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Quantifying the Decline in Juvenile Sexual Recidivism Rates

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Data from several sources have indicated that violence in general (Federal Bureau of Investigation, 2012; Finkelhor & Jones, 2004; Sickmund, & Puzzanchera, 2014), and sexual recidivism in adult offenders (Duwe, 2014; Helmus, 2009; Wisconsin Department of Corrections, 2015), has declined substantially in recent decades. This finding is significant because the potential effectiveness of public policies intended to reduce sexual violence in society rests in part on the base rate for re-offense of adjudicated violent offenders. This study examined whether the recidivism base rate for juvenile sexual recidivism has undergone a similar decline in recent decades. We examined 106 studies from 98 reports or data sets involving 33,783 cases of adjudicated juvenile sexual offenders that were carried out between 1938 and 2014. Results showed a weighted mean base rate for sexual recidivism of 4.92% over a mean follow-up time of 58.98 months ($SD = 50.97$, $Median = 52.75$). The year of initiation of the study predicted the sexual recidivism rate after controlling for the follow-up time ($\Delta F = 14.72$, $p = .0002$). Studies conducted between 2000 and 2015 reported a weighted mean sexual recidivism rate of 2.75%; 73% lower than the rate of 10.30% reported by studies conducted between 1980 and 1995. The implications for public policies, risk assessment methods, and clinical services are discussed.

Keywords: juvenile, sexual offense, recidivism, risk assessment, sexual recidivism trends

Supplemental materials: <http://dx.doi.org/10.1037/law0000094.supp>

The adoption of sex offender registration and sex offender civil commitment statutes is one of the most significant trends in criminal justice policy in recent decades. Although these laws mirror similar laws passed in the early part of the 20th century, the more recent popularity of these laws began in the 1990s. With the passage of the Jacob Wetterling Crimes Against Children and Sexually Violent Offender Registration Act in 1994 (enacted under the federal Violent Crime Control and Law Enforcement Act of 1994), sex offender registration and notification laws have been federally mandated for all states. Since the early 1990s, 21 states, the District of Columbia, and the federal government have enacted laws that allow for indefinite civil commitment of sexual offenders after they have served their adjudicated sentences (National District Attorneys Association, 2012). Typically, the stated intention of these laws is to protect society from sexual offenders who are believed to pose a high risk of sexual violence to society.

In most cases, these laws have included juvenile sexual offenders, who consistently account for between 15 and 20% of sexual

offense arrests (Federal Bureau of Investigation, 2014a). Similar proportions and rates are evident in Canadian data (Statistics Canada, 2015). As such, the prevalence of sexual offending among adolescents is disproportionate on a per capita basis compared with other age groups; even more so for crimes involving younger victims (Caldwell, 2002; Finkelhor, Ormrod, & Chaffin, 2009). Although juveniles are heavily represented in sexual offense arrests, their inclusion in these laws has been controversial (Chaffin, 2008; Garfinkle, 2003; Letourneau & Caldwell, 2013; Letourneau & Miner, 2005; Zimring, 2004).

In part, the objections to applying these laws to juveniles are based on the perception that juvenile sexual offenders as a group pose a relatively low risk of sexual recidivism as they age. As a result, policies targeting adjudicated juvenile sexual offenders may have little potential for producing a significant impact on sexual violence in society. Some jurisdictions have attempted to address this issue by including some form of risk assessment in an effort to target a subgroup of higher risk juveniles (Batastini, Hunt, Present-Koller, & DeMatteo, 2011; Caldwell, Ziemke, & Vitacco, 2008).

The effectiveness of any law that is intended to protect the public against a potential harm depends on how accurately that potential for harm can be identified. It is now well-established that the base rate of sexual recidivism is one of the most important considerations in accurately assessing risk (Borum, 1996; Doren, 1998; Epperson, Kaul, & Huot, 1995; Letourneau & Miner, 2005; Monahan, & Steadman, 1994). Events that occur very infrequently are notoriously difficult to predict with a reasonable degree of accuracy. However, establishing a reliable base rate for juvenile sexual recidivism presents several problems. Public policies such as sex offender registration, residency restrictions and civil commitment typically apply to all adjudicated juveniles. However, studies that use samples that have been drawn from treatment

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Sixty-three of the data sets used in this analysis were included in an earlier meta-analysis of study characteristics and juvenile sexual recidivism rates (Caldwell, 2007). However, the analyses reported here are unique to this study.

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programs or secured settings examine a subset of adjudicated juveniles that has been deemed higher risk or more in need of treatment (Zimring, 2004). To assess the potential value of public policies that affect all adjudicated youth, the most useful base rate would include studies of youth that were not incarcerated or referred to treatment programs.

In addition, recidivism base rates can be unstable over time and across jurisdictions. Recent studies of adult sexual recidivism rates have demonstrated that sexual recidivism rates appear to have dropped dramatically in recent decades (Duwe, 2014; Helmus, 2009; Wisconsin Department of Corrections, 2015). For example, the Minnesota Department of Corrections (2007) reported an 85% decline in the 3-year sexual reconviction rate among adult offenders released from Minnesota prisons between 1990 and 2002. Similarly, the Wisconsin Department of Corrections (2015) reported a 74.1% decline in 3-year sexual recidivism of adult sex offenders released from prison between 1992 and 2010.

This decline in sexual recidivism mirrors a general decline in sexual violence specifically, and violent offending in general that has occurred over the past 20 years. Using data on substantiated sexual abuse cases aggregated by the National Child Abuse and Neglect Data System (NCANDS), Finkelhor and Jones (2004) reported a 62% decline in substantiated child sexual abuse cases between 1990 and 2000. Furthermore, Federal Bureau of Investigation (2012) data shows a decline in the violent crime rate of 41% between 1990 and 2009. Juveniles appear to have participated equally in this decline in violence. Specifically, the violent crime arrest rate for juveniles fell 55% between 1994 and 2010 (Sickmund, & Puzzanchera, 2014). However, to date there are no studies that examine whether juvenile sexual offense recidivism specifically has declined over a similar time frame. Thus, the most current base rate may significantly differ from what the historical data indicates.

In part because of the challenges presented by determining a reliable base rate, the reliable assessment of risk with juvenile offenders has presented particular difficulties. A wide range of methods have been developed and used in an effort to identify juveniles that are high risk for sexual recidivism (Caldwell, Ziemke, & Vitacco, 2008; Epperson, Ralston, Fowers, DeWitt, & Gore, 2006; Hiscox, Witt, & Haran, 2007; Prentky, Harris, Frizzell, & Righthand, 2000; Viljoen, Scalora, Cuadra, Bader, Chavez, Ullman, & Lawrence, 2007; Worling & Curwen, 2000). These efforts have been hampered by the low base rates they have encountered, and by the lack of a coherent theory for what makes juvenile sexual offenders persist in sexual offending. Several risk factors that have proven to be robust predictors of persistence in adult sexual offenders have not demonstrated a similar value with adolescents. For example, while having a offended against a male child victim has been a reliable predictor of sexual recidivism in adults (Hanson & Morton-Bourgon, 2004), juvenile studies have failed to demonstrate a similar utility. To date, out of the 18 studies have examined having a male victim as a risk factor among juvenile sex offenders, 16 have found no significant predictive value (Auslander, 1998; Boyd, 1994; Caldwell, 2007; Caldwell, 2013; Caldwell & Dickinson, 2009; Hecker, Scoular, Righthand, & Nangle, 2002; Levit, 2015; Nisbett, Wilson, & Smallbone, 2004; Prentky, Harris, Frizzell, & Righthand, 2000; Ralston, 2008; Rasmussen, 1999; Schram, Milloy, & Rowe, 1991; Smith, & Monastersky, 1986; Spice, Viljoen, Latzman, Scalora, & Ullman, 2012;

Williams, 2007; Wolk, 2005), and two found it to be a significantly associated with a lower risk of sexual recidivism (Caldwell, Zemke, & Vitacco, 2008; Miner, 2002).

Perhaps the most widely used measure of predictive accuracy in this area is Receiver Operator Characteristics (ROC) analysis (Mossman, 1994). This method generates an Area Under the Curve (AUC) statistic that estimates the likelihood that a randomly drawn recidivist will have a higher risk score than a randomly drawn nonrecidivist. The method is widely considered to be valid regardless of the base rate because the base rate is not included in the calculation of the AUC. However, recently several authors have pointed out that ROC analysis provides limited information about how the assessment method performs in predicting rare phenomena (Mossman, 2013; Singh, 2013; Singh, Grann, & Fazel, 2011). Put simply, when predicting very low base rate events, a risk prediction method can produce a significant AUC statistic due to a high true negative rate, while risk scores for recidivists are randomly distributed. Thus, a current base rate estimate is important in evaluating the accuracy of risk prediction methods.

Considering the available evidence that indicates that rates of violence in general, adolescent violent crime in particular, and adult sexual recidivism specifically, have all dropped substantially over the last two decades (Duwe, 2014; Finkelhor & Jones, 2004; Helmus, 2009; James, 2015; Sickmund, & Puzzanchera, 2014; Wisconsin Department of Corrections, 2015), it is important to determine whether adolescent sexual recidivism rates have shown a similar decline. This study was undertaken to determine if this has occurred, and to provide a base rate estimate for adolescent sexual recidivism that may be useful in establishing effective public policies, evaluating risk assessment methods, and in the clinical application of risk assessment methods to juvenile sexual offenders.

Method

Study Selection

Studies were identified through a search of PsychLIT, Psych-Abstracts, ProQuest Research Database, the National Criminal Justice Reference Service of the United States, the library of the Department of Public Safety and Emergency Preparedness of Canada, the library of the Home Office of the United Kingdom, the library of the Government of Australia, Dissertation Abstracts International, PubMed, Google Scholar, Nexus/Lexus Academic database, and online public search engines. In addition, several studies were identified in government research reports, in published research references, and in news reports of government and nongovernmental studies. Searches were conducted using the following key terms: juvenile sex(ual) recidivism, adolescent sex(ual) recidivism, juvenile sex, adolescent sex, sexual recidivism, sexual re-offense, sexual offender, juvenile offender, adolescent offender, sexual, and sex(ual) delinquency. To establish a base rate estimate that may have the greatest value for public policy, reports that were case studies, or that examined heavily screened samples (e.g., severely mentally ill adolescents), were excluded. To clearly define the outcome being analyzed we limited the study sample to studies that examined adolescent sexual offenders who were under age 18, that reported official records of arrest or conviction for sexual offense recidivism, and provided minimal information

about sample size and sexual recidivism rates. Where several studies reported on the same sample over differing follow-up periods the report with longest follow-up time was used. This procedure netted 106 data sets from 98 reports or databases (The reports are listed in the references with an asterisk). Although a previous analysis including 63 of these data sets addressed juvenile base rate issues and study characteristics, (Caldwell, 2007), the analyses reported here are all unique to this study. In addition, this study represents the largest study of its kind and the number of studies and range of times when various studies were conducted allows for an examination of the trends of juvenile sexual recidivism over several decades.

Study Characteristics

To determine if study or population characteristics influenced the overall observed results, several study and population characteristics were coded for analysis. These included whether the study was published or unpublished, the geographic location of the study, the type of study (prospective adolescent studies, retrospective adult studies, or retrospective studies involving both adolescent and adult recidivism), the duration of the study follow-up in months, the sample size, and the median year the participants were released for recidivism follow-up, the mean age of the participants, the sexual recidivism rate and the general recidivism rate.

To account for publication bias we coded whether the study was unpublished in peer reviewed professional journals versus published in peer reviewed journals. Of the 106 studies, 79 had been subject to peer review and 27 were governmental reports or unpublished raw data sets. Studies predominantly examined samples from the United States ($n = 79$), but included samples from Canada ($n = 13$), Australia ($n = 8$), Switzerland ($n = 2$), The Netherlands ($n = 2$), the United Kingdom ($n = 1$), and Singapore ($n = 1$). Studies conducted outside of the United States did not significantly differ from each other with regard to study or population characteristics. In light of this, for the purposes of data analysis studies conducted outside of the United States were collapsed into one category.

Studies were conducted using one of three methodologies. Twenty-eight of the studies used a prospective methodology evaluating sexual recidivism from juvenile court records alone, 27 studies were retrospective examining adult sexual recidivism among individuals that were previously prosecuted for a sexual offense as a juvenile, and 51 studies that retrospectively included both offenses committed while a juvenile and adult sexual recidivism data. Four studies also reported data for juvenile and adult recidivism separately. Studies that included recidivism from juvenile court records typically began the follow-up time immediately after the first adjudicated juvenile sexual offense, while retrospective studies that used adult recidivism records typically began the follow-up when the individual reached the age of adult jurisdiction, or at the point of release from juvenile court supervision.

Studies ranged in the number of participants from 9,257 to 21. The mean sample size was 331.20 ($SD = 954.86$, $Median = 171$). The mean follow-up months for the studies was 58.98 months ($SD = 50.97$ months). Studies follow-up duration ranged from 12 months to 420 months ($Median = 50.75$ months).

Studies were published between 1943 and 2015. To determine whether the rate of juvenile sexual recidivism has changed over

time, the year that the cohort of participants began to be followed for recidivism was recorded in each study. In many cases, studies followed juveniles that had been selected for the study over several years. In these instances, the range of years during which follow-up was initiated was established and the median year in the range was recorded. Studies began their follow-up between 1938 and 2014 ($Median\ year = 1997$).

Data Analysis

The weighted mean rate of sexual recidivism for all data were calculated. Univariate analysis of variance (ANOVA) were used to determine if the source of the recidivism data (juvenile records only, adult records only, or both), mean participant age, or the length of the follow-up affected sexual re-offense rates. Studies conducted in the United States primarily relied on state wide data, while those that were conducted in other countries typically relied on national databases. An ANOVA was also conducted to determine if United States versus other nation studies had significantly different sexual re-offense rates, mean participant age, or length of the follow-up.

Analysis of trends in sexual recidivism. The decline in general rates of violence and in sexual recidivism in adult sexual offenders appears to have begun in the mid-1990s (Federal Bureau of Investigation, 2014a; Finkelhor & Jones, 2004, 2006, 2012; James, 2015). To determine if the sexual recidivism rate of juvenile sexual offenders has mirrored the decline in violence and adult sexual recidivism we conducted a linear regression. Very old studies (i.e., before 1980) often included homosexual, promiscuity, consensual fornication, and transvestite behavior as a significant portion of the study sample (Abel, Becker, Mittelman, Cunningham-Rathner, Rouleau, & Murphy, 1987; Sutherland, 1950). In addition, enforcement, sentencing, and supervision policies have changed substantially since the 1980s (Lave, 2009). For these reasons the analysis of the decline in sexual recidivism rates included studies that began the follow-up of participants after 1980. This resulted in a sample of 94 studies for this analysis.

To determine if sampling or other study characteristics have changed over time, we examined the correlation between the study characteristics variables and the year of the study follow-up. Study characteristic variables that were significantly correlated with the year of follow-up were then controlled by entering them on the first step of a hierarchical regression, followed by the year of study follow-up on the final step, to predict the sexual recidivism rate.

To quantify the extent to which the juvenile sexual recidivism trends matched the decline in general violence we created two categories of studies. Studies that conducted follow-ups in the last 15 years (e.g., 2000 to 2015) were in the recent category, and studies that took place in the 15-year time span between 1980 and 1995 were categorized as early studies. The category of early studies included 45 studies of 9,106 juveniles while the recent studies category included 33 studies of 20,008 juveniles. The difference in recidivism rates was analyzed with a one-way ANOVA.

Results

The analysis included 106 data sets in 98 reports that included a total of 33,783 juveniles. The average reported age of the

juveniles studied was 14.96 years ($SD = 0.78$ years). The average follow-up time across all studies was 58.98 months ($Median = 52.75$ months, $SD = 50.97$ months).

Recidivism Estimates

The weighted base rate for detected sexual recidivism for the full sample was 4.97% over a weighted mean follow-up of 62.06 months. The mean general recidivism rate 41.24% ($SD = 0.19\%$). The unweighted mean sexual recidivism rate was 6.59% ($SD = 4.22\%$). However, 49 of the data sets reported sexual recidivism rates less than or equal to 5%, while only three reported rates greater than or equal to 15%. Five of the studies reported sexual recidivism rates of 0% and two others reported rates below 1%. In placing the studies in rank order by sexual recidivism rates, the middle 75% of studies reported sexual recidivism rates between 3.14 and 9.50%.

Table 1 shows the weighted mean study size, sexual recidivism rate, follow-up months and participant age for the sample as a whole on the top row of the table. Other cells show the means and SD s of the same variables for studies with various characteristics. Studies that were not peer reviewed tended to be large state level data sets of unscreened youth. These studies produced the lowest mean sexual recidivism rates ($M = 3.74$, $SD = 3.10$, $F = 10.49$, $p < .0005$). However, these studies also had significantly shorter mean follow-up periods. Studies that were not peer reviewed reported an average follow-up of 38.54 months ($SD = 17.88$ months), compared with peer reviewed studies' mean follow-up of 61.56 months ($SD = 40.42$ months; $F = 2.34$, $p < .05$). Studies that were not peer reviewed also reported a mean participant age that was 0.41 years younger, $F = 4.67$, $p < .05$. Nine of the 10 studies that used state wide or national samples of all juveniles adjudicated over a specific time frame were unpublished. This may have resulted in a slightly younger population than peer reviewed studies that tended to use samples of convenience drawn from treatment programs.

Follow-Up Time Effects

Follow-up times were examined to determine how this variable may have affected the reported sexual recidivism rate. The length of

time studies followed participants varied from 12 to 420 months. For the full sample of 106 data sets, follow-up months significantly predicted sexual recidivism ($F 1,105$, $= 9.11$, $R^2 = 0.08$, $p < .005$). To determine if there was an optimal follow-up duration, after which the sexual recidivism rates did not significantly increase, studies were sorted into 9, 1-year bins on the basis of their follow-up months (e.g., bin 1 = 0 to 12 months; bin 2 = 12.1 to 24 months; bin 3 = 24.1 to 36 months, etc.). A univariate ANOVA revealed a significant increase in mean sexual recidivism rates for the first four bins (including studies with follow-up months up to 48 months), but not for Bins 4 through 9 with follow-up times exceeding 36 to 48 months. To examine the effects of follow-up more specifically, a series of 12 regression analyses were conducted to establish the minimum threshold follow-up duration beyond which sexual recidivism rates did not increase significantly. In each of these analyses, follow-up months were entered in a linear regression equation to predict the sexual recidivism rate. Each analysis in the series excluded studies that had follow-up Times 12 months shorter than the previous analysis. This analysis determined that there was no significant relationship between the length of the follow-up and sexual recidivism rates for studies that equaled or exceeded 36 months of follow-up ($F (1,56)$, $= 2.76$, $R^2 = 0.05$, $p < ns$). That is, the reported sexual recidivism rates significantly increased in studies as their follow-up times increased up to 36 months, but not beyond that time frame. Among the eight studies with follow-up times exceeding 10 years, the mean sexual recidivism rate was 8.82% ($SD = 2.93\%$).

Sexual Recidivism Decline Analysis

To determine if sexual recidivism rates have been declining in line with other rates of violent offending, we conducted a hierarchical regression analysis. In examining the relationships among the study variables, only the length of the follow-up was significantly related to the year the study began its follow-up. To determine if the duration of follow-up might account for any relationship between the cohort follow-up year and sexual recidivism, we entered the follow-up months on the first step, followed by the median year the cohort follow-up began on the final step to predict the sexual recidivism rate. To insure consistency across study definitions of sexual offending, only studies that were conducted after 1980 were included in this analysis. The results, shown in Table 2, demonstrate a significant

Table 1
Unweighted Means and SD s for Descriptive Information for the Total Sample, and Study Characteristics

Factors	Number of data sets	Mean N (SD)	Sexual recidivism (%) Mean/ (SD)	Total recidivism (%) Mean/ (SD)	Follow-up months/ (SD)	Mean age/ (SD)
Total sample (weighted)	106	318.71	4.97	39.40	62.06	14.94
U.S. studies	79	362.17 (1080.56)	6.43 ^b /(4.61)	45.55/(.14)	52.60 (36.14)	14.88 (.80)
All other countries	27	255.78 (196.04)	7.92 ^a /(3.62)	43.57/(.21)	64.19 (39.75)	15.21 (.65)
Not peer reviewed	27	521.37 (1752.84)	3.74 ^d /(3.10)	40.46/(.19)	38.54 ^a (17.88)	14.64 ^a (.78)
Peer reviewed	79	271.40 (378.26)	8.17 ^d /(4.76)	45.21/(.20)	61.56 ^a (40.42)	15.05 ^a (.076)
Juvenile only recidivism	28	225.79 (187.51)	7.05/(5.79)	33.95 ^{ac} /(.15)	28.50 ^{cd} (11.99)	14.78/(.75)
Adult only recidivism	27	208.96 (189.48)	6.95/(4.07)	44.85 ^a /(.19)	70.30 ^d /(43.63)	15.24/(1.02)
Both	51	461.84 (1332.93)	7.08/(4.64)	49.23 ^c /(.20)	63.27 ^c /(35.83)	14.92/(.60)
Community sample	48	273.77/(250.46)	6.75/(4.19)	45.14/(18.95)	59.95/(35.45)	14.83/(.73)
Residential samples	23	170.17/(100.26)	6.61/(3.60)	39.92/(20.92)	66.27/(48.05)	14.85/(.76)
Secure setting samples	29	582.83/(1255.00)	6.63/(4.77)	45.12/(19.56)	44.91/(19.35)	15.14/(.86)

Note. $N = 33,783$ juvenile cases in total. The total sample row contains weighted values. Column values with the same superscript differ significantly.

^a $p < .05$. ^b $p < .01$. ^c $p < .005$. ^d $p < .0005$.

Table 2
Results of a Hierarchical Linear Regression of the Year of the Study to Predict the Sexual Recidivism Rate

Factors	R^2 change	Standardized β	Significance ($p =$)	η^2	95% confidence interval upper/lower
Step 1: Months of follow-up	.12	.346	.001	.119	.021/.252
Step 2: Months of follow-up		.276	.005		
Year of follow-up	.13	-.369	.0002	.149	.036/.286

Note. $n = 94$ studies conducted between 1980 and 2015.

decline in sexual recidivism rates over the 34-year time span. Specifically, the year that the study began recidivism follow-up accounted for 13% of the variance in sexual recidivism rates after controlling for the follow-up duration ($\Delta F = 14.72$, $p = .0002$). A similar analysis predicting the general recidivism rate revealed a nonsignificant relationship with the cohort follow-up year after controlling for the follow-up duration, ($\Delta F = 0.02$, ns).

The results of examining the decline in juvenile sexual and general recidivism using categorical blocks of early and recent studies is illustrated in Figure 1. The 45 early studies included 9,106 participant cases in studies that had been conducted between 1980 and 1995 reported a mean sexual recidivism rate of 10.30% over a mean follow-up of 58.34 months ($SD = 41.97$). The 33 more recent studies conducted between 2000 and 2015, involving 20,008 participant cases, reported a significantly lower mean sexual recidivism rate of 2.75% over a mean follow-up of 43.86 months ($SD = 28.43$). The difference in follow-up months was not significant ($F = 2.16$, ns). However, the decline in sexual recidivism rates was significant, $F = 10.49$, $p = .002$. This 73% decline in recidivism rates is similar to those reported in adult studies and

the overall decline in violent juvenile arrests over approximately the same time frame. By comparison, the weighted general recidivism rate declined from 34.47 to 30.00%, a change that was not significant ($F = 3.12$, ns).

To determine if the decline in this observed sexual recidivism rate may be because of differences in the populations or study characteristics, we conducted a series of comparisons between the older and newer studies described above. The studies did not differ on whether they were conducted in the United States or elsewhere ($\chi^2 = 0.20$, ns), whether they had been subject to peer review ($\chi^2 = 0.001$, ns), or on the source of recidivism data ($\chi^2 = 1.86$, ns). Similarly, the two samples had similar participant mean ages; 14.90 years, ($SD = 0.83$) for older studies versus 15.05, ($SD = 0.45$) for more recent studies ($F = 0.70$, ns), and had followed participants for similar periods; 58.34 months ($SD = 41.97$) compared with 43.86 months ($SD = 28.43$) for older and newer studies, respectively ($F = 3.01$, ns).

To determine if differences in the proportion of samples drawn from more secured custody settings might account for the decline in sexual recidivism rates, the timing of the study (newer vs.

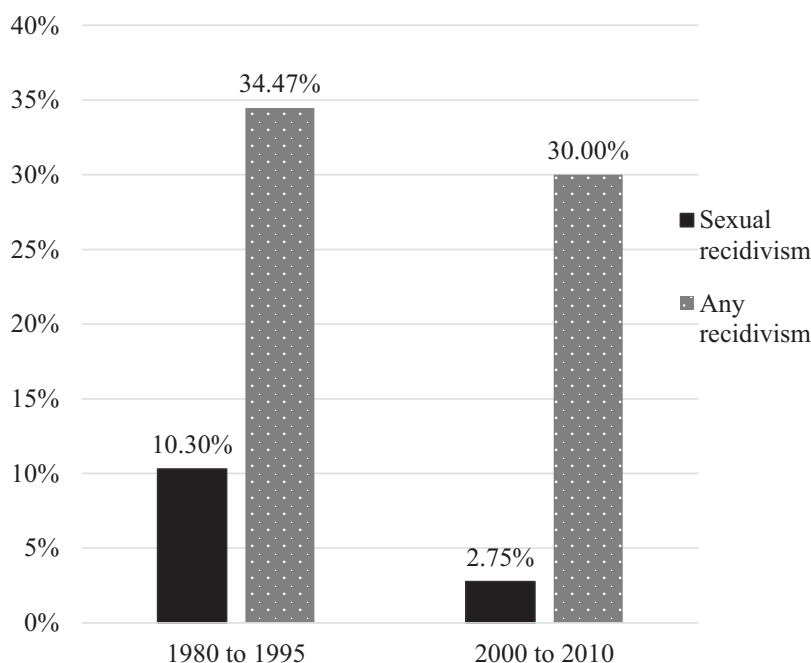


Figure 1. Sexual and general weighted recidivism rates for older studies ($n = 45$), compared with recent studies ($n = 33$). $F(1, 77) = 10.49$, $p = .002$.

older), was entered on the first step, followed by the setting of the sample (community, residential, or secured settings) in a hierarchical regression to predict the sexual recidivism rate. In this analysis, the setting of the sample did not significantly contribute to the model ($F\Delta = 0.001$, *ns*; *Std. β* = 0.004, *ns*), while the timing of the study continued to significantly predict sexual recidivism after controlling for the sample source ($F\Delta = 11.35$, $p < .005$; *Std. β* = -0.36, $p < .005$).

We further explored the possibility that differences in incarceration rates may be related to the decline in recidivism rates. In older studies, 37.65% of the juveniles had been held in a secured facility, while in newer studies 35.66% had been drawn from secured facilities. The weighted sexual recidivism rates of samples drawn from secured settings were 10.47 and 2.58% for older and newer studies, respectively. The mean general recidivism rates were 44.80 ($SD = 18.56$), and 38.67% ($SD = 20.12$), for older and more recent studies respectively. Thus, the recidivism rates of samples drawn from secured settings mirrored the rates for the full sample.

Discussion

Using the total sample of studies, these data indicate that the weighted base rate for detected sexual recidivism for juveniles adjudicated for a sexual offense is 4.97% and for general recidivism is 39.40% over a follow-up of 62.06 months. Analysis of the distribution of sexual recidivism rates indicated that longer follow-up times yielded higher sexual recidivism rates for follow-up times up to 36 months. Follow-up times that exceeded that threshold did not generate significantly higher sexual recidivism rates. Based on these data the most appropriate estimated base rate for sexual recidivism over the full data set falls approximately between 3 and 10%, with a global average of approximately 5%.

The results of this analysis documents that juvenile sexual recidivism has declined in line with the broad decline in general violence reported over the last two decades. Specifically, this analysis indicated that sexual recidivism has declined by 73% over approximately 30 years. This rate of decline mirrors the decline in broader violent victimizations in society (Lauristen & Rezey, 2013). The 33 studies conducted over the past 15 years reported a mean sexual recidivism rate of 2.75%. This suggests that the most current sexual recidivism rate is likely to be below 3%.

The rate of general offending over the same period also declined by 13.0%, from a weighted mean of 34.5 to 30.0%. This decline in general recidivism was not significant, and may not be meaningful. Because these data do not allow us to disaggregate recidivists whose only recidivism was sexual from those who recidivated with sex offenses and other offenses, it is not possible to determine what portion of the decline in general recidivism may be accounted for by the decline in sexual recidivism. Although data are limited, extant research indicates that the vast majority, but not all, of juvenile sexual offenders engage in other crimes (Ralston, 2008). Therefore, it is likely that some portion of the drop in general recidivism reflects the decline in sexual recidivism.

Possible Explanations for the Decline in Sexual Recidivism Rates

In addition to providing essential information about juvenile sexual recidivism rates, these results have several important implications for understanding the decline in violence in general, and adult sexual recidivism rates specifically. Several explanations have been offered to account for the decline in arrests for violent crimes (Federal Bureau of Investigation, 2014a), the similar decline in surveys of victims of violence (Finkelhor & Jones, 2012; Lauristen, & Rezey, 2013), and in measured rates of other forms of child maltreatment (Finkelhor & Jones, 2004; Jones, Finkelhor, & Kopiec, 2001). Because violence of many kinds measured with multiple methods have declined over a similar time frame, and often by rates that are similar to the decline in recidivism found here, it is most likely that a number of factors have combined to result in a fundamental change in the propensity for violence in American society.

Among the factors that may have played a role in the decline in juvenile sexual recidivism reported here, one possibility is that changes in juvenile justice procedures have altered the makeup of recent cohorts of juvenile sexual offenders in ways that dilute the overall risk in those cohorts. This could happen if juvenile justice officers have become more aggressive at prosecuting juveniles for behavior that would have been counseled or diverted previously, resulting in recent cohorts that include a greater proportion of low risk delinquents. However, if this were the case, one would expect that arrest rates of juveniles for sexual offenses would be increasing concurrent with the decrease in sexual recidivism rates. Federal Bureau of Investigation data indicate that arrest rates for sexual assault among juveniles have been declining in recent decades (Federal Bureau of Investigation, 2014a; Snyder, 2012). Further, the possibility that fewer victims are reporting their assaults to police is not supported by victim surveys, which show a small decline in sexual assaults that were not reported to police between 1994 and 2010 (Langton, Berzofsky, Krebs, & Smiley-McDonald, 2012; Planty, Langton, Krebs, Berzofsky, & Smiley - McDonald, 2013; Truman & Langton, 2015).

Similarly, most surveys of crime victims show a decline in individuals reporting being a victim of violent crime. Specifically, surveys of victimization rates among teens show a decline in sexual assault victimization, (Sinozich & Langton, 2014). Additionally, data from the National Child Abuse and Neglect System shows a 62% decline in the estimate of substantiated sexual abuse incidents over the past two decades (Finkelhor & Jones, 2012). Further, the National Crime Victimization Survey documents a 69% decline in the victim reported incidence of sexual assault between 1993 and 2008. In addition, data from the Center for Disease Control and Prevention Youth Risk Behavior Survey (Center for Disease Control and Prevention, 2013) indicate that high risk and precocious sexual behavior in teens has also been declining in recent decades. Thus, rates of sexually inappropriate behavior in general, sexual assault victimization rates, rates of reported sexual assaults, and arrest rates, all contradict the possibility that the recent pool of adjudicated juvenile sex offenders has been diluted with more low risk offenders. Considered as a whole, the data seems to support the inference that there has been a real decline in sexually inappropriate and assaultive behavior in adolescents in recent decades.

Another possible explanation in the juvenile justice arena could be a trend to transfer more serious juvenile offenders into adult court jurisdiction, removing higher risk juveniles from the pool of youth adjudicated in juvenile court. However, the trend in this regard appears to be going in the other direction. Over approximately the past decade, eight states have adopted laws that makes transfers of juveniles to adult court more difficult (Brown, 2012). In addition, over a similar time period seven states have raised the maximum age of juvenile court jurisdiction, thus retaining more older teens in juvenile court. Additionally, the number of juvenile held in jails on charges filed in adult court has declined substantially in the last decade (Minton & Zeng, 2015). Although these data do not rule out the possibility that juvenile sexual offenders have been transferred to criminal court at an increasing rate, contrary to the general trends, the existing information does not lend support to the explanation that transfers to the adult system explains the findings reported here.

A substantial improvement in the efficacy of sex offender treatment programs and community supervision of juvenile sex offenders is another possible explanation for the decline in sexual recidivism described here and potentially for the decline in adult sexual recidivism among adult offenders reported elsewhere. The availability of sex offender treatment programs has increased dramatically in recent decades (McGrath, Cumming, Burchard, Zeoli, & Ellerby, 2010; Levenson, 2014). Although there is a dearth of high quality studies that establish the efficacy of sex offender treatment in the extant literature, there has been important advances in the empirical basis for treatment programs (Prescott, 2002; Miner & Coleman, 2003). In addition, standards for effective programming have been established and promoted (Association for the Treatment of Sexual Abusers, 2014; McGrath, Cumming, et al., 2010). Well designed, controlled studies of the effectiveness of sex offender treatment for adolescents are rare, but the preliminary evidence suggests that treatment can be moderately effective (Bor-duin, Schaeffer, & Heiblum, 2009; Letourneau, Henggeler, Bor-duin, Schewe, McCart, Chapman, & Saldana, 2009; Reitzel & Carbonell, 2006; Worling, Litteljohn, & Bookalam, 2010).

There is considerable evidence that a general delinquent propensity is a primary feature of juveniles who go on to sexually offend as adults (Caldwell, 2007; Zimring, Piquero, & Jennings, 2007). These data do not indicate that juvenile sexual offenders' propensity for general offending has declined significantly, raising some question as to whether improved sex offender treatment could effectively reduce sexual recidivism without similarly reducing general recidivism. In addition, sex offender specific services would not account for the reduction in overall sexual victimization and arrest rates, as the majority of sexual offenses do not come to the attention of the police and thus the perpetrators never enter into treatment (Federal Bureau of Investigation, 2014b). None the less, improvements in treatment and supervision is one of the few possible explanations for which there is no contradictory evidence. Thus, it is reasonable to infer that these improvements have played some role in the results reported here.

The more recent studies examined here included an undetermined number of juveniles that were on sex offender registration lists or subject to residency restrictions. These statutes became widely popular in the 1990s, and were in place in every state by the recent time frame studied here (e.g., 2000 to 2015). It is possible that the adoption of these laws has deterred some juveniles from

recidivating. However, this possible explanation is in conflict with nearly every study of the issue. Studies of juvenile registration have found that registration requirements fail to identify juveniles that are at greater risk for sexual recidivism (Batastini, Hunt, Present-Koller, & DeMatteo, 2011; Caldwell & Dickinson, 2009; Caldwell, Ziemke, & Vitacco, 2008). Further, the research on the deterrent value of sex offender registration applied to juveniles has consistently shown no general or specific deterrent effect (Craun & Kernsmith, 2006; Batastini, Hunt, Present-Koller, & DeMatteo, 2011; Caldwell & Dickinson, 2009; Caldwell, Ziemke, & Vitacco, 2008; Letourneau & Armstrong, 2008; Letourneau, Bandyopadhyay, Sinha, & Armstrong, 2009). These statutes often serve as the basis for residency restriction laws that ban registered sex offenders from living in proximity to areas children may congregate. The extant research on residency restrictions has determined that these restrictions have no effect on sex offense recidivism (Duwe, Don-nay, & Tewksbury, 2008; Prescott, Rockoff, & Econ, 2011). However, there is growing concern that sex offender registration, community notification, and residency restrictions have unintended consequences that harm the adolescent perpetrator, their families, and at times their victims (Human Rights Watch, 2013).

Policy Implications

One explanation for the drop in adult sexual recidivism rates and child sexual abuse victimization relates to the increase in incarceration rates and length of sentences for sexual offenses perpetrated by adults (Finkelhor & Jones, 2006). Presumably, if more high frequency adult sexual offenders are incarcerated child victimization rates would decline. In addition, longer prison terms could mean that the adult sex offenders that are released from prison are, on average, older than was the case in previous decades, and are less prone to recidivism.

Although adolescent perpetrators account for a disproportionate number of sexual abuse victimizations, particularly against very young victims (Finkelhor, Ormrod, & Chaffin, 2009), adolescent incarceration rates do not appear to have mirrored the increase in adult incarceration rates in recent decades, and incarceration for sexual offenses appears to have declined (Sickmund & Puzzanchera, 2014; Sickmund, Sladky, Kang, & Puzzanchera, 2015). In addition, adolescents, when incarcerated, serve relatively short sentences as compared with adults. As a result, the age of adolescents released from detention facilities has remained relatively constant throughout this period. Thus, if an aging cohort of paroled adult offenders accounts for the decline in adult sexual recidivism rates, the same explanation would not apply to juvenile sexual offenders. In this way, these results do not support the explanation that more incapacitation through longer sentences plays the major role in the decline in sexual victimization rates.

In addition, sex offender registration, community notification, and civil commitment statutes do not appear to have played any measurable role in the decline in sexual recidivism rates noted here. The bulk of available evidence indicates that the decline in adult and juvenile sexual recidivism rates has occurred unrelated to, and possibly despite, these recent policy trends. However, the increase in public awareness of the issue of sexual violence in society that these policies reflect may have helped to increase public information and discussion of these issues. This may have improved the community understanding of the harm caused by

sexual violence, and generated a variety of changes in community attitudes that may indirectly reduce the incidence of sexual violence in society.

Increased containment or incapacitation methods, when applied to juvenile offenders, are extremely unlikely to significantly reduce the already very low sexual recidivism rate reported here. In addition, victim surveys consistently find that over half of victims do not report their victimization to police (Langton, Berzofsky, Krebs, & Smiley-McDonald, 2012; Sinozich, & Langton, 2014), and law enforcement typically clears less than half the reported cases with an arrest (Federal Bureau of Investigation, 2014b). It is clear that the bulk of the social problem of sexual violence is not subject to law enforcement measures. As with any public policy, sex offender registration and civil commitment policies have an opportunity cost in that resources devoted to these measures are not available for other programs that may be more effective. These results support the call for improved prevention efforts as the most promising way to reduce sexual violence in society (Abbey, 2005). The findings here indicate that additional, and perhaps existing containment strategies, can only reduce sexual violence in society by a small margin. By contrast, minimally effective prevention programming holds the promise of preventing a much larger proportion of the incidents of sexual violence in society.

Primary prevention strategies for sexual violence have made substantial progress in recent decades. However, studies of the efficacy of these programs are limited to college aged participants. In recent decades, these programs appear to have a small to moderate but significant impact on attitudes supporting sexual violence (Anderson & Whiston, 2005; Brecklin & Forde, 2001; Flores & Hartlaub, 1998). However, with few exceptions, programs to date have not demonstrated a reliable impact on sexually violent behavior (see DeGue, et al., 2014 for a detailed review). Clearly, prevention strategies need further development and study. Considering the potential benefit of primary prevention relative to containment policies targeting adjudicated juvenile sex offenders, it is clear that further investment in research, development and dissemination of effective prevention programs holds a greater potential for reducing sexual violence in society.

Clinical Implications

The primary clinical implications of these results relate to the assessment of risk in juvenile sexual offenders. First, these results confirm the common impression that sexual recidivism by juvenile sexual offenders is a rare event. The current rate of juvenile sexual recidivism appears to be less than 5%. By contrast the rate of general recidivism in this population appears to be up to eight times greater than the rate of sexual recidivism. This finding indicates that professionals who conduct evaluations of juvenile sexual offenders should focus the broad issues related to delinquent offending in general. Juvenile sexual offenders are a highly diverse population and require a comprehensive evaluation of their academic, mental health, behavioral, familial, psychosocial adjustment (including developing sexual adjustment), and individual treatment needs (see Grisso, 1998, for a review of this issue).

Second, the very low base rate reported here indicates that the development of methods that reliably identify juveniles that are at high risk for persistent sexual offending is apt to be extraordinarily difficult. Widely used and validated adult sexual offense risk

measures are typically able to identify a subgroup of offenders that recidivate at 3 to 5 times the sample base rate (Hanson, 1998; Phenix, Helmus, & Hanson, 2015). Under these constraints, it is extraordinarily unlikely that a method could be devised that can identify a subgroup of juvenile sex offenders that pose a higher risk for sexual recidivism than for general recidivism. Further, sex offender civil commitment statutes typically require that the subject of the petition pose a probability (e.g., greater than 50%), of sexual recidivism. The results reported here indicate that developing a standardized risk assessment method that can identify juveniles at that level of risk may not be technically feasible.

Third, the predictive utility of sexual risk assessment methods used with juveniles should include a careful review of the calibration and performance characteristics of the method, and not the area under the curve (AUC) statistic alone. An assessment method designed to predict the occurrence of rare phenomena should logically place the majority of the population in the low risk category because the majority of the population will not reoffend. However, if the vast majority of the population is placed in the low risk category, the true negative rate may itself be enough to generate a significant AUC value. Singh (2013) and others have recommended a more detailed review of the performance characteristics of risk assessment measures, and the findings reported here support those recommendations.

Actuarial risk methods typically rely heavily on static risk factors (such as previous offense history), that are believed to be constant over time. These methods typically do not hypothesize what latent characteristics produce the assessed misconduct. However, these results and other data showing a similar decline in societal violence in recent decades, raises the possibility that unidentified variables may have altered the propensity of members of society to engage in violence. Whether this indicates a break in the link between historically identified static risk factors and the potential for violent behavior they assess is unclear. Future research will be needed to determine whether the predictive utility of historically validated actuarial risk methods has eroded with the decline in violence in society.

Furthermore, actuarial risk assessment methods used with adult sex offenders typically emphasize a history of repeated sexual offending, including juvenile offending. If the dynamics that produce sexual misconduct in adolescence are shifting over time, it may be that methods that were developed using historical data may not be reliable when applied to a contemporary population. It is possible that the predictive utility of a history of juvenile offending may be eroding over time, as the link between a juvenile sex offense adjudication and future sexual recidivism weakens. Thus, it may be prudent to periodically revalidate risk assessment methods with updated samples.

Limitations

The studies included in this analysis used a variety of methods to sample their participants. This diversity may limit the relevance of the results to a specific population that is not representative of the total sample analyzed here. Future trends in commonly applied study methods or public policies could produce different results. However, the use of a large sample of studies drawn from a variety of settings and conducted over an extended time period offsets this concern to some extent.

The samples studied here were exclusively drawn from juveniles adjudicated in juvenile courts. Juveniles transferred to adult court were not included in these data. Although over the past two decades there appears to be a trend to transfer fewer juveniles into adult court (Minton & Zeng, 2015), these data do not allow any conclusions about recidivism trends in that specific population.

These results did not attempt to illuminate what factors may identify higher risk juvenile offenders. In fact, these results demonstrate that identifying risk factors that are reliable will be a very difficult task. The very low prevalence of sexual recidivism reported here suggests that very large samples will be required to obtain adequate power to identify significant predictive variables.

Similarly, participants in recent studies may have received more effective treatment and supervision services that have suppressed their recidivism rate. Additionally, the risk for any form of social misconduct is undoubtedly affected by a matrix of social norms and societal forces that are subject to change over time. These results offer no conclusive explanation as to the cause of the decline in juvenile sexual recidivism rates found here. As with the decline in other forms of violence in society, a full explanation will require further study.

Lastly, nothing in this study should be interpreted as an indication that sexual coercion and violence among adolescents is becoming a minor social problem. Although declining, the incidence of sexual abuse victimization remains unacceptably high, particularly when compared with the incidence of other serious public health issues. Indeed, the results reported here argue for expanded research directed at developing effective prevention programs as the most potentially fruitful way to reduce sexual violence in society.

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