that he or she can carry out a particular behavior.

The HBM predicts an individual’s health-related behaviors from his or her beliefs about the behaviors and their consequences. The four categories of health beliefs considered relevant to health behavior change are perceived susceptibility to the health problem, perceived seriousness of the health problem, perceived barriers to changing behavior and perceived benefits of behavior change. We selected one of these variables, perceived barriers to condom use, for inclusion in the questionnaire because other studies had found it to be related to condom use or the intentions regarding condom use (Basen-Engquist, 1992; Basen-Engquist and Parcel, 1992; Walter et al., 1993) and because it is addressed in the Safer Choices intervention.

Findings in the literature on HIV/STD prevention confirm the importance of attitudes, norms, self-efficacy and barriers to condom use as mediators of behavioral change. Some studies have found relationships between self-efficacy and an HIV risk index incorporating number of partners, risk status of partners and condom use (Walter et al., 1992), and between self-efficacy and condom use (Basen-Engquist and Parcel, 1992; Kasen et al., 1992; Schaalma et al., 1993). Less positive attitudes among teenagers toward teenage sexual activity have been associated with not having sexual intercourse (Romer, et al., 1994), having fewer sexual partners (Basen-Engquist and Parcel, 1992) and with having a low value on an HIV risk behavior index (Walter et al., 1992). Adolescents who use condoms have more positive attitudes about them (Schaalma, et al., 1993).

Perceived norms about adolescents having sex are associated with whether an adolescent has had sex (Basen-Engquist and Parcel, 1992; Walter et al., 1992; Romer et al., 1994). Likewise, adolescents who perceive that social norms support condom use are more likely to use them (DiClemente, 1991; Schaalma et al., 1992; Romer et al., 1994).

The SRBBS scales that we evaluated were developed to measure attitudes, norms, self-efficacy and barriers as they relate to sexual intercourse and condom use. The variables selected for inclusion in the SRBBS scales were based on those in the literature supporting an association with intercourse involvement or condom use as well as those addressed by the Safer Choices intervention.

The objective of our study was to validate the measurement properties of the SRBBS scales among high-school students. Content validity was addressed in developing the questionnaire and is described in Methods. To assess construct validity we used confirmatory factor analysis, which tested the hypothesized factorial structure of the SRBBS scales. The intercourse involvement and condom use models that we tested are shown in Figures 1 and 2, respectively. Figure 1 postulates, a priori, the factorial structure for the psychosocial deter-
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Fig. 1. Preliminary intercourse involvement model.

minants of intercourse involvement. This model has a three-factor structure consisting of self-efficacy, norms and attitudes about sexual intercourse. In this model, the double-arrow paths indicate that norms, attitudes and self-efficacy are expected to be significantly correlated, and that the correlation is expected to be positive. A significant correlation is expected between attitudes and norms, because social influences moderate attitude toward a behavior (Fishbein and Ajzen, 1975; Bandura, 1986). The single-arrow paths indicate the items (in the rectangles) that are hypothesized to measure each of the constructs or latent variables (in the ovals). The structure of the condom use model (Figure 2) is slightly more complex than the intercourse involvement model, in part because it includes two measures of self-efficacy: negotiating condom use with a partner (communication), and buying and using condoms. The model also includes perceived barriers to condom use.

As an additional test of construct validity, we made a priori predictions about age and gender differences on the scales and tested these hypotheses (see Figure 3). We assessed concurrent validity by testing hypotheses about the relationships between the psychosocial variables and behavioral variables (having sexual intercourse and condom use).
Methods

Instruments

A team of investigators developed the items for the SRBBS scales using the theories and models cited, empirical research, and other instruments that measured these constructs. The process for instrument development had three stages: (1) generation of items, (2) focus-group testing of the draft instrument and revision, and (3) focus-group testing of the revised instrument and final revision.

The investigative team comprised researchers from the University of Texas Houston Health Science Center, ETR Associates, Intersystems Inc., and the Division of Adolescent and School Health from the Centers for Disease Control and Prevention. All investigators were familiar with the theory and methods to be used in the Safer Choices intervention.

First, the investigative team identified, on the basis of theory and past research, the constructs to be addressed in the intervention and measured in the evaluation. The team then specified relevant content areas within each construct, e.g. self-efficacy in refusing sex and in buying and using condoms. Items addressing the content area within each construct were identified in questionnaires that had been used with adolescent populations (ASHA, 1989; Basen-Engquist and Parcel, 1992; Main et al., 1994). If the investigators could not find an adequate item, they wrote a new one.

We compiled the items in a single questionnaire, which we then administered to six focus groups of adolescents to determine whether the items were understandable. We revised the questionnaire based on focus group feedback, administered it to five more focus groups and then revised it again.

Subjects

We analyzed baseline data (N = 7614) from the Safer Choices project for this study. The data were collected from a random sample of high school classrooms in one large urban school district in Texas and two urban districts in Northern California. The sample included grade 9–12 students.

After deleting subjects that had missing observations on the study variables, the sample was reduced to 6213. Subjects dropped from the analysis due to missing data were more likely to be Hispanic and less likely to be White; the proportion of African-Americans, Asians and other ethnic groups were the same in each group. There were no other demographic differences between subjects who were dropped from the analysis and those who were included. In comparing these two groups on each construct, we found that the students excluded from the analyses perceived more conservative norms and had more conservative attitudes toward sexual intercourse, and that they had lower self-efficacy in communicating about condoms and in condom use. Students who were excluded from the analysis also perceived fewer barriers to condom use than those who were included. There were not significant differences between the groups on other variables.

Assessment of construct validity

Factorial validity

To test the factorial validity of the two models, intercourse involvement and condom use, we employed a series of Confirmatory Factor Analyses, using the LISREL 8 program and procedures (Jöreskog and Sörbom, 1993a). LISREL parameter estimates were obtained with the Weighted Least Squares (WLS) method of estimation because the data were ordinal (i.e. five-point Likert) and the sample size was large enough (n = 6213) to permit this type of estimation.

We evaluated several indices to assess model fit, as no agreed-upon standard exists. The $\chi^2$ test assesses the overall fit of the model to the data; a $\chi^2$ with $P > 0.15$ indicates that the data fit the model well (Hayduk, 1987). However, because sample size affects the magnitude of the $\chi^2$ value, we evaluated the $\chi^2$ statistic in conjunction with examination of other indices of model fit, such as Steiger’s (1990) Root Mean Square Error of Approximation (RMSEA) and the magnitude and distribution of the standardized residuals (Hu and...
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Fig. 2. Preliminary condom use model.

Bentler, 1995). For the RMSEA, a value of 0.05 indicates a good fit and an upper value of 0.08 represents a reasonable error of approximation in the population (Jöreskog and Sörbom, 1993b). In general, standardized residuals greater in absolute value than 2.58 are considered significant (Jöreskog
and Sörbom, 1993a) and a good model is expected to have all but 5% of its residuals within this range (Bollen, 1989). This criterion was relaxed in our study because the size of the residuals can depend on the size of the sample and the method of estimation employed (Hu and Bentler, 1995). Finally, the distribution of the residuals was an appropriate indication of model fit in our study because we had such a large sample size. Normally distributed residuals indicate a good fit (Bollen, 1989; Hu and Bentler, 1995).

We evaluated model modifications using theory and information from the standardized residuals and modification indices. We used $\chi^2$ tests of differences to assess whether significant changes were made to the model by testing a modified hypothesis. Akaike’s Information Criteria (CAIC) measure (Bozdogan, 1987) was also used to compare overall fit between models, with a lower value indicating a better fit.

### Differentiation between groups

To further verify the construct validity of the SRBBS scales, we measured the scales’ ability to differentiate between groups by assessing whether each scale differed as expected by age and gender. All hypotheses that tested group differentiation was determined a priori based on relationships reported in the literature (see Figure 3) and tested using multivariate analysis of variance. Age and gender were included as main effects; a polynomial contrast served to test the main effect of age. Significant multivariate effects were further assessed through univariate analysis of variance.

### Assessment of concurrent validity

To assess concurrent validity of the SRBBS scales, we tested the relationships between the intercourse involvement scales and sexual activity, and between the condom use scales and condom use. We hypothesized that students who had never had sexual intercourse would report attitudes and norms that were less supportive of having sexual intercourse and have higher self-efficacy for refusing sex than those who had experienced sexual intercourse. The same pattern of relationships was hypothesized for the comparison between individuals who had not had sexual intercourse in the past 3 months and those who had. We also hypothesized that consistent condom users (those who used a condom each time they had sexual intercourse in the past 3 months) would score higher on attitudes and norms about condom use, have more communication and condom use self-efficacy, and report fewer barriers to condom use than would inconsistent condom users.

The degree to which the scales of the intercourse involvement and condom use models are related to sexual intercourse and condom use behaviors, respectively, was assessed through multivariate analysis of variance.

### Results

#### Construct validity analysis—factorial validity

Construct validity of the two models—the intercourse involvement model and the condom use model—was tested separately. Examination of the inter-item correlation matrices for the two models indicated that the data were suitable for factor analysis. (The inter-item correlation matrices and additional detail on model testing is available upon request from the first author.)

#### Factorial structure of the intercourse involvement model

The LISREL analyses for the intercourse involvement model are summarized in Table I. The hypothesized measurement model (Model A0) did not provide an adequate fit to the data. The modification indices (MIs) indicated high loadings in the error variance/covariance matrix, which suggested correlated measurement errors between the norm and attitude scales. It appeared that these correlated measurement errors were not associated with random errors, but were related to the format of the items. The items in the norms scale are grammatically identical to those in the attitudes scale. These correlations, then, made theoretical sense so we revised the model (Model A1) to include them and re-tested it.
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Norms about abstinence
H1: Older students will perceive less conservative norms about abstinence than will younger students.
H2: Girls will perceive more conservative norms about abstinence than will boys.

Attitudes about abstinence
H3: Older students will have attitudes less supportive of abstinence than will younger students.
H4: Girls will have attitudes more supportive of abstinence than will boys.

Self-efficacy in refusing sex
H5: Older students will have higher self-efficacy in refusing sex than will younger students.
H6: Girls will have higher self-efficacy in refusing sex than will boys.

Norms about condoms
H7: Older students will perceive norms that are less supportive of condom use than will younger students.
H8: Girls will perceive norms that are more supportive of condom use than will boys.

Attitudes about condoms
H9: Older students will have attitudes less supportive of condom use than will younger students.
H10: Girls will have attitudes more supportive of condom use than will boys.

Self-efficacy in communication
H11: Older students will have higher self-efficacy in communication than will younger students.
H12: Girls will have higher self-efficacy in communication than will boys.

Self-efficacy in condom use
H13: Older students will have higher self-efficacy in condom use than will younger students.
H14: Boys will have higher self-efficacy in condom use than will girls.

Fig. 3. Hypotheses to assess construct validity by testing age and gender differences in norm, attitude, self-efficacy and barriers to condom use scales.

Table I. Confirmatory factor analysis of the intercourse involvement (A0 to A2) and condom use (B0 and B1) models

<table>
<thead>
<tr>
<th>Model</th>
<th>$\chi^2$</th>
<th>Degrees of freedom</th>
<th>$P$ value</th>
<th>RMSEA</th>
<th>Residuals</th>
<th>CAIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>$A_0$</td>
<td>1405.14</td>
<td>24</td>
<td>0.000</td>
<td>0.096</td>
<td>$-24.57$ to $24.82$</td>
<td>1609.56</td>
</tr>
<tr>
<td>$A_1$</td>
<td>530.38</td>
<td>21</td>
<td>0.000</td>
<td>0.062</td>
<td>$-13.92$ to $16.04$ skewed</td>
<td>764.00</td>
</tr>
<tr>
<td>$A_2$</td>
<td>20.32</td>
<td>9</td>
<td>0.016</td>
<td>0.014</td>
<td>$-3.85$ to $2.53$ normal</td>
<td>205.27</td>
</tr>
<tr>
<td>$B_0$</td>
<td>1965.65</td>
<td>121</td>
<td>0.000</td>
<td>0.050</td>
<td>$-26.04$ to $20.40$ highly skewed</td>
<td>2452.37</td>
</tr>
<tr>
<td>$B_1$</td>
<td>438.76</td>
<td>76</td>
<td>0.000</td>
<td>0.028</td>
<td>$-8.85$ to $8.21$ normal</td>
<td>867.08</td>
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</table>

Although we observed a substantial improvement in the fit of the model after including the correlated error terms, the results were again not satisfactory. The modification indices suggested adding a path from NSI3 (norms about multiple partners) to the self-efficacy for refusing sex scale; however, this is theoretically unsound and was not done. Indeed, in prior focus group analyses, we found that items NSI3 and ASI3 (regarding attitudes and norms about multiple partners) were problematic because the teenagers were uncertain about what we were asking. Because of the possibility that these items were
misunderstood or were introducing a new dimension into the model, we eliminated these two items and re-tested the model.

Results of the modified hypothesis are summarized in Table I (see Model A2). All indices for this model were excellent and suggested that this model fit the data very well. The CAIC also indicated that the fit of the model improved with these modifications. Although the $\chi^2$ was significant, it was quite low, especially for such a large sample size. The RMSEA was 0.014 (within the acceptable range). The magnitude of the residuals was slightly higher than the acceptable range of ±2.58 but was considered acceptable given the sample size. Finally, the standardized residuals were normally distributed, indicating the model fit the data very well. Figure 4 is a schematic of the standardized solution for this model with parameter loadings included. As illustrated in Figure 4, correlations among all scales were significant, ranging from moderate to high.

The individual item reliabilities are presented with the path diagram in Figure 4. The item reliabilities indicate the percentage of variance accounted for in each of the items. These item reliabilities were high except for the SER3 parameter. Because SER3 included two concepts—refusing sexual intercourse and negotiating condom use with a partner—we suspect that the low reliability is related to the multidimensional nature of the item.

We also computed Cronbach’s $\alpha$ using the Statistical Package for the Social Sciences (SPSS) to further compare these results with traditional

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**Fig. 4.** Final intercourse involvement model.
methods of estimating scale reliability. These results are presented in Figure 4. The reliabilities for the norm and attitudes scales were high (0.78), while for the self-efficacy scale, reliability was somewhat lower (0.70).

Factorial structure of the condom use model

Before testing the factorial structure of the condom use model, we modified the original hypothesis to include correlated error terms between the norm and attitude scales based on results from the intercourse involvement model. The LISREL analyses are summarized in Table I. The tests of the initial model showed an inadequate fit to the data (Model B0). To better understand this lack of fit, we broke down the model into three components and analyzed them separately. The results indicated that the scale for barriers to condom use did not fit the data very well. This analysis suggested eliminating items BCU4, BCU5 and BCU6. A model with these modifications was tested, and the results of this analysis are summarized in Table I (Model B1). The $\chi^2$ for this model and the magnitude of the standardized residuals were still large and indicated that the model did not fit the data very well. However, the RMSEA and the distribution of the standardized residuals indicated that the model did fit the data well. Because the ratio of $\chi^2$ to degrees-of-freedom for this model was fairly high (5.77), the model was recomputed with a smaller sample size ($n = 1000$) to determine if the inflated $\chi^2$ and the magnitude of the standardized residuals were caused by the inadequacy of the model or by the sample size. The $\chi^2$ goodness-of-fit statistic for this smaller sample size model [$\chi^2 (76, n = 1000) = 70.56; P = 0.65$] indicated a good fit to the data.

Figure 5 is a schematic of this revised model. Moderate significant correlations were found between norms and attitudes ($r = 0.63$), norms and self-efficacy in communication ($r = 0.43$), attitudes and self-efficacy in communication ($r = 0.60$), self-efficacy in communication and self-efficacy in buying/using condoms ($r = 0.42$), and self-efficacy in buying/using condoms and barriers to condom use ($r = -0.68$). Finally, a low correlation was observed between self-efficacy in communication and barriers to condom use ($r = -0.23$). All other interfactor correlations were not significant (i.e. $r \approx 0.10$).

The individual item reliabilities are presented with the path diagram in Figure 5. Reliabilities were high for the norms and attitudes scales and were somewhat low for the two self-efficacy scales and the barriers-to-condom-use scale. This indicates lower internal consistency for these scales, which is confirmed by comparing Cronbach’s $\alpha$ among the scales.

Construct validity—group differences

The results of the multivariate analysis of variance indicated that the age [$F(28, 24 472) = 13.96; P < 0.05$] and gender [$F(7, 6115) = 218.83; P < 0.05$] main effects were significant, as was the interaction term [$F(28, 24 472) = 2.30; P < 0.05$]. Results of the post hoc univariate analyses indicated that the age and gender main effects were significant for all dependent variables and that the interaction term was significant for the following constructs: attitudes and norms regarding sexual intercourse, norms about condom use, and self-efficacy in buying and using condoms. All significant interactions indicated that attitudes, norms and self-efficacy were not consistent across age groups for boys and girls. Table II presents the mean differences by age and gender for each construct. Table II shows that all the hypotheses were verified except hypothesis 5. The results showed younger students were found to have higher self-efficacy in refusing sex than older students.

Concurrent validity

The multivariate results indicated that all of the intercourse involvement scales could differentiate between those who were sexually experienced and those who were not [$F(3, 6166) = 714.74; P < 0.05$] and could differentiate between those who were sexually active in the last 3 months and those who were not [$F(3, 6132) = 461.66 P \approx 0.05$]. Post hoc univariate analyses of all scales revealed significant differences between those who were
sexually experienced versus those who were not, as well as between those who had been sexually active in the last 3 months and those who had not. In summary, subjects who never had sex had more supportive attitudes and perceived norms toward not having sex than those who were sexually experienced (see Table III). In addition, those who were sexually experienced had lower self-efficacy in refusing sex than those who were not. We observed in these same findings in comparing those who had engaged in sex within 3 months of the survey and those who had not.

The multivariate analysis for the condom use model scales included only those students who reported having sex within 3 months of the survey, which represented 31% ($n = 1855$) of the total sample. Of these, 34.8% ($n = 646$) were consistent condom users, 57.8% ($n = 1072$) were inconsistent condom users and 7.4% ($n = 137$) did not answer this question. A multivariate comparison of the consistent versus inconsistent condom users on all scales of the condom use model was significant [$F(5, 1712) = 58.69$, $P < 0.05$]. All post hoc univariate analyses were significant, suggesting that attitudes, norms, self-efficacy and barriers to condom use significantly differed between consistent and inconsistent users (see Table IV). Consistent condom users had more positive attitudes toward condom use and perceived norms to be more favorable than did inconsistent users. Higher self-efficacy scores in using condoms and communicating about condom use to a partner were
Table II. Group means and SD on attitudes, norms and self-efficacy scales for intercourse involvement and condom use models

<table>
<thead>
<tr>
<th>Model</th>
<th>Gender</th>
<th>Age</th>
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<tr>
<td>Attitudes a</td>
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<td>F</td>
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</table>
a High scores indicate attitudes supporting abstinence.
b High scores indicate norms supporting abstinence.
c High scores indicate high self-efficacy.

Discussion

Our analyses indicate that the SRBBS scales have good construct validity for measuring attitudes, norms, self-efficacy and barriers related to intercourse involvement and condom use. The models tested using confirmatory factor analysis fit the data well and, with one exception, the scales were associated with demographic and behavioral variables in the expected manner, as predicted by theory and previous research. This study contributes to the literature in that few questionnaires of this type have published data on their validity.
and reliability, including those from which we drew questions.

One strength of the study was its large and diverse sample. For example, five ethnic groups, African-American (16%), Hispanic (28%), Asian (18%), Native American (6%) and White (32%), were represented in the sample. It was also diverse in terms of socioeconomic status; for one such indicator, mother’s education, we found that 17% of the sample reported that their mothers had less than a high school education, 40% reported their mothers graduated from high school but not college, 31% reported their mothers were college graduates and 12% were not sure of their mothers’ education level. Although we have not done a multigroup analysis to determine if the SRBBS scales are equally valid for all ethnic groups, it appears to function well for this sample and thus it is well-suited to evaluate school-based programs that target mixed groups. A limitation of the sample is that only grade 9–12 students were included, thus we have no evidence that the instrument is valid for younger or older populations, or for out-of-school youth. The SRBBS scales are being used with middle-school students in another study; however, data from this research are not yet available.

The SRBBS scales are potentially useful for evaluating psychosocial changes in participants in HIV, STD and pregnancy prevention programs that address condom use and choosing not to have sex as outcomes. They are particularly relevant for evaluating theory-based programs that teach skills for avoiding unprotected sexual intercourse. These include refusal skills and condom negotiation skills.

The scales also can assess programs that use a social influences approach, wherein attempts are made to correct exaggerated perceptions of norms (e.g. ‘everybody’s doing it’) or to actually change norms regarding risk-taking behavior.

Our measurement study has implications for theories of adolescent sexual risk behavior. There was significant overlap in the constructs measured. Although the constructs came from several theories or models, there is correlation among them. This overlap limits the variance that can be accounted for by the psychosocial constructs in the relevant behavioral variables, but a case can be made for including all these constructs despite the overlap. Walter et al. (1993) compared three models (HBM, SCT and SIM) on their prediction of sexual risk-taking intentions. They found that when models are compared, the variables from the social influence model predict the highest proportion of variance in the intention to have sex and the intention to have multiple partners, whereas variables from SCT most successfully predict the intention to use condoms. However, a regression equation including significant variables from all three models (HBM, SCT and SIM) is superior to those using individual models only. This supports the idea of using variables from several theories or models, even when the constructs overlap.

The fact that correlated error terms were required

<table>
<thead>
<tr>
<th></th>
<th>Consistent users ($n = 646$) Mean (SD)</th>
<th>Inconsistent users ($n = 1072$) Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Norms</td>
<td>3.52 (0.64)</td>
<td>3.11 (0.78)</td>
</tr>
<tr>
<td>Attitudes</td>
<td>3.81 (0.41)</td>
<td>3.31 (0.74)</td>
</tr>
<tr>
<td>Self-efficacy (communication)</td>
<td>3.82 (0.32)</td>
<td>3.61 (0.50)</td>
</tr>
<tr>
<td>Self-efficacy (buying/using condoms)</td>
<td>3.60 (0.43)</td>
<td>3.49 (0.49)</td>
</tr>
<tr>
<td>Barriers to condom used</td>
<td>1.62 (0.71)</td>
<td>1.77 (0.79)</td>
</tr>
</tbody>
</table>

*a* High scores are more supportive of condom use

*b* High scores are more supportive of condom use.

*c* High scores indicate high self-efficacy.

*d* High scores indicate low perceived barriers.
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in the intercourse involvement and condom use models makes the models more complex. Although correlated error terms are often considered spurious or sample specific, we believe that in this case they are more stable. As evidence of this, correlated error terms were found in both the intercourse involvement and the condom use models. We attribute these correlated errors to the identical grammatical structure of the items with correlated error (i.e. ‘I believe people my age should wait until they are older before they have sex’ and ‘Most of my friends believe people my age should wait until they are older before they have sex’). Operationalizing the norm and attitude constructs differently would simplify the factorial structure, perhaps by eliminating these correlated errors.

Although, in general, the validity of the scales appears to be good, we have less confidence about the validity and the stability of the barriers-to-condom-use scale. This scale had to be modified significantly from the one used in the original hypothesis (50% of the items were dropped). The results we obtained with this scale, then, may be sample specific. Testing with other samples is needed to further validate the barriers scale.

The scale and item reliabilities were lower for all of the self-efficacy scales than for the attitude and norm scales. The Cronbach’s α for self-efficacy in refusing sexual intercourse was most likely reduced by including a multidimensional item that addressed both refusal to have sexual intercourse and condom use. Future efforts to develop such scales should address only one construct. The internal consistency for self-efficacy in communication and self-efficacy in condom use are marginally acceptable; internal consistency for self-efficacy in refusal of sex is adequate. Users of these scales should be aware that low internal consistency could affect the reliability of research results.

We used three methods of ensuring and testing the validity of the SRBBS scales. The first method ensured content validity by involving an investigative team that was knowledgeable about the content of items under development. These items were then pilot tested among members of the target population. The second method tested the factorial structure of the scales using structural equation modeling to establish construct validity. The third method measured concurrent validity by establishing and testing a priori hypotheses about how the constructs should be related to demographic and behavioral variables. The results of the three methods combined provide a solid base for the validity of the scales and their usefulness in the field of HIV, STD and pregnancy prevention research among adolescents.

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References


