Risk Factors for Violence in Stalking Perpetration: A Meta-Analysis

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Meta-analysis has emerged as the procedure of choice for empirically identifying the general determinants of crime. In 2004, Rosenfeld conducted the first meta-analysis of violence in stalking situations. In this study, we provide an updated quantitative analysis of the violent stalking literature. Working with a sample of 5,114 participants, our findings indicate that approximately 35% (n = 1,059) of stalkers were violent and that almost 29% (n = 604) of stalking victims were injured by their stalkers. Eight significant risk factors were found to be related to stalking violence: prior intimate partner, threats, presence of psychosis, presence of personality disorder, substance abuse, criminal history, violence history, and stalker gender. Implications for risk assessment in stalking and future research directions are discussed.

Keywords: meta-analysis, stalking violence, substance abuse, risk assessment

Since the introduction of anti-stalking laws in North America in the 1990's, stalking has become an increasingly popular area of research. Although many definitions of stalking exist, it is commonly defined as "the willful, malicious, and repeated following and harassing of another person that threatens his or her safety" (Meloy & Gothard, 1995). Several victimization surveys have been conducted in the past two decades to assess the prevalence of stalking in the general population. According to a survey conducted by the Canadian Centre for Justice Statistics (Stats Canada), 11% of women and 7% of men reported having experienced stalking within the five years that preceded the survey. Similar rates of victimization have also been reported in the United States and the United Kingdom (Tjaden & Thoennes, 1998; Walby & Allen, 2004). Recent statistics from the United States suggest that stalking victimization rates for women may have increased from previous estimates, with approximately 1 in 6 women having reported being stalked at some point in their lives (Black et al., 2011).

Impact of Stalking

Victims of stalking often experience long-term psychological distress, such as depression, anxiety, sleep disturbance, and suicidal ideation (Pathé & Mullen, 1997). Victims may also experience the development of several medical conditions related to stress such as asthma, irritable bowel syndrome, high blood pressure, and diabetes (Black et al., 2011). Many victims also make dramatic changes to their lifestyles, including relocation, ceasing social activities, and changing work habits. According to the Canadian Centre for Justice Statistics (2005), one half of female victims and one third of male victims reported changing their lifestyles in response to stalking.

Physical harm to victims is also possible. Victims can experience threats of harm, and both physical and sexual attacks from their stalkers (Pathé & Mullen, 1997; Canadian Centre for Justice Statistics, 2005). The incidence of physical violence in stalking perpetration has been estimated to be between 25% and 35%, with a homicide rate of approximately 2% (Meloy, 2003). Some studies have reported even higher incidences of violence (Purcell, Pathé, & Mullen, 2002; Rosenfeld & Harmon, 2002).

The development of new technologies has had a significant impact on both stalking behavior and prevention. With the creation of social networking sites such as Twitter and Facebook, stalkers are now able to track and monitor their victims more easily. It is now also possible to track a victim's internet activity with spyware, or his or her movement patterns with GPS devices surreptitiously placed on a vehicle. Electronic evidence such text messages or e-mail activity can be used by law enforcement officials to prosecute stalkers. According to Fraser, Olsen, Lee, Southworth, and Tucker (2010), the impact of emerging technologies on stalking has yet to be fully appreciated.

Risk Factors for Violence in Stalking

Several important risk factors for stalking perpetration have been identified in the literature. Research has shown, for example, that victims who were past intimate partners of their stalkers are more likely to be at risk for harm (Pathé & Mullen, 1997). In the United States, two-thirds of female victims and 4 out of 10 male victims were stalked by former intimate partners, making this group the most likely to be stalked (Black et al., 2011). It has been estimated that around 50-60% of all stalking cases involve ex-intimate partners (Douglas & Dutton, 2001). Past victimization surveys have shown that the perpetrators of stalking have been previously known to the victims as a friend, intimate partner, co-worker, or neighbor, and less than a quarter of victims were stalked by someone previously unknown to them (Canadian Centre for Justice Statistics, 2005). Female victims are more likely to be stalked by a former intimate partner than male victims, but both are equally as likely to be stalked by friends (Canadian Centre for Justice Statistics, 2005).

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Mental illness in the perpetrator appears to be another important risk factor. Past research in the general violence literature, for instance, suggests that the presence of psychosis can increase the odds of violence occurring by approximately 50% (Douglas, Guy, & Hart, 2009). Although the prevalence of psychosis appears relatively low among stalkers (Kienlen, Birmingham, Solberg, O'Regan, & Meloy, 1997), existing studies indicate that, at times, the presence of a psychotic illness may reduce the likelihood of violence by stalkers (Mullen, Pathé, Purcell, & Stuart, 1999).

Some personality disorders have also been linked to violence outside of stalking. In the general violence literature, individuals with Cluster B personality disorders have been shown to commit more acts of violence in both community and custodial settings (Warren & Burnette, 2012). Approximately half of stalkers in many samples have an Axis II personality disorder, with a high percentage of those having been diagnosed with a Cluster B disorder (Meloy & Gothard, 1995). A possible relationship between personality disorders and harm in stalking has also been identified, where stalkers with personality disorders were more likely to harm their victims (Mullen et al., 1999).

The relationship between substance abuse and violence is also well established (e.g., Boles & Miotto, 2003). This relationship is further complicated when substance abuse occurs in conjunction with psychosis or personality disorders (Wallace, Mullen, & Burgess, 2004; Fountoulakis, Leucht, & Kaprinis, 2008). Research has also shown a relationship between substance abuse and the occurrence of violence in stalking, where perpetrators who abuse various substances are more likely to harm their victims (Mullen et al., 1999).

Although a prior criminal history predicts future violence in the general violence literature (e.g., Bonta, Law, & Hanson, 1998), research has produced mixed findings regarding a relationship between criminal history and stalking: Some studies have reported a link between these two variables (e.g., Brewster, 2000; Mullen et al., 1999); while others have not (e.g., e.g., Meloy, David, & Lovette, 2001).

Research concerning the predictive value of threats is also somewhat inconsistent. Although early research focusing on public figure samples found that threats were not a significant risk factor for violence, subsequent research involving community samples suggests otherwise (Dietz et al., 1991; Zona, Sharma, & Lane, 1993). Threats are a common occurrence in stalking; research suggests that anywhere from 30% to 60% of victims are threatened with violence by their stalkers (Mullen et al., 1999), and that anywhere from 20% to half of the threatened victims are later assaulted (Pathé & Mullen, 1997; Warren, Mullen, & Ogloff, 2011). These data suggest that threats may be a precursor to an escalation of violence (Rosenfeld & Harmon, 2002).

Demographic variables have also been considered as an additional category of risk factors for stalking, although the predictive power of these factors is considered to be small compared to other categories (McEwan, Mullen, & Purcell, 2007). Gender is a demographic variable that has been connected to violence in the literature. Overall, men have been found to commit more violent acts then women, with as many as 90% of violent incidents being perpetrated by males (Janhevich, 1998; Perreault & Brennan, 2010). While the majority of stalkers have been identified as males (Canadian Centre for Justice Statistics, 2005), stalker gender has not been found to be a significant risk factor for harm in stalking in several studies (Pathé & Mullen, 1997; Rosenfeld & Harmon, 2002). Research examining other demographic variables such as ethnicity, age, and education has produced inconclusive results (Schwartz-Watts & Morgan, 1998; Canadian Centre for Justice Statistics, 2005).

Risk Assessment in Stalking

Few risk assessment tools currently exist to assess risk of harm in stalking. One metric, the Guidelines for Stalking Assessment and Management (SAM) is a Structured Professional Judgement (SPJ) instrument that includes variables related to both stalking perpetration and victim vulnerability (Kropp, Hart, & Lyon, 2008). The SAM was designed for use among law enforcement personnel and mental health care workers to help guide decisions about stalking risk. When compared to other commonly used measures of violence risk assessment, for example the Psychopathy Checklist Screening Version (PCL:SV) and the Violence Risk Appraisal Guide (VRAG), the SAM shows good validity and reliability, making it a possible tool for assessing risk in stalkers (Kropp, Hart, Lyon, & Storey, 2011).

The Stalking Risk Profile (SRP) is another SPJ for assessing stalking risk (Mackenzie, McEwan, Pathé, James, Ogloff, & Mullen, 2009). It provides separate combinations of static and dynamic risk factors that relate to violence, persistence, and recurrence. The SRP is a relatively unique tool for a number of reasons. First, it requires individual judgments of risk for each domain, as well as combinations of dynamic and static risk factors. This means that the measure separates different outcomes of interest. Second, it identifies important areas where psychosocial damage may be done to the stalker and that are also related to increased risk. Third, the SRP recognizes the different motivations of stalkers, and therefore does not limit the risk assessment to a single motivational variable. By examining motivational pathways, the SRP assists clinicians in developing a more nuanced, idiographic risk management plan (McEwan, Pathé, & Ogloff, 2011).

Prior Meta-Analyses

An initial meta-analysis on risk factors for violence in stalking perpetration (Rosenfeld, 2004) examined seven risk factors for violence in stalking: threats, having a prior

intimate relationship, presence of a psychotic disorder, presence of a personality disorder, substance abuse history, criminal history, and history of violence. The results of this analysis revealed significant effects for threats, psychotic disorder, personality disorder, and substance abuse history. Having a prior intimate relationship and criminal history did not have significant effects, although Rosenfeld did conclude that having a prior intimate relationship with the stalker remained an important risk factor for violence perpetration in stalking.

Although Rosenfeld's meta-analysis made a valuable contribution to the literature, his findings require updating to in light of ongoing research in stalking violence. The current study is intended to provide this update by providing a quantitative analysis of the available research concerning violent stalkers.

Method

Sample and Inclusion Criteria

Online research databases PsycInfo, Scopus, SocINDEX, Criminal Justice Abstracts, and ProQuest were searched for empirical research articles that were relevant to the present analysis. The following keywords were used: stalking, risk factor, violence, prediction, risk assessment, and aggression. In addition, the citation lists of relevant books and review articles were examined for sources which may not have shown up in the search engine results. Articles published up to December 2011 were included. In addition, several researchers were contacted directly to inquire about any unpublished data that they may possess.

In order for a study to be included in the analysis, three criteria had to be met. First, all studies had to pertain to a relationship between a risk factor and the dichotomous occurrence of violence or persistence in stalking. A risk factor was defined as being a variable that has a linear relationship with either violence or persistence (e.g., by using a correlation or a regression statistic). Second, all included studies must have been published in English, as resources were not available to translate documents in other languages. Third, all included studies must have contained a sample size greater than 20 to ensure that it had adequate statistical power. In addition, as a less stringent fourth criterion, the studies were limited as much as possible to stalkers from general forensic samples rather than public figure stalkers. As indicated by prior research, risk factors for violence in public figure stalkers may be different from the general population. For the purposes of this analysis, violence was defined as either being physical contact violence (e.g., hitting) and/or sexual violence. Persistence was defined as the length of a single stalking episode.

In total, the literature search identified 27 usable documents for the analysis (24 peer-reviewed journal articles and 3 unpublished graduate school dissertations) and one unpublished raw data set. When multiple studies reported results from the same data set, either the most recent article or the article reporting the most direct data was used. This was done in order to minimize sample overlap. The three articles examining persistence were eliminated as the data was not sufficient to conduct an analysis, bringing the total number of documents and data sets used in the study to 25. The risk factors examined in these articles will be discussed later. The final sample included studies from a number of countries (10 from the United States, 2 from Canada, 3 from the United Kingdom, 6 from Australia, 1 from Finland, and 1 from Belgium). Two samples consisted of offenders from multiple countries (one from North America and one from North America and Australia). The articles used in the final analysis were published between 1995 and 2011, with a median year of 2002. Most studies examined samples consisting of identified stalking offenders, although eight examined only data from stalking victims and one examined data from both victims and offenders. The mean sample size was N = 195. Most samples had a majority of male stalkers and female victims. However, one sample consisted entirely of female offenders and two samples studied only female victims.

Coding Procedures

In order to guide future analyses, several pieces of information about the studies were coded and recorded. Each study was coded by two coders and was assigned a three-digit number for identification purposes. One study was first coded by the first coder in order to serve as an example of the coding scheme. Two studies were coded by both the researcher and the secondary coder in order to solidify the coding scheme. Any additional disputes were discussed by both coders, and action was taken to resolve any issues. All coding information was entered into a Microsoft Excel spreadsheet for future reference. Overall, the coding scheme had good agreement between coders, indicating that it was well-defined. General coding results are reported in Table 1.

Table 1
Characteristics of Studies Included in Meta-Analysis

Study	Sample Description	N	Violent n	Risk Factors Studied	Individual Effect Sizes (r_i)
Björklund, Häkkänen-Nyholm, Sheridan, & Roberts (2010)	Student sample of stalking victims from Finland	298	137 (46)	Prior Intimate Partner Threats Stalker Gender	.24 .73 .52
Brewster (2000)	Self-report victim data from the United States	187	86 (46)	Threats Substance Abuse	.28 .20
Brooks (2010)	Court file data of stalking offenders from the United States	177	63 (35.6)	Criminal History Substance Abuse Stalker Gender	.29 .15 .09
Farnham, James, & Cantrell (2000)	Clinical files of stalking offenders from England	50	22 (44)	Prior Intimate Partner Psychosis	.43 -.20
Groenen & Vervaeke (2009)	Data from police files of stalking victims and offenders from Belgium	429 (219 victims, 210 offenders)	58 (26.5)	Threats Substance Abuse Prior Intimate Partner	.36 .28 .22
James & Farnham (2003)	Clinical files of stalking offenders from England	85	27 (32)	Criminal History Violence History Substance Abuse Personality Disorder Threats Prior Intimate Partner	.32 .12 .04 .13 .22 .39
Kienlen et al. (1997)	Court file data of stalking offenders from the United States	25	8 (32)	Psychosis	-.29
McEwan, Mullen, MacKenzie, & Ogloff (2009)	Clinical and police data of stalking offenders from Australia	211	18 (39)	Threats Substance Abuse Violence History Prior Intimate Partner Gender Psychosis Personality Disorder	.26 .16 ..25 .36 .08 -.16 .11
Meloy & Boyd (2003)	Clinical and police data of female stalking offenders from multiple countries	82	20 25	Threats Prior Intimate Partner	.24 .37
Meloy, Davis, & Lovette (2001)	Court files of stalking offenders from the United States	59	15 25	Threats Psychosis Personality Disorder Prior Intimate Partner Substance Abuse Criminal History	.27 -.32 .14 .81 .18 .01

Meloy, Mohandie, & Green (2011)	Police records of stalking offenders from North America	1005	467 (46)	Stalker Gender	.07
Menzies, Fedoroff, Green, & Isaacson (1995)	Clinical records of stalking offenders from Canada	29	6 (21)	Personality Disorder Substance Abuse Criminal History	.19 .22 .32
Mohandie, Meloy, McGowan, & Williams (2006)	Police records of stalking offenders from North America	1005 (same sample as Meloy et al., 2011)	467 (46)	Psychosis Prior Intimate Partner	-.10 .51
Morrison (2008)	Court records of Canadian stalking offenders	103	46 (45)	Threats Criminal History Substance Abuse Psychosis Personality Disorder	.47 .16 .02 -.14 .15
Mullen, Pathé, Purcell, & Stuart (1999)	Clinical records of stalking offenders from Australia	145	52 (36)	Criminal History Threats Psychosis Substance Abuse	.33 .28 -.17 .19
Oddie (2000)	Victim self-report data from the United States	159	34 (22)	Prior Intimate Partner	.26
Palarea, Zona, Lane, & Langhinrichsen-Rohling (1999)	Police data of offender and victim pairs from the United States	223	42 (18.8)	Threats Violence History Prior Intimate Partner	.15 .43 .15
Pathé & Mullen (1997)	Victim self-report data from Australia	100	(34) 34	Prior Intimate Partner	.24
Roberts (2005)	Student sample of stalking victims from England	220	(79) 35.9	Threats	.25
Rosenfeld & Harmon (2002)	Clinical records of stalking offenders from the United States	204	(69) 34	Threats Psychosis Criminal History Violence History Substance Abuse Stalker Gender Personality Disorder	.25 -.18 .41 .20 .19 .21 .08
Ross (2005)	Data from stalking victims from the United States	197	(19) 9.4	Substance Abuse Violence History	.07 .06
Schwartz-Watts & Morgan (1998)	Clinical records of stalking offenders from the United States	42	(20) 47.6	Psychosis Prior Intimate Partner	-.01 .27
Sheridan & Davies (2001)	Victim self-report data from the United Kingdom	95	(40) 42	Criminal History Threats Prior Intimate Partner	.35 .24 .31

Thomas, Purcell, Pathé, & Mullen (2008)	Victim self-report data from Australia	432	(75) 17.4	Threats Prior Intimate Partner	.27 .41
Unpublished data set, MacEwan	Data from stalking offenders in Australia	125	20 (16)	Prior Intimate Partner Substance Abuse Personality Disorder Gender Violence History Threats Criminal History	.18 .12 .13 .12 .04 .12 .07

Note: numbers within parentheses show percentages

General study characteristics were coded first. Each study was coded based on what type of research it was. Some examples of coding were a peer-reviewed journal article, a graduate school dissertation, and a published book. Second, a list was generated of all risk factors that were analyzed. In order to determine what risk factors were examined, coders were asked to look for variables that measured a linear relationship between the occurrence of violence in stalking. Third, coders recorded the year the study was published, as well as the country it was published in. It was important to code the year of publication as certain criteria (e.g., DSM diagnostic criteria) changes periodically. In addition, it was important to code the country of publication as the legal and operational definitions of stalking behaviour can vary according to country. Finally, the definition of stalking used in the study was coded in order to examine variability of the phenomenon across studies.

Specific information about the study methods was also coded. First, coders recorded information on the types of participants that were recruited. Participants were coded as either being stalking offenders, stalking victims, college/university recruited samples, or other. Second, the source of data in the study was coded. This was recorded as being an offender self-report, a victim self-report, police/legal records, clinical/medical records, or other. In the case of multiple sources of data, each source was specified (e.g., police records and victim self-report). Third, coders recorded specific information on sample recruitment methods. Participants were coded as either having been recruited by an agency referral (e.g., their names were sent to the researchers from a legal or medical agency), by fliers or word of mouth, by direct contact from the researchers, or by another method which was further specified. In the cases where participants were not recruited (e.g., archival data), the recruitment method was marked as "none." Fourth, coders recorded information about any standardized diagnostic tools used in the study. Categories that were coded were DSM (exact version was specified), personality inventories (specified), specific risk assessment tools, or as "other." Fifth, the operational definition of violence that was used in the study was coded. Violence was coded as either being only physical violence, only sexual violence, as both physical and sexual violence, or as not being specified by the researchers. Sixth, the coders recorded the specific definition of persistence that was used in the study. This was coded as either being duration, multiple points of contact with the criminal justice system, as both, or as another definition that was specified.

Specific information about the samples used in the studies was coded in order to get an idea of the overall sample used in the analysis. First, the city and country of where the sample came from was coded. In the case where the sample came from multiple geographic locations, each location was specified. If no city was stated, the coders recorded the information as directly as possible. Second, the gender distribution (numbers and percentage of total sample) of the sample was denoted. This was recorded in order to get an idea of the gender distribution among both victims and offenders. Third, the age range of the participants was coded when it was specified by the authors. If no age range was given, the coders recorded this as "not specified." Finally, the socio-economic status of all participants was coded when applicable. This was also coded as "not specified" when it was not reported by the authors.

Study quality was assessed using two different definitions of quality. As the studies used in this analysis were not traditional randomized studies, several fundamental study quality definitions could not be used. Instead, two definitions of study quality were developed to separately assess research analyzing violence risk factors and studies analyzing persistence risk factors. For a study involving violence risk factors, it was considered to be of high quality when it had multiple sources of information (e.g., police reports, medical files) and must have relied on self-report data as little as possible. For a study involving persistence risk factors, it was considered to be high quality when it was prospective (e.g., following a group of individuals over time to determine if certain actors play a role in certain outcomes) and used multiple sources of data (e.g., police data, medical files). Each rating of study quality was rated on a seven point scale, where 1 means does not meet these criteria at all and 7 means definitely meets these criteria. Overall, the two raters had a 58% percent agreement in terms of coding for study quality and a mean quality rating of 5.25.

Data Analysis

The effect size values for each risk factor in a study were calculated using the most direct data possible (e.g., a correlation or other measure of effect size). If more than one method was available for converting, the easiest and most direct method was used. For the purpose of this analysis, outlier variables were not eliminated as this would potentially bias the results. All mean effect size calculations were calculated using a Microsoft Excel spreadsheet designed by the authors. Effect sizes were aggregated using Hunter and Schmidt's (2004) weighted mean effect size formulas. In order to calculate the mean effect size for a variable, at least three studies had to have examined that variable. 95% confidence intervals were calculated using the standard error of the mean effect size in order to calculate the possible range of values for the effect size and to assess whether the calculated mean effect sizes differed significantly from zero. A mean effect size was considered to be significant if the confidence intervals excluded zero (Whitner, 1990).

Each r_m calculated for a risk factor was corrected for sampling bias using the formulas given by Hunter and Schmidt (2004). This correction allows the resulting effect sizes and their variances to be a more accurate representation of what they would be in a standardized population and therefore makes them unaffected by the size of the sample. Hunter and Schmidt's correction was used instead of the Fisher Z transformation because the transformation tends to produce an upward bias in average effect size as it gives greater weight to larger correlations (Hunter & Schmidt, 2004). The mean effect sizes were interpreted using Cohen's (1992) guidelines for interpreting correlation effect sizes: small effect size, r = .10; moderate effect size, r = .30; and large effect size, r = .50.

Heterogeneity of the effect sizes was analyzed using Hunter and Schmidt's (2004) rule of thumb. This rule of thumbs that if the sampling error variance accounts for less than 75% of the variance of the mean weighted effect size, then a moderator variable may be present. The *Q* statistic commonly used in meta-analyses was not used in the present analysis because given a large enough sample size, it will reject the null hypothesis even if a sufficient level of homogeneity is present, thus overestimating the heterogeneity of the effect sizes. Any publication bias was assessed through the calculation of Orwin's (1983) Fail Safe *N* test. This test assesses the number of unpublished studies needed to nullify the mean effect size found for a variable.

Results

The total aggregated sample size used in the analysis was N = 5,114 (2,562 males and 2501 females; gender was not specified for 51 participants). Out of the combined 2,995 offenders (2,277 males and 668 females; 50 with unspecified gender) included in the analysis, 35.4% (n = 1,059) had committed violence against the individual that they were stalking. In addition, out of the 2,119 victims (285 males and 1,833 females, with one married couple counting as one single participant) in the analysis, 28.4% (n = 604) had been physically harmed by their stalkers. The data was analyzed using Hunter and Schmidt's (2004) weighted mean effect size equations. In total, eight risk factors for violence were analyzed: prior intimate partner, presence of psychosis, presence of a personality disorder, threats, substance abuse, criminal history, violence history, and stalker gender (see Table 2).

Table 2
Mean Effect Sizes of Risk Factors of Stalking Violence

	k	*N*	r_m	SD_r	ρ	SD_ρ	CI_l	CI_u	Heterogeneity Present?	k_c
Prior Intimate Partner	16	3584	.36	.135	.36	.122	.34	.39	Yes	42.2
Threats	16	3070	.32	.296	.32	.289	.29	.35	Yes	34.7
Psychosis	9	1839	-.13	.003	-.13	0	-.18	-.09	No	3.0
Personality Disorder	7	811	.12	.001	.12	0	.05	.19	No	1.2
Substance Abuse	12	1947	.18	.076	.18	.006	.13	.22	No	9.0
Criminal History	9	1017	.19	.140	.19	.107	.13	.25	Yes	8.2
Violence History	6	1043	.19	.143	.19	.123	.13	.25	yes	5.4
Stalker Gender	6	2020	.14	.157	.14	.147	.10	.19	Yes	2.7

Note. *k* = number of studies; *N* = number of participants; r_m = sample weighted mean correlation; SD_r = sample weighted standard deviation of observed correlations; ρ = sample weighted mean correlation corrected for sampling error; SD_ρ = standard deviation of corrected correlation distribution; CI_l = lower bound of 95% confidence interval; CI_u = upper bound of 95% confidence interval; k_c = Fail Safe *N* value

Risk Factors for Violence

The largest effect size was found for the variable of prior intimate relationship (r_m= .36, SD_r = .135, CI_{95} = .34 – .39, n = 3584), indicating that stalkers who had a past intimate relationship with their victims were more likely to be at risk

to commit violence. This effect size attained moderate strength. Contrary to what was found in Rosenfeld's (2004) meta-analysis, this finding was significant. Another moderate effect size was found between the presence of threats and the occurrence of violence (r_m = .32, SD_r = .296, CI_{95} = .29 – .35, n = 3070), indicating that the presence of threats may be indicative of future violence against the victim.

Clinical variables also attained significance in the analysis. A significant negative effect size was found for the presence of psychosis (r_m = -.13, SD_r = .003 CI_{95} = -.18 – -.09, n = 1839), indicating that that individuals with psychosis, in general, tend to pose less of a risk for violence in stalking than individuals without psychosis. Presence of a personality disorder had a small effect size (r_m = .12, SD_r = .001, CI_{95} = .05 – .19, n = 476), indicating that, while the relationship isn't very large, stalkers with personality disorders are more likely to pose a risk for violence than stalkers without personality disorders. Finally, substance abuse had a small effect size of r_m = .18 (SD_r = .076, CI_{95} = .13 – .22, n = 1947), indicating a relationship between the risk for violence and stalkers who abuse intoxicants.

Variables relating to aspects of the offender's history were also significant. Violence history had an approximately small effect size of r_m = .19 (SD_r = .143, CI_{95} = .13 – .25, n = 1043). Therefore, stalkers with a history of past violence pose a potentially a greater risk of committing physical violence against their victim. Criminal history had a small effect size of r_m = .19 (SD_r = .140, CI_{95} = .13 – .25, n = 1017). This also indicates that stalkers who have a history of past crimes potentially pose more of a risk to commit violence against their victims. Finally, stalker gender had a small effect size of r_m = .14 (SD_r = .157, CI_{95} = .10 – .19, n = 2020), indicating that there is a significant relationship between the gender of the stalker and stalking violence, with male stalkers posing more of a risk for violence.

Heterogeneity

Tests for heterogeneity of effect size indicate that all variables in the present but presence of psychosis, presence of a personality disorder, and substance abuse demonstrated heterogeneity in their effect sizes, indicating the presence of possible moderator variables that may be producing systematic differences in the effect sizes.

Publication Bias

A Fail Safe *N* number was calculated for each mean effect size in the analysis. For calculation purposes, a criterion value of .1 was used. This value was chosen because it is the definition of a small effect size set forth by Cohen's (1992) effect size guides, and this would thereby give us a measure of how many studies would be needed to reduce mean effect size to a minimum value. The Fail Safe *N* values for the present studies ranged between 1.2 and 42.2, indicating that a relatively small number of studies would be needed to nullify the results found.

Discussion

Our meta-analysis found that approximately one third of stalkers act violently toward their victims and that approximately 29% of victims suffer physical harm as a result of these attacks. Contrary to the broader literature on criminal violence (Janhevich, 1998; Perreault & Brennan, 2010), male stalkers did not seem to pose a greater risk of violence toward their victims than their female counterparts in the present. Bearing in mind the usual caveat regarding the likely under-estimation of violent behavior in forensic research, these findings indicate substantial risk of physical violence to victims of stalking.

The prevalence rates of violence seen in the aggregated data are within the range reported by Meloy (2003). However, base rates of violent behavior varied considerably across individual studies, ranging from approximately 10% (Ross, 2005) to approximately 48% (Perrault & Brennan, 2010). Rosenfeld (2004) found a violence rate of 38.6% over 1055 offenders included in his meta-analysis. Rates of violence are, therefore, quite variable. This variability may be due to reporting rates, as well as the methods used by the researchers to operationally define violence and victimization. Davis and Frieze (2000), for example, reported that stalking rates can vary widely across studies due to the sample and the definitions of stalking being used in that study.

The risk of violence to victims does appear heightened by the presence of a past relationship with the stalker and the presence of overt threats in the present analysis. Although Rosenfeld (2004) found that threats were significantly related to violent behavior by stalkers, other studies (e.g., Meloy, 2003) suggest a weak link between threats and violence in stalking situations. While some threats can be hollow, our findings dovetail with Rosenfeld's and clinical experience to indicate that threats of harm can be important indicators of escalating danger to stalking victims and should be given careful consideration when assessing risk.

The finding that a prior intimate relationship with the victim is robustly related to violence in stalking situations is at odds with pre-existing meta-analytic data (Rosenfeld, 2004) but is consistent with extant research indicating that former intimates as the group most likely to be violently victimized by stalkers (Black et. al, 2011). Stalking itself has a strong relationship with intimate partner violence. In such situations, stalking is used as a way to isolate the victim, and can occur even when the couple is still living together (Walker & Meloy, 1998). Ex-partner stalking can even be considered a separate form of stalking, where past abusive history between the stalker and victim can serve as a unique form of psychological dominance (Logan & Walker, 2009).

Our finding of a negative relationship between psychosis and stalking violence is consistent with Rosenfeld's

original findings, but at odds with some of the violence literature. To some extent, this finding is also inconsistent with clinical knowledge regarding certain types of psychosis. The most obvious illness-based argument against our findings would involve erotomania. Compelling clinical case-study evidence exists, for example, that this condition can be a precursor to violence for stalkers. Thus, while our findings suggest that psychosis in general tends to inhibit aggressive behavior by stalkers, at the individual level of analysis the specific content and nature of the psychosis must be examined for its potential status as an inhibitor or amplifier of violence risk in stalking. The importance of evaluating psychosis in stalking situations is also heightened by data indicating that this variable is an important predictor of persistence in stalking (James et. al, 2010; Eke et. al, 2011).

In the present study, personality disorder was found to have only a weak relationship with the occurrence of violence. The size of the effect we found was similar to that reported by Rosenfeld (2004). Again, we suspect that this finding is impacted by the rather course grouping of all personality disorders together. In applied forensic practice it is common knowledge that some personality disorders are unrelated to violent behavior (e.g., Avoidant PD), while others are salient risk factors for violence (e.g., Antisocial PD, Paranoid PD). We suspect that a more nuanced analysis that focused, for example, on pertinent Cluster B personality disorders would find a stronger association between personality disorder and stalking violence.

Also consistent with Rosenfeld's (2004) findings, our results indicate that substance abuse has a significant relationship to stalking violence. This finding is consistent with the general literature on violent behavior (Bolles & Miotto, 2003), further reinforcing the notion that substance abuse is a powerful general risk factors for all sorts of violence.

Our results also indicate that stalkers with a criminal record and/or a history of violence against others are more likely to be violent. This finding is consistent with research in the general violence literature (e.g., Fountoulakis) but inconsistent with the results of Rosenfeld's meta-analysis. The significant effect sizes found in the present analysis may be due to the large variability in individual effect sizes over studies. The effect size for criminal history also increased from $r_m = .12$ in Rosenfeld's analysis to $r_m = .19$ in the current analysis indicating that, with additional research, criminal history has emerged as a more robust predictor of stalking violence.

Implications for Applied Practice

While considerable advances have occurred in risk assessment science in general, the literature pertaining to risk of violent behavior by stalkers can reasonably be described as nascent. Nonetheless, our findings are well represented in both of the existing risk metrics for stalking violence and, to some degree, are consistent with Rosenfeld's original meta-analysis. This convergence of findings and opinions suggest the emergence of a literature that can inform practice. Our review of this literature suggests considerable overlap between risk factors for stalking violence and risk factors for general violence. Criminal history, history of violent behavior and substance abuse disorders, for instance, are common risk factors for violence among forensic samples. Our findings indicate that these variables should also be considered when assessing risk of violence to victims of stalking.

Consideration of these general variables should be supplemented by a review of stalker-victim relationship variables, verbal threats and idiographic assessment of mental illness variables. The latter should include a nuanced assessment of personality disorders and psychosis. Both of these lines of inquiry should be guided by an appreciation of nomothetic findings derived from the general forensic literature and, if possible, an idiographic assessment of stalker mental status issues. Concluding that a patient with schizophrenia is stalking a victim in the delusional belief that he or she holds the secret to the meaning of life is likely to carry very different implications than a finding that the same patient is stalking the victim believing that he or she must be killed to prevent destruction of the world. In the end, patient-specific expressions of illness will determine the value of clinical variables.

Limitations

Although there are many advantages to conducting a meta-analysis, there are several limitations to the study design. First, some bias still may remain in the analysis because of the different study methods used in the original studies. Second, even though measures were taken to avoid the problem of overlapping populations as much as possible, some overlap may have occurred as the composition of the sample population (public figure versus general population) was not specified in the majority of the studies. Third, because most of the studies we examined did not rate violence severity, we were unable to examine the potential relationship between individual risk factors and severity of violence.

Publication bias also continues to be a significant problem for all quantitative research. Publication bias is defined as "the tendency to prepare, submit, and publish research findings based on the nature and direction of research results" (Dickersin, 2005). Because studies with null results often do not get published, a significant body of research cannot be accessed and included in a meta-analysis. The Fail Safe *N* values found for the mean effect sizes in this study suggest that a small number of additional unpublished studies would be needed to nullify the results of the meta-analysis. However, due to the small size of the stalking literature, and due to the fact that we conducted a search for

published studies, it may be unlikely that a lot of unpublished work exists.

In addition, the present analysis showed heterogeneity in all but three of the mean effect sizes, indicating the presence of possible moderating influences. These moderating influences may be due to systematic differences in the study design (e.g., using self-report data versus police file data) or may be due to difference between the data from victims and the data from the perpetrators.

The usual limitations associated with self-report data also apply to this study. Some participants may have been biased in the direction of under-reporting, while others may have made exaggerated claims. The possibility of exaggeration by research participants should not be discounted as researchers have documented the problem of false stalking reports (Pathé et al, 1999).

Suggestions for Future Research

Several potentially relevant risk factors have yet to be examined in relation to stalking violence. Rosenfeld (2004), for example, discussed several risk factors seen in the general violence literature, such as psychopathy and impulsivity, which may play a role in the perpetration of stalking violence. Similarly, the duration of stalking is a variable that may impact risk of violence by stalkers. The available data on these variables is unsettled, with one study (Bjorklund et al, 2010) finding a positive relationship between duration and violence and another study (Brooks, 2010) finding a negative relationship. Future research should examine these variables, as well as potential interactions between relevant variables.

As first noted by Rosenfeld (2004), there is also a need for both prospective research and research examining the relationship between various risk factors and violence severity. The majority of studies examined in this analysis discussed only the occurrence of violence with risk factors. It is conceivable, indeed likely, that certain risk factors may have a greater correlation with more severe forms of violence than other risk factors.

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