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The Development and Psychometric Assessment of the Adolescent Sexual Coercion Risk Scale

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Abstract

The objective of this study was to develop a psychometric measure of risk for sexual victimization from adolescent peers. Items were generated on the basis of the literature and on consultations with a multidisciplinary group of key informants. The items were administered to a sample of 327 female Grade-9 students and examined using exploratory factor analysis. The Adolescent Sexual Coercion Risk Scale items formed two lower-order factors composed of items regarding signaling sexual boundaries and displaying risk behaviors, respectively. Subsequent confirmatory factor analysis supported the two factors, and preliminary psychometric analyses demonstrated that the factors have satisfactory internal consistency. In addition, low scores on the ability to signal sexual boundaries and high scores on risk behaviors were associated with self-reported peer sexual victimization, supporting the validity of the factors as measures of risk. Future validation and potential usage of the measure are discussed.

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There has been a growing interest in the investigation of sexual assault in adolescent populations (Irwin & Rickert, 2005; Maxwell, Robinson, & Post, 2003). However, risk factors of adolescent female victimization are neither widely studied nor are standard measurements currently available. The present study therefore presents the first attempt to measure risk of peer-perpetrated sexual coercion of adolescent girls.

Adolescent Sexual Victimization

Research has demonstrated that sexual assault is highly prevalent among adolescent peers (Hickman, Jaycox, & Aronoff, 2004; Humphrey & White, 2000; Young, Grey, & Boyd, 2009), with victims reporting a range of physical and mental health consequences following the incident (e.g., Ackard &Neumark-Sztainer, 2002; Banyard & Cross, 2008; Howard & Wang, 2005; Silverman, Raj, Mucci, & Hathaway, 2001). Studies have further shown the need to view adolescents within the broader context of their romantic relationships, as most sexual assaults during adolescence are committed by a boyfriend, date, or acquaintance to the victim (Irwin & Rickert, 2005; Young et al., 2009).

Reviewing the literature on adolescent sexual violence, one of the strongest and most consistently observed risk factors for sexual victimization has shown to be previous victimization (e.g., Gidycz, Coble, Latham, & Layman, 1993; Humphrey & White, 2000; Vézina & Hébert, 2007), and although the link from victimization to revictimization is well established, the underlying mechanisms are not well understood (VanZile-Tamsen, Testa, & Livingston, 2005). In this regard, a recent study has suggested that revictimization depends on intervening experiences and risk factors rather than directly on prior experiences of sexual victimization (Fargo, 2009). As such, factors related to risk-taking behaviors have shown to be critical in relation to increasing a female adolescent's risk of experiencing sexual violence (Fargo, 2009).

Measuring Risk of Sexual Coercion in the Context of Dating

Most studies on sexual risk-taking behaviors in adolescents have exclusively measured variables without regard for the context in which they take place, for instance, age at first sexual intercourse, number of sexual partners, unprotected

sex, and engagement in prostitution (e.g., Fargo, 2009; Fergusson, Horwood, & Lynskey, 1997; Krahé, Scheinberger-Olwig, Waizenhöfer, & Kolpin, 1999).

However, taking the literature on rape prevention into account, Hanson and Gidycz (1993) have developed two of the most sophisticated and widely used measures of date-related sexual risk-taking behaviors in female college populations (Yeater & O´Donohue, 1999). These authors hypothesized that sexual victimization may be the result of an inability to communicate sexual intentions clearly as well as participating in various dating behaviors (Hanson & Gidycz, 1993; Yeater & O´Donohue, 1999). Consequently, Hanson and Gidycz developed the Sexual Communication Survey (SCS) and the Dating Behavior Survey (DBS).

The SCS was designed to assess female college participants' evaluation of the clarity and effectiveness of their communication regarding sexual intentions in dating situations. The scale contains items such as "On the first few dates, if I feel uncomfortable by the man's physical closeness (such as putting his arm around me when I don't want him to), I tell him" (Hanson & Gidycz, 1993). The DBS, on the other hand, was set out to assess various dating behaviors found in the literature to be highly correlated with sexual victimization and includes items such as "I typically consume drugs or alcohol while on a date" (Hanson & Gidycz, 1993).

Both measures have originally been developed to assess behavioral changes or effects of rape prevention programs in female college students and have been employed as such in a range of studies (e.g., Breitenbecher & Gidycz, 1998; Breitenbecher & Scarce, 2001; Gidycz et al., 2001; Gidycz, Rich, Orchowski, King, & Miller, 2006).

Research in college populations has supported the notion that inability to effectively communicate or signal sexual boundaries may present as a risk factor for sexual victimization and revictimization (Van Wie & Gross, 2001; Winslett & Gross, 2008). To signal boundaries, one has to acknowledge personal intentions as well as communicate or signal these either verbally or nonverbally (Winslett & Gross, 2008). Some authors propose that victimization and revictimization are caused by an impaired ability to recognize potentially threatening situations (Breitenbecher, 2001; Norris, Nurius, & Graham, 1999), whereas others argue that victimization and revictimization is the result of inappropriate or ineffective behavioral and verbal responses due to lack of assertiveness skills (e.g., VanZile-Tamsen et al., 2005).

Addressing Risk Factors of Adolescent Sexual Victimization

Though young age has proven to be a strong risk factor of sexual violence (Johnson, Morgan, & Sigler, 2007), studies on factors contributing to sexual victimization have primarily focused on college samples of young adult women

(Livingston, Hequembourg, Testa, & VanZile-Tamsen, 2007). Moreover, risk factors associated with sexual violence have been proposed to function in distinct age-dependent ways (Livingston et al., 2007). Currently, there is no standard measure available that specifically taps into date-related female risk taking in an adolescent population. Reliable measurements of relevant aspects of adolescent risk factors in a peer context are needed to explore the etiology of sexual coercion.

Such measures need to consider the developmental challenges and the contemporary social environment faced by adolescents. For example, many adolescents feel pressured to take part in romantic and sexual relationships (Lacasse & Mendelson, 2007), and in combination with increased sexually explorative behavior, personal boundaries are being explored and challenged (de Bruijn, Burrie, & van Wel, 2006). This developmental period is also, generally, characterized by inexperience of sex and dating (Livingston et al., 2007), in addition to marked difficulties with communicating about sex-related topics (Rosenthal & Peart, 1996).

Limitations of Existing Scales

First and foremost, the SCS and the DBS have originally been developed to target a college audience and have been employed as such. It is thus unclear whether findings from these studies generalize to adolescents. As the two measures were developed more than 15 years ago, there is an additional risk of outdated use of language in the scales. Moreover, the SCS and the DBS were designed to assess effects of rape prevention programs in college populations, and not as means of investigating risk factors of sexual violence.

In addition, psychometric problems have been observed in relation to the usage of the SCS and the DBS in studies with college students. For instance, Hanson and Gidycz (1993) reported poor internal consistency ($\alpha_{SCS} = .56$; $\alpha_{DBS} = .63$), though later studies have attempted to improve the original scales (e.g., Breitenbecher & Gidycz, 1998). Studies have also failed to show clear associations between sexual risk behaviors as measured by the SCS and the DBS, and experiences of sexual victimization and revictimization (e.g., Breitenbecher & Scarce, 2001; Gidycz et al., 2001).

The Present Study

A notable conclusion from reviewing the literature pertaining to sexual victimization and revictimization is the lack of constructs measuring date-behavior-related risk of sexual assault in a female adolescent population.

Moreover, scales used to measure female sexual risk-taking behavior in college students have been shown to have questionable psychometric properties.

Existing assessments have not been developed for use with adolescents. It is difficult to obtain access to adolescents in the school setting for research, most particularly on the subject of sexual coercion. The present study was conducted in Danish public schools. Denmark is generally believed to have equal gender opportunities (Elklit, 2002) and liberal religious affiliations, which inevitably influences the norms and values pertaining to adolescent sexuality. In addition, sexual education is mandatory in public schools, though no official agendas addressing primary rape prevention initiatives currently exist.

The present study set out to develop a psychometrically adequate scale to measure adolescent risk of sexual coercion in a Danish female population. The Adolescent Sexual Coercion Risk Scale (ASCRS) is based on existing literature, items from previous assessment development attempts, and consultations with key informants in the field of sexual assault. This study documents the development and preliminary investigations of the dimensionality, the internal consistency, and the validity of the scale.

Method

Scale Development

Items were created on the basis of (a) previous research of sexual risk-taking behavior using the SCS and the DBS in U.S. college students (e.g., Hanson & Gidycz, 1993) and (b) consultations with a multidisciplinary group of Danish key informants comprising psychologists, criminal investigators, and medical examiners with years of experience in working with adolescent victims of sexual assault. The key informants were specifically asked to consider the factors they judged relevant in regards to increasing the risk of sexual assault of adolescent females committed by a peer, boyfriend, date, or acquaintance. Using their work experience and general knowledge on the field of sexual violence, different aspects of risk for peer-related sexual victimization were identified and discussed in relation to the present study. Two central topics emerged that dealt with (a) the inability of signaling personal and sexual boundaries and (b) participation in explorative sexual behavior, respectively.

These sources were directly used to generate a pool of 29 items reflecting various adolescent behaviors that may be associated with sexual coercion. After identifying and removing items with clear conceptual overlap, the pool comprised 22 items that were included in the scale.

Instructions for the ASCRS required the respondents to decide how much they agreed with statements concerning awareness and signaling of sexual and personal boundaries, and the likelihood of displaying risk-related behaviors. All items were answered on a 6-point Likert-type scale ranging from 1 (*disagree strongly*) to 6 (*agree strongly*). The scale was piloted on a sample of 37 age-matching public school students as part of the initial scale construction process. The students were asked to complete the scale and subsequently comment on the wording of the items, the instructions given before completion, and their understanding of the scale content. Items that were regarded as ambiguous were reworded. Moreover, the pilot study verified that the participating age group found the instructions and scale content easy to understand.

Scale Validity

The Sexual Experience Survey (SES; Koss & Oros, 1982) was administered to the participants of the current study to measure severity of previous victimization to examine the validity of the new scale. The SES has proven the best available instrument in assessing the prevalence of sexual victimization (Kolivas & Gross, 2007). The SES reflects various degrees of sexual coercion, threat, and force, and it is therefore believed to be capable of identifying hidden victims. The original scale comprised 12 items rated on a 2-point scale (yes/no), which was the same response format employed in the present study. Prior to the present study, the scale was adapted to Danish using a translation–back-translation procedure. All nonuniform items were discussed, which led to minor revisions of the Danish translation. Moreover, the term *man* was changed to *boy*, as peer-to-peer victimization has shown to be an important contributor to sexual assault in adolescence (Young et al., 2009). Unfortunately, the revised SES (Koss et al., 2007) was not available when the study was designed. However, one item was added to the original version of the SES to reflect sexual victimization when the ability to consent was impaired by drugs or alcohol, as this has previously been shown to be an important aspect of sexual victimization in adolescence (Champion et al., 2004; Vézina & Hébert, 2007). Moreover, according to Danish law, the definition of rape includes conditions where the victim cannot object or resist due to the influence of alcohol or drugs (Bramsen, Elklit, & Nielsen, 2009). Also, the revised version of the SES recommends assessing for alcohol or drug-related victimization (Koss et al., 2007). The added item was phrased as follows: "Have you ever had unwanted sex with a boy while so drunk or stoned that you couldn't put up resistance?"

In accordance with other studies (e.g., Turchik, Probst, Irvin, Chau, & Gidycz, 2009), and based on selected items from the SES, different levels of

sexual victimization were categorized into three tiers: "no victimization," "moderate victimization" (unwanted sexual intercourse subsequent to verbal pressure; Items 3-6), and "severe victimization" (unwanted sexual intercourse involving force, threat of force, or when the ability to consent was impaired by drugs or alcohol; Items 10-13).

Participants and Procedure

Respondents comprised female Grade-9 students from 35 different schools (one participating class in each school) in the middle Region of Denmark. Data were collected as part of The Danish Study on Adolescent Rape Prevention (DSARP; Time 1). A total of 327 female students with a mean age of 14.9 years ($SD = 0.5$) participated in the present study.

The students completed the questionnaire during regular school hours, and the data collection was administrated either by the first author, two undergraduate students in psychology, or the schoolteacher according to written standardized instructions. Respondents were informed about the objectives of the study, voluntariness of participation, anonymity, and the confidentiality of their response.

Results

Data Analysis

Prior to data analysis, the data were screened for errors. The percentage of missing values was small (0.0%-3.7 %). Thus, the expectation maximization algorithm, which has been demonstrated to be an effective method of dealing with missing data (Bunting, Adamson, & Mulhall, 2002), was performed to impute missing data. Subsequently, the data set was randomly split into two sub–data sets used for the exploratory factor analysis (EFA) and confirmatory factor analysis (CFA), correspondingly.

Maximum likelihood EFA using Varimax rotation (loading criteria ≥ .40) was performed to assess the internal construct validity of the scale on one of the subsamples. The identification of factors was based on the Kaiser–Guttman criterion and Cattell's scree plot. In addition, each factor was required to contain a minimum of six items.

The identified factor structure was tested for fit to the second subsample in a CFA using LISREL 8.80 *(*Jöreskog & Sörbom*,* 2006). A covariance matrix and asymptomatic weight matrix were computed using PRELIS. An asymptomatic weight matrix allows for weaker assumptions regarding the distribution of the observed variables and results in improved fit and test statistics

(Curran, West, & Finch, 1996; Satorra, 1992). As recommended (Hoyle & Panter, 1995), the goodness of fit for the model was assessed with a range of fit indices, including the Satorra–Bentler scaled chi-square (S-Bχ^2), the Incremental Fit Index (IFI; Bollen, 1989), and the Comparative Fit Index (CFI; Bentler, 1990). A nonsignificant Satorra–Bentler scaled chi-square and values greater than .95 for the IFI and CFI are considered to reflect acceptable model fit. In addition, the root mean square error of approximation (RMSEA; Steiger, 1990) with 90% confidence intervals (CI) was reported, where a value less than .08 indicates reasonable errors of approximation (Jöreskog & Sörbom, 1993). Furthermore, we included the standard root mean square residual (SRMR; Jöreskog & Sörbom, 1981), which has been shown to be sensitive to model misspecification (Hu & Bentler, 1999). SRMR values less than .08 are considered to be indicative of acceptable model fit (Hu & Bentler, 1998). No correlated errors were included in the model.

EFA

Based on the total item pool and the described criteria for identification of factors, a two-factor solution was extracted and rotated. The solution comprised one factor with 10 items and a second factor with 8 items. Four items did not load on any factor, which indicated lack of validity. Hence, the items were removed to improve the scale. The EFA was then repeated without these items. The second analysis supported the two-factor solution, including one factor with 10 items and a second factor with 7 items. One item that initially loaded on the second factor failed to reach the loading criteria in the second analysis, which is why the EFA was repeated without this item. This third and final analysis confirmed the two-factor solution, comprising one factor with 10 items and a second factor with 7 items, which in total explained 45.1% of the variance. Factor 1 had an eigenvalue of 5.44 and Factor 2 had an eigenvalue of 2.22. The two factors were negatively correlated ($r = -.34$; $p < .0005$). The factor loadings from the final solution are presented in Table 1.

CFA

On the basis of the criteria associated with RMSEA and SRMR, the specified two-factor model with a RMSEA value of .075 (90% CI = .060-.090) and a SRMR value of .081 was judged to exhibit reasonable model fit. The S-Bχ^2 (226.68) was statistically significant ($p < .0005$), but this result should not lead to rejection of the model because the large sample size increases the power of the test (Tanaka, 1987). Moreover, the IFI and CFI values (both .95) were in favor of the model. Thus, it was judged that the CFA supported the

Table 1. Factor Loadings for the ASCRS Items

Item		F1	F2
14	I think about the signals I send out with my behavior	**.83**	.20
3	I am very aware of which signals I send out	**.77**	.17
22	I consider which signals I send out with my appearance	.74	.18
13	I am very aware of my own sexual boundaries	**.71**	.17
20	I only send out signals that I can vouch for	**.57**	.26
6	If I think a guy has crossed the line, I will tell him	**.54**	.17
16	I will put my foot down if a guy tries to kiss me and I don't want to be kissed	**.50**	.16
2	I always know exactly when a guy has crossed the line	.48	.05
8	I am aware that the signals I send out may have consequences	**.43**	–.14
9	When I go out, I might leave a drink unattended and then return to it later[a]	**.43**	.23
5	I might go home with a guy even though I don't know him very well	.19	**.72**
19	I might have sex with a guy even though I don't know him very well	.15	**.72**
11	I might put sexually suggestive pictures of myself on the Internet	.17	**.60**
15	I might meet up with a guy by myself whom I have only met on the Internet	.00	**.52**
12	I might keep dating a guy even if he is only interested in having sex with me	.32	**.43**
1	I might drink alcohol when I am on a date with a guy	.07	**.42**
4	I might be with a guy (kissing, petting) even though I don't want to have sex with him	.09	**.42**

Note: ASCRS = Adolescent Sexual Coercion Risk Scale; F1 = signaling sexual boundaries; F2 = risk behavior. The factor which the specific items belongs to is indicated in bold.
a. Item reverse coded.

two-factor model derived by the EFA. The standardized factor loadings ranged from .37 to .76 and all were statistically significant ($p < .05$). The two factors were negatively correlated ($r = -.61$; $p < .05$).

Description of Subscales

Factor 1 constituted various reflections of awareness and signaling of personal and sexual boundaries. This included, for instance, awareness of signals in regard to appearance and behavior (Items 14 and 22) and communication of personal boundaries (Items 6 and 16). This factor was labeled *signaling sexual boundaries*. Low scores on Factor 1 indicated a lack of ability to signal sexual boundaries.

Factor 2 largely constituted sexual behavior in different risk situations. This included, for instance, going home or having sex with a guy that the girl does not know well (Items 5 and 19), drinking alcohol when on date with a guy (Item 1), and kissing or petting without wanting to have sex (Item 4). This factor was labeled *risk behavior*. High scores on Factor 2 indicated displaying sexual risk behavior.

Reliability and Validity

Using the total sample, the two scales showed acceptable internal consistency (Signaling Sexual Boundaries = .86; Risk Behavior = .74) and a moderate negative intercorrelation ($r = -.39$; $p < .0005$). Supporting the predictive validity of the scale, low scores on signaling sexual boundaries and high scores on risk behavior were significantly associated with the SES. The Signaling Sexual Boundaries subscale was significantly associated with reports of severe victimization, $F(2, 324) = 4.2$, $p < .05$; Tukey's B post hoc. Risk Behavior was significantly associated with reports of severe and moderate victimization with severe victimization being associated with more risk behavior than moderate victimization, $F(2, 324) = 29.7$, $p < .0005$; Tukey's B post hoc.

Discussion

The purpose of the present study was to develop and validate a measure of risk for adolescent sexual coercion in a female population, titled the ASCRS. EFA indicated the existence of two distinct types of risk factors, comprising signaling sexual boundaries and risk behavior. The specified two-factor model was subsequently supported using CFA. The ASCRS showed satisfactory internal consistency (Cronbach's α = 86; 74), and the validity of the two subscales was demonstrated using the SES, reflecting experiences of sexual assault from adolescent peers.

Interestingly, the Signaling Sexual Boundaries subscale proved to be significantly associated with reports of severe peer-related victimization,

whereas Risk Behavior was significantly associated with reports of severe as well as moderate victimization. It could be speculated, that sexual risk behavior may serve as a stronger associate of sexual victimization than displaying inability to signal clear sexual and personal boundaries. As such, it may be possible that the Risk Behavior subscale is more sensitive in regard to different levels of assault severity than the Signaling Sexual Boundaries subscale.

Risk of Adolescent Sexual Coercion

The present study investigated two related aspects of risk for adolescent sexual coercion, which were the signaling of sexual and personal boundaries, and intended participation in explorative sexual behavior, respectively. Both topics resemble risk factors suggested in relation to sexual assault in adult populations (Hanson & Gidycz, 1993; Söchting, Fairbrother, & Koch, 2004), but it is yet to be explored, if signaling sexual boundaries and displaying risk behaviors function in distinct ways according to age (Livingston et al., 2007). One could argue that risk factors of sexual assault might alter according to factors such as developmental challenges (Lacasse & Mendelson, 2007) and an increase in sexual experiences (Livingston et al., 2007).

Limitations and Suggestions for Future Research

Several limitations of the present study need to be addressed. First, research has suggested that a history of sexual assault constitutes a strong risk factor for subsequent sexual revictimization experiences (e.g., Humphrey & White, 2000). Due to the cross-sectional nature of the study, causality between peer-related sexual assault and risk of sexual coercion could not be established. Further research on risk for adolescent sexual coercion would thus benefit from a more thorough investigation of signaling sexual boundaries and displaying risk behaviors as possible risk factors for peer-related sexual assault in regards to both first-time and repeated victimization. Hopefully, the ASCRS will contribute to such an enhanced understanding of the underlying mechanisms of sexual assault as well as on the future development of rape prevention programs targeting adolescent populations.

Second, generalizability of the results are limited, as the study builds on data collected in a Western European country, where adolescent courtship behaviors may take on different forms in comparison to American populations (Jaquier, Fisher, & Killias, 2006; Krahé, 1998). Pending research using the ASCRS should, therefore, investigate the cross-cultural applicability of

the scale. Moreover, self-reports on private and delicate matters such as sexual behaviors may be compromised because adolescents may under- or over report behaviors that they find socially undesirable or desirable, respectively (Brener, Billy, & Grady, 2003). However, using the SES is regarded as highly valid because it does not measure the respondent's understanding of what constitutes a rape but rather specific types of behavior that fall under the legal definition of rape (Fisher, Cullen, & Daigle, 2005). Future studies should however strive to employ the most recent version of the SES, thus increasing the validity and reliability of the scale (Koss et al., 2007). In addition, the ASCRS was specifically developed to address sexual assault in the context of adolescent dating. It should be noted that stranger assault also occur in adolescent populations (Tjaden & Thoennes, 2006); however, the present measure is not recommended in assessing risk of sexual coercion in situations of stranger assault.

Despite the mentioned limitations, this article presents a useful and psychometrically sound scale with which to measure risk of adolescent sexual coercion in a female population. In addition, findings of the present study also underline the fact that signaling sexual boundaries and displaying risk behaviors are indeed worth investigating in relation to peer-related sexual violence in adolescents.

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The authors declared no potential conflicts of interest with respect to the authorship and/or publication of this article

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