









# Couple-Based Behavioral HIV Interventions by the Social Intervention Group: Progress, Gaps, and Future Directions

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## Abstract

**Purpose:** This paper reports a review of couple-based behavioral HIV interventions conducted by the Social Intervention Group (SIG); and addresses gaps, future directions, and implications for couple-based HIV interventions. **Method:** We performed a literature review for SIG research on intervention and prevention studies involving couples/partners. **Results:** We identified nine couple-based interventions. Outcomes included reduced sexual and substance use-related risk behaviors and improved use of anti-retroviral treatment. We conducted these studies in diverse venues, including needle/syringe exchange programs, primary care clinics, and criminal justice settings. **Conclusions:** The findings of this review provide strong evidence for the efficacy of couple-based HIV interventions in reducing sexual HIV risks and linkage to HIV and substance-use treatment. SIG has advanced couple-based HIV intervention research science by improving study design, intervention core components, conceptual models, and implementation strategies; which have informed scientific directions and transformed couple-based HIV prevention research.

## Keywords

HIV, behavioral intervention, couple-based, prevention, drug-use, implementation science

Since the onset of the HIV epidemic, an estimated 75 million people have been infected globally, and approximately 40 million people have died of HIV-related illness (WHO, 2021). Approximately 1.2 million people in the United States are living with HIV, and it is estimated that approximately 13% of people living with HIV do not know their serostatus (DHHS, 2021). Globally, a significant number of new HIV transmissions occur among people involved in established relationships or marriage (Chemaitelly et al., 2014; Desgrées-du-Loû & Orne-Gliemann, 2008; Dunkle et al., 2008). It is these dyads that the Social Intervention Group (SIG) has targeted through HIV interventions. We developed, implemented, and tested HIV couple-based biobehavioral interventions to reduce sexual- and drug-risk behaviors and to improve outcomes across the HIV continuum of care.

Over the past 25 years, significant progress has been documented in biomedical HIV prevention such as antiretroviral therapy, pre-exposure prophylaxis (PrEP), and post-exposure prophylaxis (PEP), as well as behavioral interventions (Rotheram-Borus et al., 2009), such as psycho-educational and skills-building interventions designed to reduce sexual- and drug-risks, improve HIV testing and adherence to ART,

and promote the use and adherence to PrEP and PEP (Burton et al., 2010; Crepaz et al., 2015; Jiwatram-Negrón & El-Bassel, 2014) and treatment as Prevention (TasP), which is one of the most highly effective options for preventing HIV transmission. People living with HIV who take antiretroviral therapy as prescribed, and get and keep an undetectable viral load, can live long and healthy lives and will not transmit HIV to their HIV-negative partners through sex (CDC, n.d.).

Approaches used to increase uptake of these biomedical and behavioral prevention interventions primarily target

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individual modalities and not couple-based approaches. In the past two decades, there has been a modest increase of HIV couple-based behavioral studies, but their implementation in real-world settings remains limited (Burton et al., 2010; Crepaz et al., 2015; El-Bassel, Gilbert, et al., 2010; Gause et al., 2018; Jiwatram-Negrón & El-Bassel, 2014).

Despite the limited number of couple-based HIV biomedical and behavioral interventions, a number of systematic reviews and meta-analyses provide evidence that HIV couple-based behavioral interventions are more efficacious in promoting protective sex, increasing condom use, increasing HIV testing, and increasing uptake and adherence to ART, when compared with HIV interventions delivered to individuals (Burton et al., 2010; Crepaz et al., 2015; Desgrées-du-Loû & Orne-Gliemann, 2008; El-Bassel, Gilbert, et al., 2010; Gause et al., 2018; Jiwatram-Negrón & El-Bassel, 2014; Muessig & Cohen, 2014; Remien et al., 2005).

Research on couple-based HIV interventions have also shown that couple-based modalities can provide a supportive environment that improves communication about behaviors (i.e., having an outside relationship or a sexually transmitted infection). A couple-based modality also provides opportunities to enhance positive decision making, such as taking responsibility for safer sex practices and promoting social support (Crepaz et al., 2015; Jiwatram-Negrón & El-Bassel, 2014). Moreover, the systematic reviews demonstrate that an HIV couple-based modality improves communication and negotiation skills, as well as relationship satisfaction (Burton et al., 2010; Crepaz et al., 2015; Gause et al., 2018; Jiwatram-Negrón & El-Bassel, 2014).

Additionally, systematic reviews have shown that the majority of couple-based behavioral interventions target heterosexual women and men (Burton et al., 2010; Jiwatram-Negrón & El-Bassel, 2014). To date, few studies have focused on couples comprised of men who have sex with men (MSM) (e.g., Wu et al., 2011). These systematic reviews also report a consensus on the critical need for more HIV intervention approaches that focus on couple modalities, particularly for key populations in intimate relationships, such as people who use drugs, MSM, those involved in the criminal justice system, and transgender men and women (Burton et al., 2010; Crepaz et al., 2015; Jiwatram-Negrón & El-Bassel, 2014). Moreover, systematic reviews call for more research on advancing theories guiding HIV couple-based studies, measurement, recruitment and retention in this type of research, and implementation and dissemination of couple-based interventions to real-world settings (e.g., in HIV/STI clinics, criminal legal settings, substance use treatment programs, and primary care offices) (Burton et al., 2010; Jiwatram-Negrón & El-Bassel, 2014).

SIG has received considerable funding to advance couple-based behavioral HIV intervention research. This paper reports a review of the couple-based behavioral HIV intervention studies conducted by SIG since 1997. In this review paper, we included multiple types of studies, including quasi-experimental

designs to test the feasibility or preliminary outcomes, and randomized controlled trials (RCTs) that evaluate the efficacy and implementation of HIV couple-based research. We highlight our contributions in a number of areas of couple-based HIV intervention science, such as the definition of “couple” in HIV couple-based research, inclusion and exclusion criteria used in couple-based research, recruitment strategies, study designs, intervention modalities, theories that guide the interventions, common core elements of the interventions, challenges to conducting couple-based HIV/STI research, scientific contributions of study outcomes on reducing sexual and drug use risk behaviors and improving outcomes across the HIV care continuum, and implementation strategies to promote couple-based intervention delivery. Further, this review discusses gaps in the science of couple-based research and future directions and implications for social work research and practice.

## Method

In this review, we included couple-based studies conducted by SIG-affiliated researchers that aimed to decrease sexual- and drug-risk behaviors; reduce HIV/STI transmission and acquisition; promote HIV testing and initiation of ART; sustain treatment adherence; and diminish fatal and non-fatal drug overdose. Specifically, we included SIG research that implemented at least one intervention or prevention modality that focused on the “couple”: including dyads, sexual partners, and married or cohabiting partners. The included research focused on heterosexual and MSM couples, and organizations considering adoption of couple-based approaches. The studies employed RCTs or quasi-experimental (pre-post) designs. This paper aimed to review the cumulative body of research performed by SIG on this topic, therefore, studies by non-affiliated authors were excluded. Papers that focused on modeling epidemiological/surveillance or lacked published outcomes were also excluded.

As a starting point, we compiled an internal list of publications by SIG that fit inclusion criteria. We then performed electronic searches for this review on studies that were published between January 1990 and December 2021 through PubMed, Biomed Central, CINAHL, and Sociological Abstracts to ensure inclusion of all relevant articles. Search terms included “HIV” in conjunction with “HCT,” “VCT,” “CVCT,” “prevention,” “intervention,” “treatment,” or “adherence,” as well as “couple,” “MSM,” “partners,” “dyad,” or “married.” Reference-chaining was also performed. All identified articles produced by SIG-affiliated researchers that fit these inclusion criteria were cross-referenced for duplication and the remaining papers were screened for relevance. Relevant papers were reviewed by the lead author and one co-author independently.

## Results

We identified 13 peer-reviewed papers that published outcomes from nine discrete couple-based HIV interventions.

We summarized each intervention, target population, outcomes, and findings (Table 1), as well as guiding principles, theoretical frameworks, and funding sources (Table 2).

This section includes findings related to the methods (e.g., definitions of a “couple,” inclusion criteria, recruitment sites, samples, study designs, etc.), primary and secondary outcomes, and theoretical frameworks underlying each intervention.

### *Definition of “Couple” in SIG’s Couple-based Studies*

As reported in Table 1, of the nine studies that were identified in the review, six included heterosexual couples, one study focused on MSM (Wu et al., 2011), and one included both heterosexual and MSM couples (Remien et al., 2005). Participants in all SIG HIV couple studies were adults 18 years or older.

Inclusion criteria to define a “couple” included, (1) length of time: one study required participants to have been together for at least 3 months (El-Bassel et al., 2019), with seven studies requiring couples to have been together for at least 6 months (Table 1); and (2) intention to stay together: all but two couple-based studies (Remien et al., 2005; Wu et al., 2011) stipulated that both partners needed to indicate an intention to remain together for at least one year in order to meet inclusion criteria (Table 1). This was done in order to enhance retention of the couples in the study. These criteria and definitions have guided all SIG couple-based studies and have been used in many global HIV studies involving couples (Jiwatram-Negrón & El-Bassel, 2014).

Three of the nine studies employed a verification assessment screening, modified from McMahon et al. (2003), prior to study participation to confirm whether the couple was “truly a couple.” For example, each partner was separately asked when the couple first met, length of time together, and information about living arrangements to determine whether the individuals were, indeed, a couple (El-Bassel, Gilbert, et al., 2011; Remien et al., 2005; Wu et al., 2011).

### *Partner Violence Experience as an Exclusion Criterion for Participation in the Studies*

Participants were assessed for intimate partner violence (IPV) at screening, baseline, and follow-up interviews. In the majority of studies, participants were excluded if either member of the dyad reported experiencing physical and/or sexual IPV at screening or baseline, in order to avoid escalation of IPV. This is consistent with literature that suggests that discussing serious matters such as condom use may further escalate IPV, if the relationship is already contentious (Wingood & DiClemente, 1997). In PACT, SIG’s most recent couple study, IPV exclusion criteria were not implemented; instead, a brief IPV assessment was integrated into the study’s recruitment and enrollment procedures (El-Bassel

et al., 2019). This was done so that couples who may need the intervention in order to learn how to prevent HIV together, acquire better communication skills, and gain understanding about condom negotiation were not excluded (El-Bassel et al., 2019). Couples who reported IPV or fear of IPV were asked individually whether they had an order of protection and if they would feel safe participating in sessions where sensitive issues about sex, relationships, drugs, adherence to ART, or linkage to care are discussed. During and outside the sessions, procedures were put in place to assess suspicion about, or witnessing whether one or both partners was verbally, physically, or sexually abusive. We trained research staff and the session facilitators to assess IPV, and use IPV safety planning and safety referrals as needed. Further, in the PACT study, ground rules focused on safety were established at the beginning of the session. For example, couples made an agreement that “We commit to being responsible for our reactions and avoiding threats or actions that may cause our partners to feel physically unsafe.”

### *Recruitment Sites and Strategies*

As reported in Table 1, recruitment sites and strategies used to enroll couples varied across studies. SIG’s first couple-based study, Project Connect, detailed a recruitment protocol describing the development (protocol development) and implementation (strategies employed) of an approach that safely enrolled 217 African American and Latinx heterosexual couples into the study with no adverse events (Witte et al., 2004). This approach was adapted in subsequent studies.

Recruitment strategies also met potential participants “where-they-were” by visiting venues that members of the target populations frequented, such as service organizations and food pantries. For example, in studies among people who inject drugs, participants were recruited at needle/syringe programs (El-Bassel et al., 2014; El-Bassel, Gilbert, et al., 2011). For PACT, an intervention for men undergoing community supervision and their female partners, recruitment occurred at alternative-to-incarceration programs and probation offices (El-Bassel et al., 2019). For studies that targeted sero-discordant couples (El-Bassel, Jemmott, et al., 2010; Remien et al., 2005), recruitment occurred at HIV clinics and community-based organizations serving people living with HIV. Word-of-mouth and street-based outreach were also popular methods of recruitment; with Connect 2, Project Eban, and Project Renaissance utilizing them (El-Bassel et al., 2014; El-Bassel, Gilbert, et al., 2011; El-Bassel, Jemmott, et al., 2010). Further, studies also used one member of a couple to recruit their partner: Project Connect recruited women at primary care clinics, who then recruited their partners (El-Bassel et al., 2003); while in PACT, the men were recruited first and then they brought in their partners (El-Bassel et al., 2019). This shift in approach was an intentional change to ensure that recruiting through women was not biasing sample selection. For the SMART

**Table 1.** Couple-Based Behavioral HIV Interventions Implemented by the Social Intervention Group.

Paper	Intervention Name and Modality	Years Implemented, Location, Recruitment	Sample and Eligibility Criteria	Design	Outcomes	Findings	Limitations
(El-Bassel et al., 2003)	<i>Project Connect</i> 6, 2-h sessions, delivered over 6 weeks (1, 1-h HIV/STI control session). Sessions were with the couple together (besides for the first session which occurred individually), or the woman alone. Focused on the woman and her recruited partner, emphasizing the relationship context, including issues of intimacy and closeness in the relationship, the meaning of monogamy and trust, and how all of these factors act as barriers to HIV/STI protection. Importance of relationship communication, negotiation, and problem-solving skills. How relationship dynamics may be affected by gender roles and expectations. The sessions emphasized	1997–2001 New York City, United States Primary care clinics in the Bronx	217 minority, heterosexual couples in NYC at risk for HIV Women were eligible for the study if she: had a main steady male sexual partner with whom she had been involved for at least 6 months; was confident that she would stay with this main steady partner for at least one year; had had vaginal or anal sex with this partner in the past 30 days; did not always use condoms with this partner in the past 90 days; reported no life-threatening IPV by this partner within the last 6 months. Women also had to report knowledge or suspicion that her partner had at least met one of the following risk criteria: that he had had sex with other men or women in the last 90 days; had been diagnosed with or exhibited symptoms of an STI in the last 90 days; had injected drugs in the last 90 days; was HIV positive.	3-arm RCT: • couples (n = 81) • women only (n = 73) • control (woman only) (n = 63)	Assessed at baseline and 3-month follow-up. In the last 90 days: self-reported number of unprotected acts of vaginal intercourse with the study partner; proportion of protected acts of vaginal intercourse with the study partner; self-reported number of STI symptoms; number of sexual partners; number of times participants engaged in vaginal intercourse with their study partner; and the number of times either a male or female condom was used with this partner.	No significant differences were seen between the couples and women-only arms. Both intervention arms saw reductions in the proportion of unprotected and increases in the proportion of protected sex acts at 3-month follow-up.	Participants were self-selected; no biological STI outcomes; short follow-up; relatively small sample size; different dosage/attendance between the two intervention arms.

*(continued)*

**Table 1.** (continued)

Paper	Intervention Name and Modality	Years Implemented, Location, Recruitment	Sample and Eligibility Criteria	Design	Outcomes	Findings	Limitations
(El-Bassel et al., 2005)	each couple's contribution to enhancing the future health of ethnic communities hardest hit by HIV/AIDS. The intervention combined content related to the New York State Department of Health hierarchy of safer sexual practices and prevention of HIV/STIs, as well as joint HIV testing.	(see El-Bassel et al., 2003 for more information)	(see El-Bassel et al., 2003 for more information)	3-arm RCT (see El-Bassel et al., 2003 for more information)	Assessed at 12-month follow-up. In the past 90 days: number of unprotected acts of vaginal intercourse with the study partner; proportion of protected acts of vaginal intercourse with the study partner; and always used a condom during sex.	No significant differences were seen between the couples and women arms. Both intervention arms saw reductions in the proportion of unprotected sex acts at 12-month follow-up.	Relatively small sample size limits generalizability; self-selection of more motivated couples; different rates of attrition between the intervention arms; lack of biological outcomes on STIs; only female partners were followed-up with
(Witte et al., 2006)	Project Connect (see El-Bassel et al., 2003 for more information)	(see El-Bassel et al., 2003 for more information)	(see El-Bassel et al., 2003 for more information)	3-arm RCT (see El-Bassel et al., 2003 for more information)	Assessed at 3-month follow-up: Any female condom use; number of female	No significant differences were seen between the couples and women	Data were self-reported; 90-day follow back may be too

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Table 1. (continued)

Paper	Intervention Name and Modality	Years Implemented, Location, Recruitment	Sample and Eligibility Criteria	Design	Outcomes	Findings	Limitations
(Witte et al., 2014)	Connect web-based versus manual implementation Agency participants attended a four-day, face-to-face structured orientation and training on either the original, manualized Connect program or the "Multimedia	2007-2012 New York, United States Screened a list of state-funded community service providers and multi-service agencies as well as non-state funded agencies identified through five web	80 HIV prevention agencies (253 staff) Eligible agencies had 'not-for-profit' status in the United States, provided HIV prevention services to heterosexual men and women, and agreed to send at least one participating staff member to receive training on one of two versions of the Connect	Longitudinal matched pairs cluster randomized trial: • Multimedia, web-based arm (40 agencies, 122 staff) • Traditional, manual arm (40 agencies, 131 staff)	Assessed at 6, 12, and 18-month follow-up: Total number of couples with whom staff implemented Connect at each agency; the mean number of Connect sessions implemented by staff at each agency; whether staff implemented at least	On average, the staff from web-based agencies implemented the intervention to fewer couples than those at manual-based agencies. There were no differences found between conditions on the average number of	The study was powered to assess whether the web-based approach was superior to the manual-based approach; data was based on self-report; the study occurred during and after an economic
					condoms used; female condom use intentions; and female condom use outcome expectancies (defined as beliefs about the likelihood of positive or negative outcomes due to engaging in female condom use).	arms. Women in the intervention arms were more likely to use a female condom with their study partner and with all partners, and used female condoms at a higher rate with all partners, than individuals assigned to the control intervention. At the end of 3 months, they were more likely to intend to use female condoms in the next 90 days.	long a time period to remember accurately; control group members were not given free condoms—may not have used them because unable to procure; although active intervention participants could have received multiple female condoms by attending all sessions, these condoms could have been used prior to the 90-day follow-up phase, upon which the data are based.

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**Table 1.** (continued)

Paper	Intervention Name and Modality	Years Implemented, Location, Recruitment	Sample and Eligibility Criteria	Design	Outcomes	Findings	Limitations
	Connect” program (translated from the original into a Web-based format. Additionally, planned, investigative-team-initiated telephone consultations to provide technical assistance at 2 and 4 months following the workshop were provided. The web-based intervention replaces original hard copy materials with a Web-based interface of translated interactive tools and video enhancements that facilitators use as a “road map” to lead participants through activities. This version also dynamically monitors session progress (e.g. time spent on which activity, when, and by whom). This version’s goals were to simplify facilitation so that staff with a wider	sites of HIV services coalitions	program (traditional or Multimedia)		one session of Connect; and whether staff implemented a complete cycle of Connect in the prior 6 months. For individuals, the outcomes were operationalized as: the total number of couples with whom participant implemented Connect at their agency; sum of the number of Connect sessions implemented by participant at their agency; whether participant implemented at least one session of Connect; and whether participant implemented a complete cycle of Connect.	sessions completed per facilitator; the likelihood to implement at least one session; or the likelihood to complete at least one cycle of Connect. There were no differences between participants at Web-based agencies compared to those at manual-based agencies on average number of couples to whom they provided sessions; number of sessions completed per facilitator; the likelihood to implement at least one session; or the likelihood to complete at least one cycle of Connect. The most commonly reported barriers were: economy/funding issues, recruitment of couples, and staff turnover. No significant differences between	recession, which impacted funding for the organizations.

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Table 1. (continued)

Paper	Intervention Name and Modality	Years Implemented, Location, Recruitment	Sample and Eligibility Criteria	Design	Outcomes	Findings	Limitations
(El-Bassel, Gilbert, et al., 2011)	range of educational and experiential levels, from peer volunteers to trained professionals, could use the program; to increase the couple's engagement with the materials; and to make it easy to rapidly deploy and disseminate to agencies via the Internet. (See above for details on the manual Connect)	2005-2010 New York City, United States Street outreach, homeless shelters, soup kitchens, syringe exchange programs, and word-of-mouth recruitment	282 low-income, drug-involved heterosexual couples who are at risk for HIV Couples were eligible to participate if both tested HIV negative using OraQuick and OraSure assays; both identified each other as their main, regular partner, boyfriend, girlfriend, spouse, lover; both reported that they have been together for at least 6 months and couple status was verified by separately asking each partner standard questions about their relationship; both intended to remain together for at least one year; at least 1 partner	3-arm RCT: • couple (n = 95) • individual (member of the couple who used drugs) (n = 92) • couple-based control (n = 95)	Assessed at baseline, immediately post-intervention, 6-month, and 12-month follow-up. Sexual behaviors with study partner and with all other partners in the prior 90 days including: number of vaginal and anal intercourse acts; number of unprotected vaginal or anal intercourse acts with their study partners and with all other partners; consistent condom use (e.g. used a condom 100% of time during vaginal sex); and incidence	Over 12-month follow-up, there was a significant reduction in the incidence rate of unprotected acts of intercourse with the study partners compared with participants in the attention control arm, and the decrease in the couples group was larger than the decrease in the individual group. No significant impact was seen on drug-related risk behavior, though intervention effects were promising at p	Potential selection bias on who agreed to participate; too small a sample size to power for a sufficient number of HIV/STI transmissions; data was self-reported; attrition may have influenced results.

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Table 1. (continued)

Paper	Intervention Name and Modality	Years Implemented, Location, Recruitment	Sample and Eligibility Criteria	Design	Outcomes	Findings	Limitations
	<p>condom use placement skills along with a broader repertoire of pleasurable safer sex activities and syringe disinfection skills; and enhancing the couple's motivation to protect each other and set mutual risk-reduction goals. Facilitators were trained to validate the relationship's strengths of commitment, love, trust, and empower the dyad to enact protective behaviors. A safe environment was created where sensitive or taboo topics (e.g., outside sexual partners) related to a couple's risks could be disclosed and addressed.</p>		<p>reported using illicit drugs in the prior 90 days and was seeking or in drug treatment; at least 1 partner reported having had unprotected intercourse with the other in the prior 90 days. At least 1 partner had to report 1 or more of the following HIV risk criteria: sex with other partners in the prior 90 days; injecting drugs in the prior 90 days; or self-reported being diagnosed with an STI in the prior 90 days.</p> <p>Couples were excluded from the study if either partner: reported experiencing severe intimate partner violence in the past year by the other partner (as assessed by subscales of the Revised Conflict Tactics Scale); exhibited a severe cognitive or psychiatric impairment assessed during informed consent; did not sufficiently understand English; reported intentions to conceive a baby in the next year; or reported an intent to relocate in the coming year.</p>		<p>of concurrent sexual partners. Drug risk behavioral outcomes included number of times injection drugs were used; and number or times syringes, cookers, cotton, or rinse water were shared with another user in the past 90 days. Frequency and type of drug use in the past 90 days were collected for the following substances: cocaine, crack, heroin, cannabis, and unprescribed sedatives, opiates, and stimulants. Biologically confirmed STI cumulative incidence over the 12-month follow-up period.</p>	<p>&lt;.1 level across follow-up. Prevalence of the STIs was low at the baseline assessment and was even lower at each follow-up assessment.</p>	

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Table 1. (continued)

Paper	Intervention Name and Modality	Years Implemented, Location, Recruitment	Sample and Eligibility Criteria	Design	Outcomes	Findings	Limitations
(Wu et al., 2010, 2011)	<i>Connect with Pride</i> 7 90-min sessions given to each couple Sessions focused on knowledge and technical skills related to transmission of HIV and other STIs, condom use, and drug use/risk reduction; outcome expectancies of sexual risk and methamphetamine use; and social and self-regulatory skills (e.g., couple communication, joint problem-solving, couple condom negotiation). Recognizing that participants may already be HIV-positive and in concordant relationships, the harm reduction strategies of serosorting and strategic positioning were acknowledged in the intervention, and participants were encouraged to build upon such	[unknown] New York City, United States Local service agencies, bars, clubs, and community events frequented by MSM Referrals were made from service providers at local community-based organizations	34 methamphetamine-using, Black MSM couples at risk for HIV People were eligible if they had a "primary main male partner" (defined as: a male with whom he has had an ongoing sexual relationship over the prior 6 months); and a male with whom the participant has an emotional relationship/bond more than with any other person; self-identify as African American and/or Black, or identify having a main partner who self-identifies as such; report having had unprotected anal sex with a man who is a non-main partner in the past 60 days (or whose main partner meets this criterion); report using methamphetamine at least once in the past 60 days (or whose main partner meets this criterion); report not being either in, or seeking drug treatment; identify each other as their main partner; and not be newly diagnosed as HIV-positive within the last 6 months.	Pre- /post-test	Assessed at baseline and at 2-month follow-up. Number of male sexual partners; episodes of unprotected anal intercourse with a main partner; proportion of episodes of anal intercourse with a main partner that were condom-protected; methamphetamine use; and illicit drug use.	At follow-up, participants reported significantly fewer sexual partners; fewer episodes of unprotected anal sex; and greater condom use with their main partner. Participants also reported significantly less methamphetamine use; any illicit drug use; and number of illicit drugs used.	Small sample size; non-random study design; individuals may have only participated for money.

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**Table 1.** (continued)

Paper	Intervention Name and Modality	Years Implemented, Location, Recruitment	Sample and Eligibility Criteria	Design	Outcomes	Findings	Limitations
	<p>successes and skills in risk reduction with current, other, or future partners. Sexual risk reduction was promoted in the intervention via concern for STIs other than HIV, as well as the possibility of superinfection and attendant concerns about risk of increased viral pathogenicity and antiretroviral resistance. The intervention activities were designed to increase awareness of, and ability to redress the impact of the multiple, marginalized statuses—racial/ethnic minority, sexual minority, methamphetamine/illicit drug user, and/or person living with HIV/AIDS. Particular attention was paid to phenomena and experiences arising from the intersection of these statuses (e.g., feeling like Black men are</p>						

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Table 1. (continued)

Paper	Intervention Name and Modality	Years Implemented, Location, Recruitment	Sample and Eligibility Criteria	RCT:	Design	Outcomes	Findings	Limitations
(El-Bassel, Gilbert, et al., 2010)	<p>responsible for the HIV/AIDS epidemic, being on the "down low," lack of positive role models of Black MSM couples). In addition, couples worked to strengthen social support for their relationship well-being and were encouraged to protect other Black MSM from HIV/STIs.</p> <p><b>Project Eban</b> 8 weekly structured 2-h sessions delivered by male and female co-facilitators. Some sessions were for individual couples and others for groups of couples. The intervention relies on the principles of Nguzo Saba: unity, self-determination, collective work and responsibility, cooperative economics, purpose, creativity, and faith, and are called upon to motivate couples to consistently use condoms to protect each other and their</p>	2003-2007 Atlanta; Los Angeles; New York City; and Philadelphia, United States HIV care clinics, other health clinics, AIDS service organizations, community-based organizations, targeted street outreach, word-of-mouth, and various media outlets	260 serodiscordant Black couples Heterosexual couples were eligible if they had been together 6 months or more; were aware of each other's HIV serostatus; only 1 partner was HIV seropositive; at least 1 self-identified as African American or Black, reported unprotected intercourse with the other in the previous 90 days, and reported that the couple was not planning a pregnancy within 18 months; and each partner was 18 years or older, intended to remain together for at least 12 months, and did not plan to relocate beyond a	<ul style="list-style-type: none"> <li>• Couple-based HIV/STI prevention intervention</li> <li>• Individual-based health promotion control intervention (see below for more information)</li> </ul>	Assessed at baseline, immediately post-intervention, 6-month, and 12-month follow-up. Number of condom-protected vaginal and anal intercourse acts; number of unprotected vaginal or anal intercourse acts; and consistent condom use with study partner and incidence of concurrent partners in the past 90 days at baseline and follow-ups, and in the past 60 days at immediate postintervention.	The proportion of condom-protected intercourse acts was larger among couples in the intervention group; the adjusted percentage of couples using condoms consistently was higher in the intervention group than in the comparison group; the adjusted mean number of (log) unprotected intercourse acts was lower in the intervention group than in the comparison group. The cumulative STI	The sample may not have been properly representative of Black serodiscordant couples, many of whom do not know their partner's status; self-reported behavior.	

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Table 1. (continued)

Paper	Intervention Name and Modality	Years Implemented, Location, Recruitment	Sample and Eligibility Criteria	Design	Outcomes	Findings	Limitations
	community. Individual couple sessions focus on interpersonal factors associated with sexual risk reduction, (ex: communication, problem solving, monogamy, and negotiation skills), and skills covered during individual couple sessions are reinforced in the group sessions. Group sessions address community-level factors (ex: increasing positive norms for condom use, reducing stigma associated with being an African American couple affected by HIV, and increasing social support for HIV risk reduction). Session structure includes: reviewing the highlights of the prior session; reviewing homework assignments and difficulties encountered;		reasonable distance from the study site. Couples were excluded if either partner did not have a mailing address; evidenced significant psychiatric, physical, or neurologic impairment that would limit effective participation; reported victimization by severe violence perpetrated by the other in the past year; was unwilling or unable to commit to completing the study; or was not fluent in English. Couples who participated in a couple-based HIV/STI risk reduction intervention in the past year were also excluded.			incidence over the 12-month follow-up did not differ between couples in the intervention and comparison groups.	

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Table 1. (continued)

Paper	Intervention Name and Modality	Years Implemented, Location, Recruitment	Sample and Eligibility Criteria	Design	Outcomes	Findings	Limitations
(El-Bassel, Jemmott, et al., 2011)	<p>presenting and discussing HIV/STI topics; modeling and role-playing risk reduction skills; reviewing weekly progress for each couple's risk reduction goals, identifying barriers, resetting goals for the following week; and reviewing new homework.</p> <p>[Health promotion intervention related to Project Eban]</p> <p>8 weekly structured 2-h sessions delivered by male and female co-facilitators. In order to build self-efficacy and skills, participants learned about and were taught physical exercises. Activities addressed outcome expectancies regarding adhering to the 5-a-day diet (consuming 5 to 9 servings of fruits and vegetables daily), and barriers to following the diet. To build self-efficacy and skill, participants</p>	<p>[see El-Bassel, Gilbert, et al., 2010 for more information]</p>	<p>275 serodiscordant Black couples [see above for eligibility and exclusion criteria]</p>	<p>RCT:</p> <ul style="list-style-type: none"> <li>• Individual-based health promotion intervention</li> <li>• Couple-based HIV/STI prevention intervention (see above for more information)</li> </ul>	<p>Assessed pre-intervention, immediately post-intervention, and at 6, and 12-month follow-up. Primary outcomes were: adherence to fruit and vegetable consumption and physical activity guidelines. Secondary outcomes included fatty food consumption, prostate and breast cancer screening, and alcohol use.</p>	<p>Health promotion intervention participants were more likely to report consuming 5 or more servings of fruits and vegetables daily and adhering to physical activity guidelines compared with HIV/STI intervention participants. In the health promotion intervention compared with the HIV/STI intervention, participants consumed fatty foods less frequently, more men received prostate cancer screening, and more</p>	<p>Limited outcomes, as this was the "control" arm; self-report.</p>

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**Table 1.** (continued)

Paper	Intervention Name and Modality	Years Implemented, Location, Recruitment	Sample and Eligibility Criteria	Design	Outcomes	Findings	Limitations
	generated strategies for overcoming the barriers, and prepared fruit smoothies as an example of how to incorporate a healthful snack into their daily diet. Participants also learned about the importance of cancer screening and dangers of excessive alcohol use. The first 7 sessions included take-home assignments, which participants and facilitators reviewed in the subsequent session.					women received a mammogram. Alcohol use did not differ between the intervention groups.	
(El-Bassel et al., 2019)	<b>Project PACT</b> Five weekly sessions (1st session: 45 min; remaining 4 sessions: 90 min each) delivered over 5 weeks. The intervention consisted of 12 core elements: Couple-based HIV counseling, testing, and referral; disclosure of drug and sexual risks; couple communication,	2013–2016 New York City, United States Community Supervision Program sites	230 couples consisting of men in community supervision who use drugs and their main female sex partners Couples were eligible if both partners identified each other as their primary sexual partner of the opposite sex; the relationship had lasted at least 3 months; at least one partner reported having had condomless vaginal and/or anal intercourse with the other in the past 90 days;	<b>2-arm RCT:</b> • PACT • HIV Counseling, Testing, and Referral control arm	Assessed at baseline and at 3, 6, and 12-month follow-up. HIV and STIs; total number of times of condomless intercourse; number of times of intercourse with the study partner and all other partners; number of sexual partners during the past 90 days; injection drug use in the last 90 days.	Those in the intervention arm reported significantly fewer incidences of unprotected sex, fewer sexual partners, and fewer sexual activities with other partners; and were less likely to report being under the influence of drugs or alcohol the last time they had vaginal and/or anal intercourse with	Self-reported measures; selection-bias in who participated (female participants were chosen by male partners, and unmotivated partners may not have agreed to participate).

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Table 1. (continued)

Paper	Intervention Name and Modality	Years Implemented, Location, Recruitment	Sample and Eligibility Criteria	Design	Outcomes	Findings	Limitations
	negotiation, and problem-solving skills; technical condom use skills; strategies for identifying and reducing personal risks, such as unsafe injections; biomedical HIV-prevention strategies (HIV treatment as prevention, PrEP, and PEP); linkage to HIV, STI, and substance use treatment; reproductive health issues; risks and experiences of sexual coercion; safe pregnancy planning for serodiscordant couples; opioid overdose response and prevention; informal social support; and couple goal setting to increase protective behaviors.		at least one partner reported exposure to an outside HIV risk in the past year (engaged in unprotected sex with another partner, shared syringes, tested positive for an HIV/STI) or at least one partner suspected that their partner had exposure to an outside HIV risk; the couple planned to stay together for at least another year; the male partner reported either use of illicit drugs or binge drinking (i.e., drinking 5 or more alcoholic beverages on a single occasion) in the past 90 days or attended substance abuse treatment in the past 90 days; the male partner was mandated to community supervision, alternative to incarceration, or probation verified by court records. Couples were excluded if either partner showed evidence of significant psychiatric or cognitive impairment as assessed during informed consent;			their study partners compared to the control arm. At 12 months, HIV and STI incidence did not differ significantly between the 2 arms.	

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Table 1. (continued)

Paper	Intervention Name and Modality	Years Implemented, Location, Recruitment	Sample and Eligibility Criteria	Design	Outcomes	Findings	Limitations
(Gilbert et al., 2010)	<i>Pilot Project Renaissance</i> 4, weekly 120-min sessions. The intervention arm included 3 single-gender group sessions with the male and female partners, followed by an individual couple session. The control arm consisted of four group sessions with both male and female partners. Each session was couple-based and focuses on: identifying HIV risks encountered by the couple and introducing, modeling, and practicing couple communication and problem-solving risk skills. Content incorporated social cognitive	2005–2006 Shu, Kazakhstan Needle exchange program	either partner reported an order of protection within the past year or identified any safety concerns about participating in sessions with their partner; or either partner did not have sufficient fluency in English. 40 couples who reported injection drug use Couples were eligible: if both partners identified each other as their main partner of the opposite sex and someone whom the participant considers a boyfriend or girlfriend, spouse, lover, and/or parent of his or her child; both partners reported that they had been in a relationship for at least 6 months; both partners reported that they intended to remain together for at least 12 months; at least one partner reported having unprotected vaginal or anal intercourse with the other partner one or more times in the previous 30 days; at least one partner reported injecting drugs in the past 30 days; and neither partner reported planning to relocate	RCT • HIV/STI risk-reduction intervention • Couples Wellness Promotion control	Assessed at baseline and 3-month follow-up. Primary outcomes: proportion of condom-protected acts of vaginal and anal intercourse; number of acts of unprotected vaginal and anal intercourse during the 30 days prior to the assessment period; number of incidents of unclear syringes or needles in the past 30 days; proportion of injection acts in which unclear needles or syringes were used in the past 30 days; number of people with whom participants shared needles or syringes within the past 30 days. Secondary outcomes: favor the	Intervention participants were more likely to report a higher proportion of condom-use during vaginal sex with their study partners and a lower number and proportion of injection acts in which syringes or needles are shared at the 3-month follow-up. While observed differences between the intervention and control participants on decreasing the number of unprotected acts and the number of different people with whom participants shared needles were not statistically significant, they did favor the	Small sample size; self-reported measures; the control arm did not allow for controlling for non-specific modality differences; short follow-up.

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Table 1. (continued)

Paper	Intervention Name and Modality	Years Implemented,		Sample and Eligibility Criteria	Design	Outcomes	Findings	Limitations
		Location,	Recruitment					
	skill-building strategies, including couple sexual communication skills, problem-solving and assertiveness skills, as well as technical condom use and syringe disinfection skills. Participants were taught problem-solving and assertiveness skills to identify and avoid triggers for unsafe sex and injection practices.			beyond a reasonable distance from the study site. Couples were excluded if: either partner showed evidence of significant psychiatric, physical, or neurological impairment that would limit effective participation; either partner reported severe physical or sexual violence perpetrated by the other partner in the past year; either partner was unable to commit to participate in the study through to completion; either partner reported that the couple was planning a pregnancy within the next 18 months; either partner was not fluent in Russian.		HIV knowledge; condom negotiation self-efficacy; couples' risk-reduction communication skills.	intervention group. Intervention participants were significantly more likely to increase their level of HIV knowledge, condom use self-efficacy, and couple communication skills at the 3-month follow-up.	
	Each session began and closed with a ritual (ex: listening to an inspirational Kazakh song, poem, or quote). At the end of each session, participants were asked to set a risk reduction goal for the week; progress with respect to each goal is reviewed at the next session. The content for the first three single-gender groups for male and female partners is identical, except for a component that is							

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**Table 1.** (continued)

Paper	Intervention Name and Modality	Years Implemented, Location, Recruitment	Sample and Eligibility Criteria	Design	Outcomes	Findings	Limitations
(El-Bassel et al., 2014)	<p>added to Sessions 2 and 3 in the female partner gender groups that is designed to help women anticipate and manage partner negative reactions in response to requests to use condoms or to not share needles.</p> <p><b>Project Renaissance</b> 5, 2-h sessions, spaced at least 5 days apart. The first 3 sessions were single-gender groups for male partners and female partners led by same-gender facilitators. These single-gender groups were conducted at the same time in separate rooms. These group sessions were followed by 2 single-couple sessions.</p> <p>The intervention focused on strategies to reduce risk behaviors for HIV, HCV, and STIs by: encouraging both partners to disclose and identify mutual drug-related and</p>	<p>2009–2012 Almaty, Kazakhstan Couples were recruited through word-of-mouth from participants to their injecting network members. Research assistants also recruited potential study participants from health clinics, syringe and harm reduction service locations serving PWID, and neighborhood locations where PWID gather</p>	<p>300 drug-involved heterosexual couples in Kazakhstan Couples were eligible if both partners identified each other as their main intimate partner of the opposite sex; their relationship had lasted for at least 6 months; both partners reported intending to remain together for at least 12 months; at least one partner reported having had unprotected vaginal or anal intercourse with the other partner in the previous 90 days; and at least one partner reported injecting drugs in the past 90 days. Couples were excluded if either partner showed evidence of significant psychiatric, physical, or neurological impairment; reported severe physical</p>	<p>RCT • Couples HIV risk reduction and overdose prevention • Couples wellness promotion and control and overdose prevention</p>	<p>Assessed at baseline, 3, 6, 12-month follow-up. Tested for HIV, HCV, gonorrhea, and chlamydia. The risk behavior assessment was used to assess sexual and drug-use risk behaviors, including: number of vaginal and anal intercourse acts, and consistent condom use during vaginal intercourse (with study and other partners); number of times participants shared needles or syringes, or engaged in unsafe injection behaviors in the past 90 days.</p>	<p>Participants in the intervention had significantly fewer incident infections of HCV, and lower, but not significantly, rates of HIV; there were no differences between study arms in STI incidence. Participants in the intervention arm had lower incidence of unprotected acts of vaginal intercourse with their study partners and an increased likelihood of reporting consistent condom use with their study partners. Reductions in sexual risk behaviors were primarily seen at 3-month follow-up and not at the 6- and 12-month follow-up</p>	<p>Non-random sampling, potentially biased sample of only those in committed relationships; inclusion of overdose prevention content in both study arms can limit ability to determine the effect of the intervention on drug use practices.</p>

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Table 1. (continued)

Paper	Intervention Name and Modality	Years Implemented, Location, Recruitment	Sample and Eligibility Criteria	Design	Outcomes	Findings	Limitations
(Gilbert et al., 2018)	sexual risks; modeling, role-playing, and practicing couple communication, negotiation, and problem-solving skills that both partners could employ together to reduce their drug-related and sexual risks; practicing technical condom use placement skills along with learning about pleasurable safer sex activities; learning needle/syringe disinfection skills and strategies for obtaining new syringes from pharmacies or harm reduction programs; and identifying and addressing risks for opiate overdose using peer administration of naloxone, an opiate antagonist.	2009-2013 Almaty, Kazakhstan Recruited from Project Renaissance	or sexual violence perpetrated by the other partner in the previous year; reported that the couple was planning a pregnancy within the next 18 months; or was not fluent in Russian.	RCT [see El-Bassel et al., 2014 for more information]	Assessed at baseline, 3, 6, 12-month follow-up. Experienced an overdose both ever, and in the past 6	periods. Findings from sexual risk behaviors with all partners were similar to the findings from sexual behaviors with study partners. Participants from both arms reported a substantial reduction in rates of needle sharing and unsafe injections from baseline to the 12-month follow-up, no significant differences between conditions with respect to injection drug risks over the follow-up period were found.	Lack of statistical power to observe statistically significant effect sizes on

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Table 1. (continued)

Paper	Intervention Name and Modality	Years Implemented, Location, Recruitment	Sample and Eligibility Criteria	Design	Outcomes	Findings	Limitations
	Prevention (SKOOP), an evidence-based opioid overdose prevention intervention with lay naloxone administration. [see above (El-Bassel et al., 2014) for further information on intervention content]		sex that lasted for at least 6 months, who would be willing to participate in the study for the following 12 months; at least one partner reporting injecting drugs in the past year; and having had unprotected sex with study partner in the past 90 days. Couples were excluded if either partner: showed evidence of significant impairment as determined during informed consent; reported severe violence perpetrated by the study partner in the past year; or was not fluent in Russian.		months; if saline solution or naloxone was injected in response to an overdose in the past 6 months; and if participants injected someone else with naloxone in the past 6 months; fatal overdose.	12-month follow up; rates of self-reported non-fatal overdose and heroin use substantially decreased from baseline to the 12-month follow up for both conditions, and use of naloxone and drug treatment similarly increased. Only approximately one-third of participants exchanged their study vouchers for naloxone from the HIV care clinic. Over the 12-month follow up period, there were 105 participants who reported using naloxone to reverse an opioid overdose or that someone else administered naloxone to them. There were no participant deaths due to overdose reported during administration of naloxone and no adverse events related to naloxone administration reported during the study.	overdose outcomes; no control arm for overdose prevention; self-report for non-fatal overdose; non-fatal overdose; prevention component of the WP + OD comparison group was delivered in separate single-gender group sessions, but to both members of the couple together in the HIV/HCV + OD arm. However, in the WP + OD comparison group, both male and female partners were simultaneously exposed to overdose prevention content.

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Table 1. (continued)

Paper	Intervention Name and Modality	Years Implemented, Location, Recruitment	Sample and Eligibility Criteria	Design	Outcomes	Findings	Limitations
(Remien et al., 2005)	SMART Couples 4, 45–60-min sessions. Consisted of education about treatment and adherence, identifying adherence barriers, developing communication and problem-solving strategies, optimizing partner support, and building confidence for optimal adherence.	2000–2004 New York City, United States Clinical staff were informed of the study, and flyers were posted in hospital outpatient HIV/AIDS treatment clinics, private medical practices, and community-based organizations	215 serodiscordant heterosexual and homosexual couples in NYC Participants were eligible if they were an HIV-serodiscordant couple (self-report); in a relationship duration of at least 6 months; and both partners were English-speaking. The HIV-seropositive partner needed to be in primary care and taking ART for at least 1 month.	RCT: • Intervention • Usual care (control)	Medication adherence assessed at baseline and at 3, 6-month follow-up.	The treatment arm showed higher mean medication adherence at post-intervention when compared with controls, whether adherence was defined as proportion of prescribed doses taken, or doses taken within specified time parameters.	Potential bias due to self-selection of participants; participants received financial compensation for attending and assessment appointments.

**Table 2.** Guiding Principles and Framework of SIG Couple-Based Behavioral HIV Interventions.

Intervention	Fidelity Measures	Theoretical Framework	Community Engagement	Funding Sources
<i>Project Connect</i>	Facilitators completed standardized training, used structured intervention protocols, met on a weekly basis with clinical and task supervisors, and received routine monitoring (via audiotape) and feedback from an on-site supervisor. For evaluation of quality assurance, independent raters reviewed a random sample of 10% of the sessions for each facilitator.	AIDS Risk Reduction Model; Bronfenbrenner's Ecological Perspective	Researchers worked with community members to design the intervention.	National Institute of Mental Health
<i>Multimedia Connect</i>	Fidelity built into the design with supervisory support through technical assistance calls; facilitator fidelity measured through audio recordings and paper-based process measure (manual) or dynamically monitored by the web-based program (e.g. time spent on session activities, when and by whom).	Social Cognitive Theory; scaffolded learning theory	Utilized a community advisory board to assure study protocols were relevant and appropriate for agency-based settings.	National Institute of Mental Health
<i>Connect 2</i>	Quality assurance (QA) procedures were implemented by digitally recording all intervention sessions. Recordings and session-specific QA checklists were reviewed to monitor fidelity of implementation of all 3 conditions and to provide corrective feedback to facilitators.	Social Cognitive Theory; Bronfenbrenner's Ecological Perspective	Researchers worked with community members to design the intervention.	National Institute of Drug Abuse
<i>Connect with Pride</i>	Intervention sessions were audio-recorded for review to ensure fidelity of intervention delivery.	Social Cognitive Theory; Bronfenbrenner's Ecological Perspective	A community advisory board provided input.	Centers for Disease Control and Prevention
<i>Project Eban</i>	To ensure the fidelity of implementation, facilitators used structured manuals with detailed implementation protocols, completed fidelity assessment forms after each session, met weekly with supervisors, and received reviews of audio-taped sessions and feedback from their supervisor. An independent quality assurance monitor also rated the fidelity of a random sample of 10% of sessions from each intervention.	Social Cognitive Theory for both interventions; Bronfenbrenner's Ecological Perspective and an Afrocentric paradigm for the HIV prevention intervention	A Community Advisory Board was established to ensure that the Eban HIV/STI Risk Reduction Intervention was culturally congruent and tailored to the needs, issues, and worldviews of many urban African American HIV-serodiscordant couples.	National Institute of Mental Health

(continued)

**Table 2.** (continued)

Intervention	Fidelity Measures	Theoretical Framework	Community Engagement	Funding Sources
<i>Project PACT</i>	All sessions were recorded and listened to by supervisors in order to provide feedback to the facilitators to improve the fidelity and delivery of the sessions.	Social Cognitive Theory; Bronfenbrenner's Ecological Perspective; Motivational Interviewing	A Community Advisory Board of members from NYC Department of Probation, ACS, NYC Department of Health, numerous CBO's and persons with lived experience provided input on recruitment and retention.	National Institute on Drug Abuse
<i>Project Renaissance</i>	Process measures were collected and analyzed for each condition.	Social Cognitive Theory; Bronfenbrenner's Ecological Perspective	A community advisory board collaborated in developing the RCT.	National Institute on Drug Abuse
<i>SMART Couples</i>	Fidelity was maintained through systematic reviews of session audiotapes and weekly supervision meetings with the study's principal investigator and project director.	Ewart's Social Action Theory	A community advisory board provided input.	National Institute of Mental Health

Couples study, which focused on antiretroviral medication treatment adherence, participants were recruited from hospital-based HIV care clinics (Remien et al., 2005). Agencies solicited for participation in Multimedia Connect were contacted by email and phone (Witte et al., 2014).

### Design and Sample Size

As described in Table 1, of the nine intervention studies, eight employed RCT designs, while one study used a pre/post design (Wu et al., 2011). The active arms of the RCT studies included different modalities and core intervention components (Table 1). Sample sizes varied from 34 couples (Wu et al., 2011) to 535 couples (El-Bassel, Jemmott, et al., 2011, 2010). RCTs either included three arms: an individual intervention arm, couple intervention arm, and control arm; or two arms: the couple-based intervention and a control (Table 1). The implementation study on Multimedia Connect (Witte et al., 2014) utilized a cluster RCT design that randomized HIV services agencies ( $n=80$ ) and included up to six staff members at each agency as participants ( $n=253$ ). Agencies were recruited, matched on key variables, and randomly assigned to one of two conditions (Witte et al., 2014).

### Couple Modalities and Core Elements of the Interventions

As the science of HIV care advanced, we learned more about couple-based interventions and strengthened a number of core elements. For example, in more recent studies we included greater content on sexual and reproductive health, such as safe pregnancy planning for sero-discordant couples. We also paid more attention to sexual

violence within the dyad, from both individuals, regardless of gender. Now, we include skills on navigating conflicts that allow the couple to discuss these issues within and outside the sessions and have expanded safety planning. We also have expanded the core components on case management and linkage to care outside the sessions. We include more content on PrEP in order to educate the couple about its benefits and how to access it. We also cover barriers that arise to using PrEP and how to resolve them.

As described in Table 1, studies employed one of three couple-based modalities to deliver the intervention sessions: (1) dyadic sessions, in which a couple met with an intervention facilitator; (2) combination of sessions with a group of couples meeting together and then separating out into dyadic sessions; and (3) single gender group sessions plus dyadic sessions. Often, the control arm consisted of participants receiving the intervention individually. As described in Table 1, studies occasionally delivered core intervention elements separately to participants; for example, to a single-gender group, where female and male participants first met separately with a facilitator who was gender-matched to the group to discuss sensitive couple-context issues and how they are differently perceived by gender. When implementing Project Renaissance in the Central Asian nation of Kazakhstan, cultural customs required the first three sessions to be with participants in a gender-specific group, prior to bringing the couple together for dyadic sessions. This opportunity was used to increase confidence and openness among the participants, especially the women who were reticent to speak up about sensitive issues focused on sexuality. These sessions were used to create a safe environment to participate in dyadic, couple-based sessions.



### Common Intervention Core Elements

As described in Table 1, the studies used a number of theory-driven common intervention core elements. The original elements of the Connect study were developed through formative research with participants from a single-sex, group-based HIV/STI prevention intervention and were contextually relevant, acceptable, and feasible (Sormanti et al., 2001). Studies provided information and raised awareness about HIV/STIs; and provided skills-building in condom use, couples' communication, negotiation, problem-solving, and goal setting. Studies additionally sought to address power imbalances associated with decision-making, and offered strategies to promote and maintain healthy physical and emotional relationships, including becoming more familiar with sexual anatomy, discussions of safe pregnancy planning for serodiscordant couples, the importance of treatment adherence and, in the most recent couple-based study, PrEP to prevent the acquisition of HIV (El-Bassel et al., 2019). Further, core components were tailored to people who use or inject drugs. These studies covered content related to the micro-social context of drug use in intimate relationships, such as the meaning of sharing or refusing to share needles or drugs, the relationship between refusal to share needles/syringes and partner violence, and strategies to manage negative reactions when refusing needle/syringe sharing (Gilbert et al., 2010). Sessions contained discussions on substance use and its unique associations with sexual risks, ways to navigate conflict within dyads, and the importance of seeking mental health and substance use services to support couples who have experienced trauma or violence. Two studies (El-Bassel et al., 2019; Gilbert et al., 2018) contained education on overdose response and prevention, including knowledge about overdoses and how to use naloxone to reverse opioid overdoses.

### Outcomes of HIV Couple-based Studies

As described in Table 1, we reported outcomes from nine studies published in 13 peer-reviewed papers. The studies reported wide-ranging outcomes, such as reductions in the number of unprotected sex acts and increased proportion of protected sexual acts, including the use of both male and female condoms; further, participants reported significantly fewer sexual partners. The SMART Couples intervention participants showed higher mean medication adherence at post-intervention when compared with controls; additionally, participants in the intervention arm were significantly more likely to achieve high levels of adherence when compared with controls. However, in most cases, effects diminished with time, as seen at 3 and 6 months post-intervention (Remien et al., 2005).

In studies amongst people who use drugs, participants reported reduced substance use (Wu et al., 2011) and reduced unsafe injection practices at follow-up (Gilbert

et al., 2010). Project Renaissance overdose prevention participants reported significant reductions in non-fatal overdose and injected heroin/opioid use; and significant increases in drug treatment attendance and naloxone use to prevent death from overdose (Gilbert et al., 2018). Participants in the PACT intervention were less likely to report being under the influence of drugs or alcohol the last time they had intercourse with their study partners and reported fewer sexual partners. Further, Project Renaissance found significantly lowered incidence of HCV infection amongst those in the active intervention arm (El-Bassel et al., 2014).

Responding to the call for increased implementation science in HIV prevention studies, as well as promotion of digital technologies, the Multimedia Connect implementation study (Witte et al., 2014) tested whether training and technical assistance (TA) for a couple-based HIV prevention program using a web-based modality would yield stronger adoption of the program compared to training and TA in the same program with a traditional, manual-based modality. We recruited agencies and matched them on key variables (number of full- and part-time paid staff providing HIV prevention services in the prior year; and number of clients receiving multi-session HIV prevention services in the prior year), and randomly assigned them to the conditions. Staff members participated in a four-day, face-to-face training session, followed by TA calls at 2 and 4 months, and follow-up assessments at 6, 12, and 18 months post-training and TA. Longitudinal multilevel analysis found no differences between groups on any outcomes at the agency or participant level except that web-based agencies implemented the program with 35% fewer couples compared with staff at manual-based agencies.

### Theories that Guided the Studies

The theoretical frameworks underpinning each intervention's design are described in Table 2. The most frequently cited theories included Bronfenbrenner's Ecological Perspective theory (Bronfenbrenner, 1979) and social cognitive theory (Bandura, 1986). Additionally, Project Connect utilized the AIDS Risk Reduction Model (Catania et al., 1990), while its real-world implementation study was guided by scaffolded learning theories (Perkins & Salomon, 1989). Project Eban was further guided by an Afrocentric Paradigm, while PACT additionally included motivational interviewing (Miller & Rollnick, 2012). SMART Couples was driven by Ewart's Social Action Theory (Ewart, 1991). These theories informed the intervention components that address social relationship contexts and social systems. Social cognitive theory suggests that implementation of a new program occurs when there is exposure to and motivation among agency staff to acquire the skills and resources to enact the program (Bandura, 1986).

## Scientific Progress, Gaps, and Future Directions in Our Couple-based Studies: Lessons Learned and Recommendations

Over the past 30 years, SIG studies reported in this paper have made significant scientific contributions to developing, testing, designing culturally congruent interventions, and implementing evidence-based HIV/STI prevention for couples. As described in this paper, the studies have advanced the science of such research by improving study designs, intervention core elements, conceptual models, and delivery and implementation strategies; all of which have informed future scientific directions and transformed the prevention field in this area of research. Since our couple-based studies began in 1997, we have learned that couples, especially those in key populations (people who use drugs, MSM, etc.) can be recruited from diverse locations in a multiplicity of ways; and that HIV service agencies are eager to participate in such intervention studies. Further, it is feasible to engage couples in HIV prevention and treatment. SIG studies report successful strategies in which couples can be recruited individually, together, or through their social networks.

The outcomes of the studies described in [Table 1](#) indicate success in developing and implementing evidence-based HIV/STI prevention studies for couples, with these studies showing positive outcomes. In the majority of studies, participants in intervention arms, compared to control arms, reported reduced sexual and drug use risk factors, and increased protective behaviors. The CDC has identified four SIG studies as best practices (CDC, n.d.) and recommended the dissemination of these studies in real-world settings. Results indicate that SIG's couple-based interventions can be delivered to a single dyad, a group of couples together, to a single-gender group of participants, or a combination of these, as described in [Table 1](#). However, the decision of which of the modalities works better depended on the cultural context where the study was conducted. For example, in Project Renaissance in Kazakhstan with people who inject drugs (El-Bassel et al., 2014), as well as in Project Eban with African American couples (El-Bassel, Jemmott, et al., 2010), participants preferred to meet initially in single-gender sessions prior to attending dyadic sessions. Single-gender sessions provided them with an opportunity to become comfortable speaking about intimate topics. However, further research is needed to answer what might be the best combination of these modalities, and for which populations. In future couple-based HIV intervention research, we also propose that special attention be paid to barriers, facilitators, and implementation strategies to promote adoption of couple-based evidence-based practices in real-world settings. We particularly recognize the need for more attention to advancing health equity contexts. Although our studies included a large number of African American and Latinx couples, more attention needs to be paid to reaching out to communities of color. For example, in Project Eban, all the couples

were African American and the intervention's core elements were tailored to African American culture; an Afrocentric paradigm was used to guide both the core components and the delivery of the sessions (El-Bassel, Jemmott, et al., 2010). All sessions were delivered by African American facilitators, and the principal investigators and the majority of the researchers were people of color (El-Bassel et al., 2016; El-Bassel, Jemmott, et al., 2011, 2010; Wyatt et al., 2020). From this, we learned that African American participants expressed strong motivation and willingness to participate in research and disclose sensitive issues when the majority of the researchers and intervention facilitators are of a similar ethnicity and/or culture (NIMH Multisite HIV/STD Prevention Trial for African American Couples Group, 2008a, 2008b). We believe that Project Eban provides a prototype of a strong culturally-congruent couple-based intervention. This intervention was implemented and led to important outcomes ([Table 1](#)), including increased condom use and safer sex practices (Wyatt et al., 2020). Research is needed to replicate the recruitment strategies used in Project Eban to recruit African American couples, and to examine how these strategies may work in recruitment of other ethnic minority couples.

In addition to peer-reviewed studies on couple-based interventions, SIG has been funded to collaborate with the CDC (Stallworth et al., 2015) to adapt, revise, update, and expand the target populations in Connect through *Connect High Impact Prevention (HIP)*. Connect HIP is a three-session, relationship-based HIV/STI prevention program for sexual and needle/syringe-sharing relationships at risk for HIV infection or coping with an HIV-discordant status. Connect HIP incorporates the CDC's high-impact prevention approach (CDC, 2011) to reduce new HIV infections. It is targeted to those at high risk for HIV: MSM individuals in couples, especially African Americans; HIV-discordant couples; couples involved in shared substance use, especially injection drug use; and transgender couples. It includes HIV testing strategies, screening for STIs, linkage to care, and treatment adherence for ART for HIV-positive partners, including messaging around "undetectable = untransmissible," or U = U, and for PrEP for HIV-negative sex partners.

Despite these robust and reproduced results, we have identified gaps and limitations that must be addressed. SIG couple-based studies reported in this paper included only one study conducted exclusively with MSM (Wu et al., 2011). None of the studies were conducted with transgender couples or sex workers who have regular sexual partners. Future research would benefit from couple-based HIV/STI risk reduction for these key populations. Connect HIP (CDC, n.d.), which targets a broad range of couples, needs further testing in real-world settings to both confirm effectiveness and adoption through a dissemination and implementation hybrid design. In many of our couple-based studies, we employed a crude definition for a "couple," specifically couples who intended to remain together for another year.

We used this time-based criterion to ensure that the couple could be retained during the study implementation. This requirement may lead to the exclusion of couples and individuals who could benefit from the intervention, either in their current relationship, or in future ones. As such, for future studies, we propose the use of a flexible, broader definition of a “couple” as incorporated in Connect HIP, which did not include exclusion based on length of relationship. Additionally, implementation efforts should take place in real-world settings in order to reach out to more diverse couples who need HIV interventions and services, and improved access to ART and PrEP. Most couple-based SIG studies reported in this paper excluded couples who have experienced severe physical or sexual IPV, reported an order of protection within the past year, or identified safety concerns about participating in sessions with their partner. Such criteria may have excluded couples that could have benefited from the interventions.

We have used multiple couple-based modalities such as delivering the sessions to a single dyad at a time, a mixed format of an individual dyad and couples group sessions, or content delivered to a small, gender-specific group of individuals followed by dyadic sessions. All of these modalities were found to be feasible. Each has a number of strengths, as we described in the paper; however, we believe that more studies are needed to ascertain the most effective combination of modalities, and whether that varies by population.

Most of our couple-based HIV prevention approaches are guided by individual-based theories, such as social learning and cognitive behavioral theories (Table 2). These theories hold the notion that couples need support to initiate change, alter their behavior, and sustain the changes. It may be productive to apply theoretical frameworks that allow the inclusion of multiple influences (e.g., social and structural barriers, such as addressing stigma by providers and the community against people who use drugs, those at risk for HIV or living with HIV, or those who have been engaged with the criminal legal system) to better understand the dynamics among, and environmental factors on, the outcomes and participation in couple-based studies. To guide our couple-based studies, we used three major theories: Bronfenbrenner’s Ecological Perspective theory (Bronfenbrenner, 1979), social cognitive theory (Bandura, 1986), and Catania’s AIDS Risk Reduction Model (Catania et al., 1990). We also used an Afrocentric Paradigm to guide Project Eban, which was designed for African American participants. For our implementation study (Hunt, 2017; Witte et al., 2014), we used scaffolded learning theories (Perkins & Salomon, 1989). Our research shows that a combination of these theories can be used successfully to guide the intervention core components and implementation of the research. However, we acknowledge that there is a need for more research to better understand how these combinations of theories inform the core combinations of the intervention and their implementation. Future research should examine what

combination of theories are needed for what populations (heterosexual couples, MSM, transgender, African American, Latinx, etc.) in couple-based research. Clearly, multidisciplinary studies must be considered in these areas for future research. Moreover, gender-specific theories such as the relational theory of gender (Goldner, 2002) and gender identity and roles need to be integrated with these theories to inform couple-based intervention core components.

Implementation science is critically needed to ensure that evidence-based models are integrated into real-world practice settings through a better understanding of the barriers and facilitators of adoption strategies, and dosage of TA and training needed to enhance retention and improve implementation. Only one implementation science study examined transportability and implementation of our couple-based prevention intervention to real-world settings (Witte et al., 2014). Examining implementation strategies promoting evidence-based HIV prevention and treatment interventions, and training clinicians and facilitators from various professions including community health workers with a peer framework to use couple-based approaches are needed in order to make a public health impact on the HIV epidemic. We urgently advocate for attention and resources to disseminate evidence-based, dyadic-focused prevention and treatment research across sectors such as health, behavioral health, community-based, and criminal legal systems. Expanding the scaleup and utilization of couple-based HIV interventions will require commitment by governments and donors to fund research on dissemination and implementation. Implementation science research is also required to identify multi-level factors (e.g. organizational resources, reimbursement mechanisms, staffing, training, supervision) that are needed to support couple-based HIV prevention interventions. As described in Table 2, we engaged a Community Advisory Board (CAB) to provide feedback on all the stages of the design, implementation, and interpretation of the findings across all studies. However, we described the process of involving CABs and the process in only two of the studies (NIMH Multisite HIV/STD Prevention Trial for African American Couples Group, 2008a; Sormanti et al., 2001).

Future studies would also benefit from including larger sample sizes and using multiple biological endpoints. Most of the couple-based studies reported in this paper relied on accurate recall and self-reported outcomes. Only five studies reported biological outcomes, with four assessing STIs/HCV (El-Bassel et al., 2019, 2014; El-Bassel, Gilbert, et al., 2011; El-Bassel, Jemmott, et al., 2010), and one reporting on viral load (Remien et al., 2005). Very few of our studies have been sufficiently powered to examine new STI and HIV, or HCV infections as outcomes. In all of SIG’s couple-based studies, data analytical approaches have mainly targeted the individual, not the couple, as the unit of analysis, except for the implementation study focused on organizations (Witte et al., 2014). More attention should be given to couple-data analytical techniques such as actor-

partner interdependence models. Little research has examined the role of mediators' impact on the study's primary outcomes (El-Bassel et al., 2016; Hunt, 2017). In Project Eban, mediation analyses using the product-of-coefficients approach in a generalized-estimating-equations framework revealed that condom-use outcome expectancy, partner-reaction outcome expectancy, intention, self-efficacy, and safer-sex communication improved post-intervention, and mediated intervention-induced improvements in condom-use outcomes (El-Bassel et al., 2016). These findings underscore the importance of targeting outcome expectancies, self-efficacy, and safer-sex communication in dyadic HIV risk-reduction interventions. More investment needs to be placed on couple-based mediation analysis to identify the factors that further explain the interventions' effects.

Finally, a limitation of our review is that its goal was to be an exploration of the research emerging from SIG and how the group has advanced this area of research, but it does not fully survey the field of couple-based HIV interventions.

## Conclusion

Using a couple-based modality allows both members of the dyad to recognize their mutual responsibility to protect each other from HIV acquisition and/or transmission, and encourages couples to work together to stay healthy. The findings from SIG's studies are consistent with other systematic reviews on the advantages of couple-based HIV interventions (Burton et al., 2010; Crepaz et al., 2015; Gause et al., 2018; Jiwatram-Negrón & El-Bassel, 2014). Couple-based HIV prevention modalities stress the relationship's context (i.e., commitment, love, trust), and its connection to HIV acquisition. A couple-based modality supports the promotion of a safe environment to discuss sensitive topics such as sexual concurrency, power imbalances, sexual coercion, pregnancy decision-making and safety, disclosure to each other of extra-dyadic sexual partners, a history of HCV/STIs, present or past injection drug use, or experiences in abusive relationships. Using a couple-based modality allows the dyad to learn about, and practice important skills together; such as communication and problem-solving skills, gender differences (e.g., how men and women discuss sex, the meaning of requesting and/or refusing the use of condoms), gender inequalities in risky practices, and sexual expectations (El-Bassel et al., 2019, 2014, 2003). Using a couple-based modality has also been found to increase the initiation and adherence of ART among individuals in serodiscordant relationships (Hunt et al., 2013; Remien et al., 2005) as well as improve adherence to treatment regimens that prevent mother-to-child transmission of HIV (Hampana et al., 2022). Although we implemented the SMART Couples study prior to the scientific message on U = U, which underscores that people living with HIV who have an undetectable viral load are unable to transmit HIV, this message has since been endorsed in the past several years, including by the US Centers for Disease

Control and Prevention and the HIV Medicine Association (CDC, n.d.; HIVMA, n.d.). As such, when we replicate and disseminate SMART Couples, this message must be fully integrated into the core elements.

While a great deal of progress has been made in HIV couple-based research, more attention needs to be paid to the methodological barriers discussed in this paper, including greater attention to disseminating and translating couple-based modalities to real-world settings. For successful implementation of couple-based approaches in real-world settings, an ideological shift from focusing on the individual to the dyad must occur, with an emphasis on navigating existing organizations.

Finally, we recommend that a couple-based modality be used at each stage of the HIV care continuum, from prevention and testing, to initiating ART and achieving viral suppression. Jointly engaging a couple at each stage may lead to better outcomes, if the responsibility is placed on the dyad and not simply on recruiting a partner to treatment, while also involving them in forging linkages to support in their community, and improving retention in prevention, treatment, and care. This approach requires a shift in HIV prevention where the emphasis moves from the individual to dyadic contexts. The shift also requires training service providers and social workers, and increased funding to focus on the dyad as the unit of change rather than the individual client. In order to increase penetration and dissemination of HIV couple-based studies, regulatory changes in reimbursement, trainings for providers, and funding to support this type of intervention are critically needed.

## Discussion and Applications to Practice

The field of Social Work provides an excellent arena to employ couple-based interventions; however, few social workers use evidence-based couple interventions to prevent HIV transmission and other co-occurring substance use and mental health issues. Such interventions remain greatly underutilized in HIV clinics or HIV community-based organizations staffed by social workers (Hunt, 2017; Pomeroy et al., 2002; Witte et al., 2014). Two major reasons may explain this shortcoming: (1) a couple-based modality is rarely taught to social workers in academia or through on-the-job training, and (2) couple-based intervention and prevention approaches require more time and investment with clients; however, reimbursement is limited for couple-based interventions delivered in most agencies. There is a need for changes to be made in reimbursement regulations to support dyadic-based modalities.

Since SIG leadership and the majority of the investigative team are social workers, we are committed to advancing couple-based approaches to HIV prevention and care engagement and retention to further reduce the negative impacts of HIV. One approach to this aim would be to optimize the role and function of social work in many sectors in the

selection of, and championing of the adoption and sustained implementation of the couple-based interventions highlighted in the paper. Along with the support of the CDC in scaling up our couple-based interventions, dissemination and implementation studies conducted by social workers who understand multidisciplinary and systems frameworks are needed to examine strategies specifically targeting social work program leadership to increase awareness and to champion solutions to barriers. Further, clinical social workers have skills for working with dyads in many settings such as health care, criminal justice, or behavioral health settings that can be utilized for couple-based approaches. Yet evidence-based couple-focused interventions for HIV and other co-occurring substance use and mental health issues remain underutilized in social work practice. Future efforts to scale up such interventions in a range of agency settings would benefit from more rigorous implementation science research that may identify the organizational resources, support, and staff training and supervision that are needed. Our studies have shown that an integrated approach to HIV prevention and care, and substance use screening and treatment are effective. Studies that test efficient online training and collective learning addressing HIV, substance use and overdose, IPV and trauma-informed care, and that support couple-based intervention implementation are needed.

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