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Longitudinal Research With Sexual Assault Survivors: A Methodological Review

Rebecca Campbell,[1] Heather Brown Sprague,[1] Sara Cottrill,[2] and Cris M. Sullivan[1]

Abstract

Longitudinal research designs are relatively rare in the academic literature on rape and sexual assault despite their tremendous methodological rigor and scientific utility. In the interest of promoting wider use of such methods, we conducted a methodological review of projects that have used prospective longitudinal designs to study the occurrence of sexual victimization throughout the lifespan and/or the process of change during rape recovery (N = 32 projects). Five questions were examined: (a) What were the substantive foci of these longitudinal studies? (b) How were survivors recruited? (c) What participation rates were typical? (d) How long were participants followed over time and with what success rates? and (e) What incentives were used to increase participation? Most studies focused on postassault sequelae and recruited survivors from hospital emergency departments and other first-response help-seeking sites with highly variable participation rates. Retention rates were comparable across studies (approximately 70%).

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In 1996, the National Research Council's (NRC) review of violence against women scholarship found that the vast majority of studies in the field use cross-sectional research designs, creating a notable void of longitudinal information on which to build interventions and advance prevention. Nearly a decade later, the NRC's (2004) follow-up report noted that this methodological gap was still problematic:

> The top priority for the immediate future should be given to improving definitions and the quality of data in surveys, *conducting longitudinal studies of violence against women*, and evaluating theoretically sound prevention and intervention programs. (pp. 96-97, italics added)

Indeed, Koss and White's (2008) analysis of 11 national and global research agendas on violence against women also found consistent, persistent calls for longitudinal research, specifically projects that assess patterns of risk and protective factors as well as victimization across the life span. Cross-sectional research has established that women experience sexual, physical, emotional/psychological, and other forms of abuse in childhood, adolescence, and adulthood, and often endure multiple forms of abuse at any one time (see R. Campbell, Greeson, Bybee, & Raja, 2008; Koenig, Doll, O'Leary, & Pequegnat, 2004 for reviews). However, few studies have examined victimization and resulting health sequelae longitudinally.

Why the press for longitudinal research? The short answer, promulgated and reinforced even in introductory research methods classes, is simple: longitudinal designs offer the possibility of establishing causality by examining temporal effects and ruling out confounding explanations. Methodologists Singer and Willett (2003) provided a more nuanced discussion of the possibilities of longitudinal research. They distinguished two kinds of longitudinal foci: questions regarding change (i.e., how people mature and develop) and event occurrence (i.e., whether and when certain events occur). Change and event occurrence data can be collected retrospectively, but it is more common, particularly in the behavioral sciences, to obtain such data prospectively. Change-focused questions allow for investigation of within-individual patterns of change (growth trajectories) to see rises and falls over time in focal variables. Between-individual change (interindividual differences) can also be explored to determine whether different people have variable patterns of

within-individual change and what predicts these differences. Event-focused questions examine the occurrence and timing of significant events in people's lives, communities, or societies. These longitudinal models help identify when people are at risk for certain events and why some may be disproportionately so.

The benefits of applying each of these forms of longitudinal research to the study of sexual assault are many. For example, event-focused longitudinal research can help identify when individuals are at highest risk for assault and what factors predict victimization. Event-focused longitudinal research would involve prospectively tracking a sample of individuals to document victimizations (first assaults or revictimizations) and to identify differential risk patterns for victimization. Change-focused longitudinal research, on the other hand, is critical for understanding survivors' well-being after they have been victimized. Such work involves collecting data from survivors (preferably relatively soon after the assault) to chart declines and improvements in mental health, physical health, and overall well-being. Individual growth trajectories can illuminate the varied processes of recovery and shed some light on how and why survivors recover as they do from these forms of violence.

In spite of the tremendous utility of these methods, they remain relatively rare in sexual assault research (and in violence against women scholarship more generally). Why so rare compared to other methods? Here, too, the short answer has become lore: longitudinal studies are very expensive, lengthy, and require extensive resources to do well (NRC, 1996; Sullivan, in press). But again, the longer answer is more complicated in the context of violence against women research. Tracking women over time who have experienced violence poses additional safety and ethical considerations (J. Campbell & Dieneman, 2001). To date, these issues have been explored most closely in research on domestic violence/intimate partner violence. For example, Sullivan and Cain (2004) as well as Logan, Walker, Shannon, and Cole (2008) emphasized the absolute necessity of keeping women safe throughout *any* contact with researchers, from scheduling to assessment, and longitudinal research demands repeated, sustained contact, which raises the stakes substantially. Extensive safety and confidentiality training is necessary for all staff and, with project turnover, training can become a prolonged activity. In addition to these concerns, longitudinal sexual assault research raises ethical considerations regarding when survivors should be approached regarding participation in research and at what point posttrauma is it possible to give truly informed consent (Ruch & Wang, 2006).

These challenges are substantial but not insurmountable, as a relatively small body of longitudinal research has emerged in the past 25 years of

sexual assault scholarship. In the interest of advancing the use of longitudinal methods, a systematic review of these studies may be useful for identifying emerging techniques and strategies and their relative success in recruiting and retaining sexual assault survivors over time. Therefore, the purpose of current project was to identify longitudinal studies of sexual assault survivors and examine five key questions: (a) What are the substantive foci of longitudinal studies to date? (b) How were survivors identified and recruited into research? (c) What participation rates are typical? (d) How long were participants followed over time and with what success rates? and (e) What incentives were used to try to increase participation in these studies?

Method

We used a three-phase process to identify longitudinal studies of sexual assault survivors. First, the PsycINFO/PsycARTICLES database was searched using the terms *sexual assault*, *rape*, *sexual violence*, and *longitudinal*, *prospective*, *repeated*, and *over time*. This same search was then repeated using the Cambridge Scientific Abstracts search engine that has a broader multidisciplinary focus. These two search engines yielded 32 published articles. Second, we identified 10 authors (Foa, Gidycz, Kilpatrick, Koss, Resick, Resnick, Rothbaum, Testa, Ullman, and White) whose work was identified in our first phase as using longitudinal designs and conducted a complete review of their publications to ensure that we had captured all of their relevant works. This second phase identified 15 additional published articles. In the third phase, we conducted a manual search of all articles on sexual assault published within the last 20 years in the following journals: *Journal of Interpersonal Violence*, *Violence Against Women*, *Psychology of Women Quarterly*, *Journal of Consulting and Clinical Psychology*, and *Journal of Traumatic Stress*. We selected these journals because Jordan's (2009) review of the publishing history in violence against women scholarship indicated that sexual violence research was typically published in these outlets. We reviewed the methodology of any article on sexual assault/rape to determine whether a cross-sectional or longitudinal research design was used. This third phase identified three new articles. Our final sample was 53 articles published in peer-reviewed journals. As expected, given the resource-intensity of longitudinal projects, multiple articles were often published from the same data sets. We reviewed the methods sections of each of the 53 articles to identify which came from the same parent projects, which yielded our final sample of $N = 32$ unique projects/studies. Table 1 presents a summary of these studies, organized such that each row reflects one of the 32 unique projects; citations for additional articles from the same

Table 1. Longitudinal Studies of Rape Survivors

Study	Focus	Where Recruited	Participation Rate	Retention	Incentives
Acierno, Resnick, Flood, and Holmes (2003); Resnick et al. (2007)	Health sequelae—intervention	First-response site: At academic rape center where victims received medical forensic exam within 72 hr postassault	84% (226/269)	Treatment completion = 87% T2 (6 weeks) = 60% T3 (6 months) = 62% 68% completed at least one follow-up	Free video intervention
Atkeson, Calhoun, Resick, and Ellis (1982)	Health sequelae	First-response site: Packet of materials distributed at emergency room; letter mailed home several days following the assault	12% (115/1000)	T2 (2 weeks) = NR T3 (1 month) = NR T4 (2 months) = NR T5 (4 months) = NR T6 (8 months) = NR T7 (12 months) = NR	Reimbursed (amount NR)
Burgess and Homstrom (1974)	Health sequelae	First-response site: Hospital ER where victims received medical forensic exam	(NR)	T2 (1 year) = 85% (additional 5% indirect follow-up with families, police reports, and people who knew survivors)	(NR)
Cascardi, Riggs, Hearst-Ikeda, and Foa (1996)	Health sequelae	Multiple strategies: Referrals from police, hospital ERs, and mental health professionals; media ads	(NR)	T2 (4 weeks) = NR T3 (8 weeks) = NR T4 (12 weeks) = NR 63% completed all assessments	US$30 for each assessment

(continued)

Table 1. (continued)

Study	Focus	Where Recruited	Participation Rate	Retention	Incentives
Feeny, Zoellner, and Foa (2000)	Health sequelae	Multiple strategies: Referrals from police and hospital; newspaper ads		T2 (4 weeks) = NR T3 (12 weeks) = NR	
Feeny, Zoellner, Fitzgibbons, and Foa (2000)		Multiple strategies: Study 1: Referrals from police and hospital; newspaper ads (see Feeny, Zoellner, Fitzgibbons et al., 2000) and Valentiner et al., 1996)		Study 1: T2 (10 days) = 98% T3 (33 days) = 81% T4 (62 days) = 70% T5 (91) days = 68%	Study 1: Paid US$35 for each assessment
Orth, Cahill, Foa, and Maercker (2008)		First-response site: Study 2: victim assistance organization	Study 2: 35%	Study 2 T2 (5 months) = 38% T3 (7 months) = 81%	Study 2: 25 Euros
Foa, Hearst-Ikeda, and Perry (1995); Foa, Dancu, Hembree, Jaycox, Meadows, and Street (1999); Zoellner, Feeny, Fitzgibbons, and Foa (1999)	Health sequelae—intervention	First-response site: Victims assaulted between 6 and 21 days who were referred to anxiety center by police officers, victims' advocate counselors, and hospital emergency room personnel	(NR) (consent) 82% (intent-to-treat) (96/117)	Treatment completion = 82% T1 (PreTreatment) = NR T2 (PostTreatment) = NR T3 (3 months) = NR T4 (6 months) = NR T5 (12 months) = NR 18% overall attrition	Free therapy US$35 for each follow-up evaluation

(continued)

Table 1. (continued)

Study	Focus	Where Recruited	Participation Rate	Retention	Incentives
Foa et al. (2005)	Health sequelae—intervention	Multiple strategies: Referrals from police, victim advocates, and other professionals; newspaper ads and flyers	92% (consent) (210/229) 85% (intent-to-treat) (179/210)	Treatment completion = 68% T1 (Pretreatment) = 85% T2 (Posttreatment) = 68% T3 (3 months) = NR T4 (6 months) = NR T5 (12 months) = NR 34% overall attrition	Free therapy
Foa, Riggs, Dancu, and Rothbaum (1993)	Measurement	(NR)	(NR)	T2 (5-6 weeks) = NR T3 (9-10 weeks) = NR T4 (12-14 weeks) = NR T5 (6 months) = NR	(NR)
Foa, Rothbaum, Riggs, and Murdock (1991)	Health sequelae—intervention	Multiple strategies: Referrals from local professionals and victim assistance agencies; newspaper ads	(NR)	Treatment completion = NR T2 (Posttreatment) = NR T3 (3 months) = NR	(NR)
Frazier, Mortensen, and Steward (2005)	Health sequelae	First-response site: Victims treated in ER by nurse examiners; victims already in counseling	69% (consent) (141/203) 70% (participated) (98/141)	T2 (2 weeks) = 51% T3 (2 months) = 57% T4 (6 months) = 52% T5 (12 months) = 54% 65% completed at least 2 time points	US$20 paid for each questionnaire

(continued)

Table 1. (continued)

Study	Focus	Where Recruited	Participation Rate	Retention	Incentives
			(additional 30 counseling clients also agreed to participate)		
Gidycz et al. (2001)	Revictimization—intervention	College: Intropsychology courses	(NR)	T2 (2 months) = 98% T3 (6 months) = 80%	Participation in risk-reduction program US$15 for final follow-up, extra credit in class
Gidycz, Rich, Orchowski, King, and Miller (2006); Gidycz, Orchowski, King, and Rich (2008)	Revictimization—intervention	College: Psychology department participant pool	100% (500/500)	T2 (3 months) = 81% T3 (6 months) = 70%	Participation in risk-reduction program US$20 for follow-ups; extra credit for initial assessment
Gidcyz, Van Wynsberghe, and Edwards (2008)	Revictimization	College: Intropsychology courses	(NR)	T2 (9 weeks) = NR	Partial course credit for participation

(continued)

Table 1. (continued)

Study	Focus	Where Recruited	Participation Rate	Retention	Incentives
Griffin (2008)	Health sequelae	Multiple strategies: Referrals from victim-assistance agencies, police agencies, and hospitals; media ads	(NR)	T2 (6 months) = 100%	US$60 first assessment, US$80 for follow-up
Hanson and Gidycz (1993)	Revictimization—intervention	College: Undergrad psychology courses	(NR)	T2 (~4 months) = 96%	Participation in sexual assault prevention program Extra credit in intro psych courses
Humphrey and White (2000); Smith, White, and Holland (2003); McMullin, Wirth, and White (2007)	Revictimization	College: Women entering college	(NR)	1990 sample: T2 (1st year college) = 88% T3 (2nd year college) = 83% T4 (3rd year college) = 84% T5 (3rd year college) = 78% Completed all waves = 48%	US$15 paid for each completed survey

(continued)

Table 1. (continued)

Study	Focus	Where Recruited	Participation Rate	Retention	Incentives
				1991 sample: T2 (begin 1st year college) = (NR) T3 (end 1st year college) = 88% T4 (end 2nd year college) = 83% Completed all waves = 45%	
Kaysen et al. (2006)	Health sequelae	First-response site: Referrals from police, hospital, and victim service agencies	(NR)	T2 (3 months) = 64%	(NR)
Kilpatrick, Veronen, and Resick (1979a); Kilpatrick, Veronen, and Resick (1979b); Kilpatrick, Resick, and Veronen (1981)	Health sequelae	First-response site: Rape victims who sought counseling/advocacy from rape crisis center or sought treatment at county hospital ER	43% (46/106)	T2 (6-10 days) = 81% T3 (1 month) = 88% T4 (3 months) = 73% T5 (6 months) = 57%	US$5/hour

(continued)

Table 1. (continued)

Study	Focus	Where Recruited	Participation Rate	Retention	Incentives
Koss and Figueredo (2004a); Koss and Figueredo (2004b)	Health sequelae	Multiple strategies: Referrals from clients of sexual assault service centers; direct mailings to physicians, clergy, and psychotherapists; posters and flyers	18% (48/269) (for sexual assault service center recruitment only)	T2 (6 months) = NR T3 (12 months) = NR T4 (18/24 months) = NR 71% completed 2 or more interviews	US$25 and child care and transportation provided
Marx, Calhoun, Wilson, and Meyerson (2001)	Revictimization—intervention	College: University research pool	(NR)	T2 (2 months) = 92%	Participation in risk reduction program Course credit
Messman-Moore and Brown (2006)	Revictimization	College: Flyers and class announcements	(NR)	T2 (10 weeks) = 96% T3 (20 weeks) = 89% T4 (30 weeks) = 85%	Payment (US$30 for first assessment and US$15 for each additional session) or research credit

(continued)

Table 1. (continued)

Study	Focus	Where Recruited	Participation Rate	Retention	Incentives
Resick, Nishith, Weaver, Astin, and Feuer (2002); Resick, Galvoski, Uhlmansiek, Scher, Clum, and Young-Xu (2008)	Health sequelae—intervention	Multiple strategies: Referrals from victim assistance agencies, community therapists; flyers, newspaper ads, and word of mouth	63% (eligible) (162/256) 93% (intent-to-treat) (150/162)	Treatment completion = 73% (average) T1 (Pretreatment) = 98% T2 (Posttreatment) = 79% T3 (6 months) = 79% 15% overall attrition	Free therapy
Resnick, Acierno, Amstadter, Self-Brown, and Kilpatrick (2007)	Health sequelae—intervention	First-response site: At academic medical center where victims received medical forensic exam within 72 hr postassault	75% (442/592)	Treatment completion = 87% T2 (3 months) = 53% T3 (3-6 months) = 33% T4 (6+mo) = 54% 66% completed at least 1 follow-up	Free therapy
Rothbaum, Foa, Riggs, Murdock, and Walsh (1992); Gilboa-Schechtman and Foa (2001)	Health sequelae—intervention	Multiple strategies: Victims seen in inner-city hospital ER and info brochures distributed by victims' assistance officers; media ads	(NR)	Treatment completion = 67% T2 (2 weeks) = NR T3 (3 weeks) = NR T4 (4 weeks) = NR T5 (5 weeks) = NR T6 (6 weeks) = NR T7 (7 weeks) = NR T8 (8 weeks) = NR	Free therapy US$20/session, US$30 bonus at last assessment for completing all sessions

(continued)

Table 1. (continued)

Study	Focus	Where Recruited	Participation Rate	Retention	Incentives
				T9 (9 weeks) = NR T10 (10 weeks) = NR T11 (11 weeks) = NR 55% completed at least 10 of 12	
Rothbaum, Ninan, and Thomas (1996)	Health sequelae—intervention	Multiple strategies: Referrals from professionals and media ads	(NR)	Treatment completion = 71% T2 (12 weeks) = NR	(NR)
Ruch, Amedo, Leon, and Gartrell (1991)	Health sequelae	Help-seeking center: Recruited at intake to a sexual assault treatment center	(NR)	T2 (8 days, average) = 57%	(NR)
Ruch and Wang (2006)	Measurement	First-response site: Victims informed of study at intake to sexual assault treatment center and then asked for consent to contact them later	59% (223/380)	T2 (3 months) = 93% T3 (7 months) = 87% T4 (11 months) = 83% T5 (15 months) = 82%	US$15 for assessments at Months 1, 5, 7 US$20 for assessments at Months 11 and 15 + US$50 if completed all surveys

(continued)

Table 1. (continued)

Study	Focus	Where Recruited	Participation Rate	Retention	Incentives
Testa, Livingston, and Hoffman (2007); Livingston, Hequembourg, Testa, and VanZile-Tamsen (2007); Testa, Van-Zile-Tamsen, and Livingston (2007)	Health sequelae	Other: Random digit dialing of households	61% (1014/1662)	T2 (12 months) = NR T3 (24 months) = NR Completed all waves = 91%	US$50/session
Turchik, Probst, Chau, Nigoff, and Gidycz (2007)	Revictimization	College: Online psychology experiment sign-up	(NR)	T2 (~4 months) = 73%	Course credit
Ullman, Townsend, Starzynski, and Long (2006); Ullman and Najdowski (2009); Mason, Ullman, Long, Long, and Starzynski (2009); Najdowski and Ullman (2009)	Health sequelae	Multiple strategies: Flyers, advertisements, and notices distributed on college campuses, community and health agencies, and rape crisis centers	90%	T2 (1 year) = 69%	US$20 for survey

(continued)

Table 1. (continued)

Study	Focus	Where Recruited	Participation Rate	Retention	Incentives
Ullman (2000)	Measurement	Multiple strategies: Flyers, advertisements, and notices distributed on college campuses, community and health agencies, and rape crisis centers	86%	T2 (8 weeks) = NR	Paid US$10 for first survey, US$5 for the follow-up
Valentiner, Foa, Riggs, and Gershuny (1996); Zoellner, Foa, and Brigidi (1999); Zoellner, Sacks, and Foa (2001); Orth, Cahill, Foa, and Maercker (2008)	Health sequelae	Multiple strategies: Referrals from emergency room personnel, victim-assistance police officers; media ads	(NR)	T2 (4 weeks) = NR T3 (6 weeks) = NR T4 (8 weeks) = NR T5 (10 weeks) = NR T6 (12 weeks) = NR	(NR)

Note: NR = information was not reported/not given in published manuscript; ER = emergency room.

projects are listed in the first column of each row. The published articles from each of the 32 projects were reviewed and coded by two research assistants for information regarding our five focal research questions. A final, independent audit of the coding was then conducted by a third research assistant.

Results

What Are The Substantive Topics In Longitudinal Sexual Assault Research to Date?

The substantive foci of the 32 projects could be classified into five categories. First, the most common topic in longitudinal sexual assault research has been understanding the mental health sequelae of sexual victimization ($n = 13$ projects; 41%). For example, the longitudinal research conducted in the 1970s and early 1980s by Atkeson, Calhoun, Resick, & Ellis (1982), Burgess and Holmstrom (1974), and Kilpatrick, Veronen, & Resick (1979a, 1979b) laid the scientific foundation for our current understanding of how fear and anxiety, depression, and startle reactivity progress over the course of survivors' recoveries. More recently, multiple investigators have expanded this line of inquiry to explore the interrelationships of mental health and substance abuse and other comorbid conditions (e.g., Testa, Livingston, & Hoffman, 2007; Ullman, Townsend, Starzynski, & Long, 2006). Second, from this knowledge base, longitudinal treatment studies evolved, and independent research teams lead by Foa, Resick, Resnick, and others have identified multiple effective therapeutic interventions for alleviating rape-related symptomatology and/or preventing substance abuse among rape survivors ($n = 8$ projects; 25%).

The third most investigated topic in longitudinal sexual assault research has been sexual revictimization ($n = 4$; 12.5%) and fourth, the development of interventions that seek to prevent victimization/revictimization ($n = 4$; 12.5%). This line of work has often been conducted with college students to track their victimization over the course of their college experience and identify risk factors for first-time and subsequent sexual assaults (e.g., Messman-Moore & Brown 2006; McMullin, Wirth, & White, 2007; Smith, White, & Holland, 2003). Building on this work, projects by Gidycz, Marx, and their colleagues have used longitudinal experimental designs to evaluate a risk reduction program for sexual revictimization (e.g., Gidycz, Rich, Orchowski, King, & Miller 2006; Marx, Calhoun, Wilson, & Meyerson, 2001). In addition to these four major substantive foci, three studies (9%) have used longitudinal methods for measurement development (Foa, Riggs, Dancu, & Rothbaum, 1993; Ruch & Wang, 2006; Ullman, 2000).

How Do Researchers Identify and Recruit Sexual Assault Survivors for Longitudinal Research?

In light of the fact that most studies in this small literature were focused on understanding mental health sequelae, finding sexual assault survivors fairly soon after they had been assaulted was methodologically necessary but practically difficult as it requires finding where survivors "surface" in their communities postassault. As a result, the majority of projects in this review ($n = 22$; 69%) recruited survivors from medical, legal, and/or social service programs where victims often turn for help postassault. Half of these studies ($n = 11$) recruited exclusively from first-response help-seeking sites and half ($n = 11$) worked with these programs in combination with other techniques such as newspaper media ads (termed "multiple strategies" in Table 1).

Recruiting at first-response help-seeking sites can be quite effective because approximately 27% to 40% of survivors seek medical care and medical forensic examinations (most often in hospital emergency departments/emergency rooms), 26% to 40% report the assault to the police and pursue prosecution through the criminal justice system, 16% to 60% obtain mental health services, and 14% to 21% contact rape crisis centers (R. Campbell, Wasco, Ahrens, Sefl, & Barnes, 2001; Ullman, 1996a, 1996b, 2007; Ullman & Filipas, 2001). Recruitment at hospital emergency departments has been a particularly common strategy in longitudinal research (21 of the 22 projects recruiting through first-response help-seeking sites worked with hospital ERs)[1] because medical forensic exams are typically done within 72 hr postassault, thereby providing access to survivors very soon after the assault. A variation on this recruitment strategy has been to enlist the help of medical and legal professional to provide referrals to the study rather than directly approaching survivors immediately postassault at these first-response sites, so that survivors can choose whether to contact the research team at a later date (e.g., Ruch & Wang, 2006). Rape crisis centers are a highly underutilized recruitment site as only five of the projects using first-response site recruitment (either exclusively or in combination with multiple strategies) worked with these programs (another 5 projects worked with "victim assistance agencies," but it was not clear based on the information in the published articles whether these programs were in fact rape crisis centers).

If the substantive goals of the study do not require immediate postassault recruitment, then community-based sampling strategies can be used to find survivors who do not seek help from formal social systems. For example, a project by Testa, Livingston, & Hoffman (2007) used random digit dialing to recruit a representative sample of community women aged 18 to 30. Some

women had prior histories of sexual victimization and all women were followed over 2 years to capture subsequent victimizations, if any, and health outcomes.

Recruitment through college courses has also been used for longitudinal research and, not surprisingly, this method is used mostly in studies of revictimization and evaluations of risk reduction interventions (n = 8; 257%). Undergraduate students were approached regarding the opportunity to participate in research by such strategies as (a) distributing information to females entering college, (b) announcements and handouts in classes, and (c) participation as research participants for introductory psychology classes. In these studies, researchers screen women for a history of sexual victimization and most samples include women with and without histories of sexual victimization; only a few studies use victimization as a selection criteria (e.g., Marx et al., 2001).

What Are Survivors' Initial Participation Rates in Longitudinal Research?

Initial participation rates were not provided in more than half of the published articles (n = 18; 56%), mostly in projects with college student samples (which focused on revictimization or revictimization interventions). When this information was provided, we computed participation rate for *non*intervention studies as the number of survivors who agreed to participate relative to the number of individuals informed/approached about the study. For intervention studies, we defined consent participation rates as the number of individuals who consented to participate in the project relative to the number screened eligible for the intervention; intent-to-treat participation rates were defined as the number of individuals who began the study after initial consent relative to the number who consented but dropped out before the study.

Nonintervention studies of postassault health sequelae typically recruited survivors at first-response sites, but with marginal success. Participation rates for these studies ranged from 12% to 69%, but most were less than 45%. Perhaps this is not entirely unexpected given that this recruitment method involves approaching survivors immediately postassault when the trauma is still quite recent and survivors may not be willing to share details about their experiences. Participation rates in intervention studies of postassault health sequelae were markedly higher, typically in the 80% range for consent and intent-to-treat. Virtually all of these studies also recruited in first-response sites, but perhaps because their incentive was free therapy or video intervention, initial participation rates were higher.

What Retention Rates Are Typical in Longitudinal Sexual Assault Research?

Researchers use variable notation/terminology in designating waves of longitudinal data collection. For instance, most label the first assessment T1 and then the first follow-up is labeled T2 (and so on); however, a few research teams used the designation T1 for the first-follow-up in their publications. To compare across studies, we imposed a standardized labeling for Table 1 such that T1 reflects the first assessment and T2 reflects the first follow-up (which was the more common labeling approach).

As is readily apparent in Table 1, longitudinal sexual assault studies are highly variable in the number of times they try to collect data from participants and across what intervals. But, interestingly, there was not substantial variation in retention rates as a function of how long the research team attempted to track participants. Studies that tried to follow participants for 6 weeks or less had on average a 77% retention rate; studies that tracked to 3 months had a slightly lower average rate of 75%; studies to 6 months, 76%; and studies to 1 year (or more), 77%. The highest retention rate was obtained by Testa, Livingston, & Hoffman (2007) at 91% over 2 years, which was also one of the longest intervals attempted.

There did not appear to be substantial variation in retention rates as a function of study foci or method of sample recruitment. As might be expected, retention rates were somewhat higher for college student studies of revictimization or revictimization interventions (81% on average, across variable tracking intervals). Studies of postassault health sequelae and health interventions, which typically recruit from first-response sites, were quite comparable at 73% to 77% average retention (across variable tracking intervals). Treatment completion rates for the intervention studies were more variable, ranging from 68% to 87%.

What Incentives Are Used in Longitudinal Sexual Assault Research?

Researchers use a variety of incentives and reimbursements to try to attain high participation and retention rates in longitudinal studies. Half of the projects in this review provided financial compensation to participants, ranging from US$10 to US$60 for the first assessment (most were US$20 to US$35). Many projects increased the amount of financial compensation for subsequent assessments and/or provided a bonus for completing additional or all follow-ups. As noted previously, there was not substantial variability in

retention rates across studies, so it does not appear that there is a strong association between compensation amount and retention success. That said, the two studies with the highest retention rates were also at the high end of the compensation range (Griffin, 2008: US$60-US$80; Testa, Livingston et al., 2007: US$50 each).

Discussion

Our goal in this review was to summarize key methodological features of longitudinal studies with sexual assault survivors. Although we extracted useful information regarding recruitment methods, participation rates, retention, and incentives, many published reports did not include these technical details. The advancement of longitudinal scholarship on sexual violence against women will be facilitated by the dissemination of such information so that researchers can make strategic decisions about how best to structure their projects in light of their specific goals. Indeed, we decided to write this review because when our team was planning a longitudinal sexual assault study, we found no compiled resources on this methodological design.

This analysis of 32 longitudinal sexual assault projects highlights that choice of recruitment site(s) and the use of participant incentives may make a difference in initial participation rates. Studies on postassault sequelae often recruit from first-response medical, legal, and social service programs, such as hospital emergency departments, rape crisis centers, and police departments to find survivors fairly soon after the assault occurred. With incentives of therapeutic interventions, participation rates tend to be higher than in nonintervention projects. So, what can be done to increase participation in nonintervention studies? This review cannot provide a definitive answer to this question, but it does offer a few clues.

First, Frazier, Mortensen, and Steward (2005) obtained the highest documented participation rate for a nonintervention study of 69% by working in collaboration with a Sexual Assault Nurse Examiner (SANE) program. Other research has found SANE programs to be a more survivor/patient-centered model of care than what is offered in traditional hospital emergency departments (see R. Campbell, Patterson, & Lichty, 2005 for a review). SANE programs appear to be particularly effective in addressing the immediate trauma of sexual assault and empowering survivors' choices (R. Campbell, Patterson, Adams, Diegel, & Coats, 2008). If survivors are well-cared for and their immediate needs have been met, then perhaps they are more willing to collaborate with researchers. Second, Ruch and Wang (2006) also obtained one of the higher participation rates for a nonintervention, first-response site

recruitment study (59%). In this project, victims were informed about their study at intake to sexual assault treatment center and then asked for consent to contact them later. Survivors did not have to make a decision about participating in the study right away; the recruitment methods emphasized survivors' choice. Taken together, the Frazier et al. and Ruch and Wang study suggest that empowering care and empowering choice may be keys to better participation rates. Of course, these ideas are speculative, but future research that systematically compares participation rates across methods of recruitment would shed more light on this phenomenon.

Nevertheless, it is important to keep in mind that most rape survivors do *not* seek community services, so recruiting from hospitals, rape crisis centers and the police can only reach certain segments of what must be presumed to be a diverse, heterogeneous population. The degree and nature of bias introduced by such recruitment methods is nearly impossible to estimate but is worth nothing that cross-sectional studies have documented that interactions with the legal and medical systems (in particular) often exacerbates victims' feelings of shame, blame, and fear, which has been associated with increased PTSD (see R. Campbell, 2008 for a review). As a result, longitudinal studies of the mental health consequences of sexual assault with women recruited from these settings may have captured both the distress of the rape itself and the distress of negative help-seeking experiences without adequately disentangling these effects. However, near-immediate postassault identification of rape survivors may be extremely difficult with other recruitment methods. Prospective studies with college samples have the potential to avoid this problem, as it would be conceivable that researchers would be able to capture mental health effects before, during, and after help-seeking (if any). Most research with college student samples, however, has been focused on victimization/revictimization rather than charting postassault health sequelae. College students also represent a very select group of individuals, severely limiting generalizability of findings.

Random digit dialing (RDD) methods have been used in large-scale cross-sectional sexual assault research (e.g., the Rape in America Project by Kilpatrick and colleagues [1992] and the National Violence Against Women Survey by Tjaden and Thoennes [1998]), but to date, only one project has used these methods for the recruitment of a sample for longitudinal research (e.g., Testa, Livingston et al., 2007). Testa's project had a 61% participation rate, which is high for nonintervention studies, and was successful at retaining 91% of the sample over 2 years. Clearly, this project suggests that RDD may be an effective but underutilized recruitment method in longitudinal sexual assault research. On the other hand, RDD methods are struggling

with growing coverage problems (because of increased use of cell phones and decreased use of land lines) and falling response rates (see Galesic, Tourangeau, & Couper, 2006; Johnson, Holbrook, Cho, & Bossarte, 2006 for reviews). Other strategies, such as audio computer-assisted interviews, Web surveys, and interactive voice response surveys, have several methodological advantages over RDD methods (see Galesic et al., 2006) and some of these techniques have been used with success in cross-sectional sexual violence studies (e.g., DiLillo, DeGue, Kras, Loreto-Colgan, & Nash, 2006; Reddy et al., 2006; Rosenbaum, Rabenhorst, Reddy, Fleming, & Howells, 2006). Mixed mode designs are also worth exploring in longitudinal sexual violence research.

Retention rates in longitudinal sexual assault research were fairly consistent even with very different assessment intervals across studies. Most projects were able to retain, on average, about 70% of their original sample. These rates can likely be improved, and there is a growing literature in domestic violence research specifically on tracking strategies that may be of use to sexual assault researchers. For example, Sullivan and colleagues (1996) systematically examined the strategies necessary to obtain their retention rate with intimate partner violence (IPV) survivors of 94+% every 6 months across 2 years. They concluded that their retention rate was due in large part to involving survivors in designing their retention protocol, respecting survivors throughout the research process and explaining how the study findings would be used to improve services, being willing to go into the community to locate study participants over time, using participants' family and friends to help locate them, extensively training interviewers in safety protocols, and compensating participants for their time. Logan and colleagues (2008) corroborated the utility of these techniques in their ability to retain 94% of IPV survivors over 1 year. These strategies are all generalizable to longitudinal research with sexual assault survivors but, as noted by both Sullivan and Logan, these efforts are both resource- and time-intensive.

In the continued development of longitudinal research on rape and sexual assault, it will also be important to capitalize on the newest advances in statistical analysis for such designs. Although this review focused on design and implementation issues rather than statistics, it is worth noting that, to date, the most commonly used analytic techniques in longitudinal sexual assault research have been ANOVA/ANCOVA or MANOVA/MANCOVA, with some studies in this review using hierarchical regression (or SEM path modeling), logistic regression, and log linear analysis. Such techniques are certainly appropriate, but there has been a veritable explosion of more nuanced methods for analysis of change and event occurrence that may be more illuminating

(see Singer & Willett, 2003). For example, questions about interindividual differences in sexual assault recovery can be modeled with multilevel approaches, such as mixed effects regression (see Resick, Nishith, Weaver, Astin, & Feuer, 2002, Resick et al., 2008) or individual growth curve modeling (see Koss & Figueredo, 2004 a,b; see also Orth et al., 2008 for cross-lagged measurement models). Event occurrence research on victimization and revictimization can be sensitively handled with survival analysis (see Smith, White, & Holland, 2003) or Cox regression models. Capturing the maximum detail possible about risk and protective factors for the occurrence of sexual victimization and recovery will be instrumental in achieving the long-established national and global agendas for research-informed interventions and prevention.

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Note

1. The other project recruited from a "sexual assault treatment center," but there was not sufficient information provided in the article to determine whether this was a hospital emergency department medical forensic exam program.

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