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Integrating intra-individual and dyadic factors in examining health among gay and bisexual men: A narrative review of recent literature

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Abstract

Gay and bisexual men (GBM) experience disproportionate rates of mental health and other negative health outcomes. For GBM in relationships, contextualizing the myriad of negative outcomes as a dyadic process may provide insight into the mechanisms through which these adverse outcomes develop. The objective of this review is to examine the current state of the relationship science literature using a health framework, *Relationship Process and Health*. We conducted a search for articles using PubMed, PsycInfo, and Web of Science for empirical articles in English published in the past 15 years on GBM in a relationship, assessing attachment, and relationship functioning as predictors of health outcomes. We found 649 articles. After screening, 23 articles were identified and reviewed. Findings overwhelming identified HIV risk as the primary health outcome. Attachment was associated with relationship functioning and sexual risk behaviors. Relationship-specific components were largely used as predictors of sexual HIV transmission risk behaviors. Together, these studies suggest that relationship functioning is a prospective link between attachment and health-related outcomes. The literature has yet to examine empirically dyadic-level mechanisms that may explain the association between individual attachment and health outcomes aside from HIV risk, and needs more examination of other health disparities affecting GBM.

Keywords

gay and bisexual men; relationships; attachment; health; health behaviors

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In the past decade, there has been an increase in research exploring the inter-connected nature of relationship functioning and individual health among sexual minority men in relationships with other men. Gay and bisexual men (GBM) face unique challenges in enacting intimate relationships. Experiences of stigma may lead to expectancies – or the anticipation – of rejection from romantic partners, with implications for both relationship functioning and health. The Relationship Process Framework (RPF; Pietromonaco et al, 2013) suggests that Attachment-related beliefs (about the desirability of the self and the reliability of others) are associated with health through the mechanism of relationship functioning. The RPF has the potential to provide a roadmap for integrating research on individual and couple level determinants of health. The purpose of this review was to explore existing work and suggest future directions.

Studies of GBM relationships have given substantial attention to contextualizing primary (main) partners as routes for HIV transmission. Among GBM, primary partners are estimated to account for 35–68% of new HIV infections (Goodreau et al., 2013; Sullivan, Salazar, Buchbinder, & Sanchez, 2009). Research on partnered GBM has demonstrated that relationship functioning factors have been linked to problems with sexual coercion, intimate partner violence (IPV) (e.g. Finneran & Stephenson, 2014), sexual agreements (e.g. Mitchell, Harvey, Champeau, & Seal, 2012), and drug use (e.g. Starks et al., 2019) all of which have been implicated in the HIV epidemic broadly and among GBM, specifically.

A growing literature has begun to examine the interpersonal context in which health behaviors occur, particularly among primary partner relationships. Historically, these studies have examined the impact of supportive relationships as a protective factor against aversive health outcomes among heterosexual couples (Dunkel Schetter, 2017). For example, a recent meta-analysis examining relationship functioning among heterosexual married couples found that greater marital quality was associated with greater physical health (e.g. lower risk of mortality, better disease prognosis, lower blood pressure) and mental health (e.g. depressive symptoms) (Robles, Slatcher, Trombello, & McGinn, 2014). More recently, the field has begun to examine the role of romantic relationships among GBM and have shown a reduction of psychological distress among recently partnered gay men (Bariola, Lyons, & Leonard, 2015). Researchers have also highlighted the interdependence between relationship satisfaction and reports of depression among men in a same-sex relationship, suggesting that both their own level of relationship satisfaction as well as their partner's predict individual-level mental health outcomes (Starks, Doyle, Millar, & Parsons, 2017).

Couples interdependence theory (CIT) has been utilized to understand the ways in which one's partner influence or behaviors related to health promotion can affect their motivation to engage in those specific behaviors (Rusbult & Van Lange, 2003; Rusbult, Verette, Whitney, Slovik, & Lipkus, 1991). One notable element within the CIT framework is the transformation of motivation process, which refers to a cognitive process that shapes the interactions within interpersonal relationships. Specifically, it highlights the motivations behind behaviors to achieve a specific outcome within interpersonal situations (Yovetich & Rusbult, 1994). This process often occurs when couples' begin to think in terms of shared goals, particularly those that require joint efforts (A. J. Rogers et al., 2016; Rusbult & Van Lange, 2003; Rusbult et al., 1991; Yovetich & Rusbult, 1994). During moments of conflict,

one partner may react based on self-interest or on motivations that consider the shared goals of the relationship. The latter is better able to promote couple well-being. Previous research has demonstrated that moments of conflict, where transformation of motivation is unsuccessful, can lead to the emergence of mental health problems (Mackinnon et al., 2012), therefore suggesting that greater relationship satisfaction and constructive communication are paramount characteristics of adaptive relationship functioning.

Intra-individual theories of interpersonal development, have examined how intra-individual factors regarding interpersonal relationships underlie the capacity of persons in a relationship to engage in health-related behaviors through a transformation of motivation. *Adult attachment theory* is a dominant individual-level theory within the relationship science literature. Bowlby (1969) argued that children would exhibit attachment behaviors, primarily proximity-seeking behaviors, as a strategy to mitigate distress to protect them from potential threats. Similarly, adults that are securely attached will reliably attend to a partner's distress in a responsive and supportive manner and are likely to engage in more constructive problem-solving (Campbell, Simpson, Boldry, & Kashy, 2005; Kobak & Sceery, 1988). This reliable pattern of events will promote a sense of valuing intimacy and reduce anxiety over abandonment and separation (Hazan & Shaver, 1987). Those characterized as insecurely attached will demonstrate a greater preoccupation with confronting the distress-eliciting situation (i.e., their romantic partner after experiencing a relational conflict). These individuals, characterized as anxious-avoidant, will exhibit more proximity-seeking behaviors that are motivated by their concerns of abandonment and rejection (Hazan & Shaver, 1987, 1994). In contrast, avoidantly attached individuals may engage in more avoidant or distancing behaviors to their attachment figure. These individuals will demonstrate behaviors that are self-reliant in order to suppress a negative affect through emotional repression and seclusion, in general, as they prefer not be dependent on others or feel that others are dependent upon them (Cassidy, 1994; Cassidy & Kobak, 1988; Mikulincer, Shaver, & Pereg, 2003). Insecure attachment styles within the context of a relationship has been linked to negative physical and mental health outcomes (Pietromonaco, DeBuse, & Powers, 2013; Stanton & Campbell, 2014), low relationship satisfaction (Butzer & Campbell, 2008; Mohr, Selterman, & Fassinger, 2013), and increased risk of IPV (Bartholomew & Allison, 2006; Fournier, Brassard, & Shaver, 2011).

Recently, Pietromonaco, Uchino, and Dunkel Schetter (2013) have provided a framework - *Relationship Process Framework* - which integrates dyadic-level functioning and individual-level development in a comprehensive manner to identify and explain the mechanisms by which intra-individual beliefs about intimacy in relationships and enacted relationship functioning come to be associated with health outcomes. This framework posits that the effect of intra-individual level predispositions on the health of a couple operates through a variety of mechanisms. Specifically, this framework proposes that attachment style is associated with health outcomes through a dyadic process within the relationship. Dyadic processes include relationship behaviors (e.g. intimacy, caregiving, perceived support), which can mutually influence each other. For example, the attachment style of one partner is posited to influence the relationship functioning (e.g. intimacy, perceived support) of the couple. Further, the model posits a series of mediational effects whereby attachment, impacts relationship functioning, which in turns influences the health behaviors of

individuals in the couple (e.g., decisions around condom use, maladaptive coping) potentially causing adverse health outcomes effects (e.g. HIV transmission, depressive symptoms).

Current Study

Both intra-individual and interdependent factors between main partners can effect decisions and behaviors related to health. In the past decade, studies examining relationship factors among same-sex couples, and the correlation between relationship factors and health among GBM have been ignored. To understand fully the state of the literature there is a need to synthesize findings across studies and to purpose possible mechanisms, which may help to explain the association between intra-individual, relationship functioning, and health among GBM.

The purpose of the current literature review is to identify areas of research in the relationship science field that require further attention to gain a more comprehensive prospective of how intra-individual relationship beliefs and relationship functioning influence health outcomes. To this end, the Pietromonaco, Uchino, et al. (2013) framework guided the theoretical structure of the review on *Relationship Processes and Health*. Given the disproportionate rates of health-specific issues experienced among the GBM population, in general, and partnered GBM more specifically, this review will address the current state of relationship science research and identify relationship-specific factors that may affect the disproportionate rates of HIV infection. For example, the current state of research has demonstrated that the variability of relationship functioning endorsed may affect health-related outcomes within a dyad, and a couples' ability to effect change of health-related behaviors. Additionally, the current review will identify the gaps in the current body of literature and provide recommendations for future research targeting the disproportionate rates of mental health issues and HIV transmission among partnered GBM.

Methods

Although the present review is narrative by method, we aimed to provide a more structured review by integrating the guidelines lines set forth by *Preferred Reporting Items for Systematic reviews and Meta-Analyses* (PRISMA) (Moher, Liberati, Tetzlaff, & Altman, 2009). The PRISMA guidelines consist of a 27-item checklist and a flow diagram. The checklist includes items deemed essential for transparent reporting of literature reviews of empirical studies examining health outcomes (Liberati et al., 2009). The checklist defines the criteria an researchers should address to help provide evidence that the review was planned, and executed with transparency (Moher et al., 2009). Specifically, the 27 items cover all aspects of the review manuscript, including guidelines on the title, abstract, introduction, methods, results, discussion, and the disclosure of funding sources as well as any conflicts of interest (Tate & Douglas, 2011).

Although PRISMA was originally intended to evaluate clinical trial research, more recently PRISMA has been adopted by researchers to evaluate social and psychological research questions in efforts to increase transparency and rigor in conducting literature searches and

publishing reviews (e.g., Lerner & Robles, 2017; Perinelli & Gremigni, 2016; Tate & Douglas, 2011). Therefore, by applying both the PRISMA structure and organizing our results within the *Relationship Processes and Health* theoretical framework, this review provides a cohesive and structured approach from which to examine the current state of relationship science regarding the association between relationship mechanisms and the health of GBM. IRB approval was not required as this was secondary analysis.

Literature Search and Data Extraction

In January 2018, we conducted a thorough electronic search for articles using PubMed, PsycInfo, and Web of Science for empirical articles in English published in the past 15 years, which assessed constructs of attachment and relationship functioning as predictors of health-related outcomes among same-sex male couples, as detailed in Table 1. The criterion of limited the search to publications in the past 15 years was included as formative research on same-sex male couples was largely focused on relationship formation in the absence of particular health outcomes. The search included key-terms for same-sex male couples (i.e., “same-sex couples” and “gay relationships”) attachment (i.e., “secure” and “insecure attachment styles”), relationship functioning (i.e., “relationship satisfaction” and “commitment”), and health-related factors (i.e., “risk behavior” and “health”). Automatic search filters were applied to relevant inclusion criteria (i.e., year published and peer reviewed journals). This strategy was used in identifying both the attachment and relationship functioning literature. We additionally searched the Cochrane Library for redundant, similar, or relevant articles. We did not search or aim to identify unpublished literature, as they have not formally undergone peer review.

Articles were included in this review if they met the following criteria: (1) contained relevant data on the association between relationship mechanisms and the health of individuals or couples; (2) sampled GBM in a relationship; (3) did not conflate results related to gay and bisexual men with other sexual and gender minority populations such as lesbian women; (4) were survey-driven or mixed methods (theoretical and qualitative articles were excluded); (5) were published in English; and (6) were published between 2003 and 2018. Articles were excluded if they addressed the attachment and relationship functioning in contexts other than romantic relationships and health or behavioral health outcomes. We also excluded dissertations, editorials, letters, commentaries, and conference presentations.

Two of the first three authors reviewed the titles and abstracts of all publications found during these searches. Articles were excluded based on their titles and/or abstracts because they were not relevant to the current review. All other articles went through a second screening that consisted of reading the entire article to determine whether it met inclusionary criteria. If one of the first two authors was unsure whether an article should be excluded, the third reader also read it and consensus was reached through discussion. The inter-rater agreement was strong (91%) between the readers. Abstracts that met inclusion criteria were retrieved, reviewed, and summarized. Data extraction was conducted by using standardized items informed by the PRISMA and *Methodologic Quality* criteria, which included study location and year, study design, relationship length, demographic variables (i.e., age, race, and HIV status), study measures, and study outcomes. We also documented sample

characteristics, including if the study analyzed dyadic- or individual-level or data. Each study's analysis or outcome was extracted as a separate finding.

Study Content and Methodologic Quality

Although the health research on romantic relationship is emerging, varying levels of research have been conducted. This includes exploratory research, correlational studies, and studies that used analytic analysis that controlled for various factors. In efforts to capture the variability in studies, we examined each publication and extracted data relevant to the *Methodologic Quality Score* (See Table 2) (Lee, Schotland, Bacchetti, & Bero, 2002). The MQS checklist, is composed of 11 items, each focused on different characteristics of empirical research (i.e., defined constructs, validity/reliability of data, study design, sample size, data analysis, and appropriate inferences from data) (Table 2), and is a standardized tool used for assessing the quality of research reports. This system has been successfully used in previous studies in a variety of multidisciplinary health-related journals (Buhi & Goodson, 2007; Goodson, Buhi, & Dunsmore, 2006; Guilamo-Ramos et al., 2012; Lerner & Robles, 2017; C. R. Rogers, Goodson, & Foster, 2015).

Table 3 provides an itemized analysis for each report scored based on the 11 MSQ characteristics, possible scores range from 0 (lowest quality) to 20 (highest quality). After coding the selected reports, the first author met with coders to resolve issues of disagreement. Once each report was coded, all scores are summed to denote the methodological quality. Based on their total score, reports were grouped into three different categories, low quality (0–6 score), medium quality (7–14 score), and high quality (15 score) studies. The distributions of MSQ scores for each report reviewed are presented in Table 3. MQS scores ranged from 11 to 16, of the 23 reports coded 8 were classified as high quality, 15 were medium quality, and no reports were low quality.

Results

Our searches initially identified 649 records. We removed 501 records, as they did not pertain to the current study. For example, records excluded examined parent/teacher attachment and educational attainment. From this, 148 abstracts were evaluated to be potentially relevant for the review. We subsequently excluded 125 reports for not meeting the inclusion criteria, as described in Figure 1.

We identified 23 reports for our thematic analysis (refer to Table 4 for detailed descriptions of the included reports). This review included findings from both dyadic studies ($n = 13$) and individual partner ($n = 10$). Among the dyadic studies review sample sizes ranged from 23 to 566 dyads and among studies where one member of the dyad was present sample sizes ranged from 46 to 186. A majority of studies were conducted in the US, six studies were conducted outside of the US, and two studies did not report a geographical location as to where the study was conducted.

Description of Included Studies

For the current review, we identified 19 quantitative studies and four mixed-method studies. In terms of study design, a majority of studies were cross-sectional ($n=16$) and seven were longitudinal. Only two studies utilized a random sample design while a majority of studies utilized a convenience/non-probability sample design (See Table 4).

A majority of reports assessing relationship functioning reported findings based on cross-sectional data. Only two studies reported findings based on longitudinal data (Brown & Keel, 2015; Newcomb & Mustanski, 2016). Six of the eight studies included dyadic-level data in their analysis. Many of the studies were conducted on both heterosexual and GBM samples, only data that reflect the sample or subsamples of GBM are reported. Sample sizes ranged widely from 51 to 550 with White Americans or Europeans comprising 18.9%–85.0% of the samples across all studies. The mean age of participants ranged from 18.5 to 46.7. The majority of participants were recruited using convenience sampling methods including targeted internet advertisements and passive venue-based methods.

The majority of findings from the attachment-based reports were based on cross-sectional data. Three studies were longitudinal spanning three to four years (Boesch, Cerqueira, Safer, & Wright, 2007; Darbes, Chakravarty, Neilands, Beougher, & Hoff, 2014; Starks, Newcomb, & Mustanski, 2015). Six of the 13 studies included dyadic-level data in their analysis. Similar to reports on relationship functioning, we only reviewed data that reflect the sample or subsamples of GBM. Sample sizes ranged widely from 87 to 1,132 with White Americans or Europeans comprising 25%–89% of the samples across all studies. The mean age of participants in the studies ranged from 18.8 to 44.6 years. The majority of participants were recruited using dual recruitment methods usually via the internet and venue-based methods.

Summary of Study Findings

Taken together, these studies illustrate a consistent pattern of associations between relationship functioning and health-related outcomes, and between attachment and relationship functioning that resemble the pathways proposed within the Relationship Process and Health framework (Pietromonaco, Uchino, et al., 2013). Similarly, these studies also highlight a series of understudied pathways particularly involving attachment styles and health as well as relationship functioning and maladaptive coping strategies (e.g., intimate partner violence (IPV), substance use, eating disorders) among men in a same-sex relationship. The findings of the current review are presented in line with the pathways outlined by Pietromonaco, Uchino, et al. (2013) beginning first with studies on relationship functioning followed by those on attachment style.

Relationship Functioning and Health Outcomes—Consistent with the Relationship Processes and Health model, relationship functioning was associated with health outcomes among coupled GBM. Across studies multidimensional assessment of relationship functioning was the norm – rather than the exception – across reviewed studies. With the exception of two studies (Brown & Keel, 2015; Newcomb & Mustanski, 2016), all studies assessed the influence of relationship functioning on health-related outcomes using multiple

dimensions of relationship functioning. In particular, studies examined a combination of measures assessing different levels of relationship satisfaction, trust, and communication within the relationship.

The majority of studies focused on behavioral outcomes associated with the sexual transmission of HIV. Consistent with CIT, findings across studies suggest that variability in relationship functioning was generally associated with reports of transmission risk behaviors. Specifically, relationship functioning was associated with reports of condomless anal sex (CAS) with a main partner (Gamarel, Starks, et al., 2014; Newcomb & Mustanski, 2016; Starks, Gamarel, & Johnson, 2014), CAS with a casual partner (Mitchell, Harvey, et al., 2012), and breaks in sexual agreements (Gomez et al., 2012). Greater constructive communication, trust, and commitment within the relationship were associated with fewer breaks in a sexual agreement (Gomez et al., 2012). Similarly, investment in a sexual agreement was associated with fewer reports of CAS with a casual partner (Mitchell, Harvey, et al., 2012). Mirroring these results, Newcomb and Mustanski (2016) found that endorsement of the previous items associated with unhealthy relationships were associated with greater HIV risk. For example, GBM who endorsed they “felt trapped or stuck in the relationship” reported higher rates of CAS both cross-sectional and overtime.

Individual HIV status was also associated with HIV transmission risk behaviors and relationship functioning. Two studies analyzed samples of HIV serodiscordant couples’ and found variability in relationship dynamics between the HIV-positive and HIV-negative partners’ influence on sexual risk taking and relationship satisfaction (Gamarel, Neilands, Golub, & Johnson, 2014; Starks et al., 2014). Gamarel, Starks, et al. (2014) found that among HIV-positive men, higher sexual satisfaction was associated with lower rates of CAS. The authors also reported a positive association between sexual satisfaction and protected anal intercourse among HIV-negative men. Similarly, Starks et al. (2014) found that the HIV-negative partner reporting lower rates of sexual satisfaction and intimacy was associated with a greater likelihood of engaging in HIV risk behaviors (i.e., CAS); whereas, among an HIV-positive partner sexual satisfaction was positively associated with CAS.

As an alternative to focusing on the prediction of sexual HIV transmission risk behaviors, two studies focused on the association between relationship functioning and specific HIV prevention strategies including: planned condom use with partners (Mitchell, Garcia, Champeau, Harvey, & Petroll, 2012) and attitudes towards Couples HIV Testing and Counseling (CHTC) (Rendina et al., 2014; Sullivan et al., 2014). The findings from these studies demonstrated a link between better relationship functioning and positive attitudes regarding HIV prevention. Studies focused on acceptability and efficacy of CHTC provided evidence on dyadic-level characteristics such as couples’ relationship satisfaction, constructive communication, and views of dependability and faith in one’s partner were associated with positive attitudes around couples-based HIV testing interventions (Mitchell, 2014; Sullivan et al., 2014). Similarly, those reporting higher relationship satisfaction and relational commitment were more likely to report greater self-efficacy of future condom use and attitudes towards future condom use respectively.

Only two studies examined the association between relationship satisfaction and a health outcome other than HIV transmission risk and HIV prevention. Starks et al. (2017) found an indirect association between the development of an individual capacity for intimacy (consistent with Erikson's (1963) intimacy versus isolation stage) and depression through relationship satisfaction, such that greater intimacy was associated with higher relationship satisfaction and lower depressive symptoms. Notably, intimacy here refers to an intra-individual capacity for the formation of an emotionally close but appropriately bounded relationship with another individual (Erikson, 1968), and not the degree of intimacy perceived in the current relationship. Brown and Keel (2015) found that higher relationship satisfaction scores were associated with decreases in a drive for thinness and fewer bulimic symptoms longitudinally.

Attachment Theory and Relationship Functioning—Studies that examined associations between adult attachment style and relationship functioning utilized diverse approaches to conceptualize the construct and likewise vary in their selection of measures utilized to operationalize attachment. For example, several studies contextualized attachment from a global perspective exploring the influence of avoidant and anxious attachment styles on health-related outcomes (Cooper, Tottenhagen, Curran, Randall, & Smith, 2017; Gabbay & Lafontaine, 2017a, 2017b); while other studies contextualized attachment on specific sub-domains that reflect attachment-related attitudes (Starks et al., 2015; Starks & Parsons, 2014). Many studies assessed attachment as a domain specific unidimensional construct, which represented an individual's capacity for closeness in a specific way or perceptions of closeness in a specific relationship. In line with the conceptualization of attachment as an individual's capacity for closeness in a relationship, one study globally defined and assessed emotional attachment and relationship functioning (Darbes et al., 2014), while others examine more specific attachment styles such as anxious/avoidant (Bartholomew, Regan, Oram, & White, 2008; Craft, Serovich, McKenry, & Lim, 2008; Elizur & Mintzer, 2003; Passarelli & Vidotto, 2016). Additionally, two studies examined attachment style more robustly by measuring at least two or more distinct styles of attachment (Ramirez & Brown, 2010; Starks & Parsons, 2014). In general, couples' categorized as securely attached reported greater relationship functioning and relationship quality compared to couples' that were insecurely attached (Boesch et al., 2007; Cooper et al., 2017; Elizur & Mintzer, 2003).

Despite the inconsistencies in contextualizing attachment styles present in previous work, the findings were consistent with the *Relationship Processes and Health* framework (Pietromonaco, Uchino, et al., 2013). The majority of these studies examined attachment as a predictor of relationship functioning (dyadic processes) and found that relationship commitment (Boesch et al., 2007), relationship quality (Cooper et al., 2017; Starks et al., 2015), relationship satisfaction (Boesch et al., 2007; Elizur & Mintzer, 2003), and general relationship functioning (Mohr et al., 2013; Passarelli & Vidotto, 2016) were positively correlated with secure attachment. Similarly, studies examining attachment avoidance and anxiety found that greater reports of attachment avoidance and anxiety to be associated with lower relationship quality (Cooper et al., 2017), lower trust, and lower sexual intimacy within in the relationship (Gabbay & Lafontaine, 2017a).

Attachment Theory and Health-related Outcomes—With regard to sexual health-related outcomes, three studies examined associations between attachment style and the engagement in CAS with a main or casual partner. Starks and Parsons (2014) utilized an actor partner interdependence model to evaluate associations between attachment style and transmission risk behaviors and found that insecurely attached men were more likely to report a greater number of CAS acts with casual partners compared to securely attached men. In addition, men with avoidantly attached partners' were significantly more likely to have CAS with casual partners compared to those men with securely attached partners' (Starks & Parsons, 2014). In that same vein, for serodiscordant couples, a greater level of overall attachment was associated with a greater likelihood of engaging in CAS with a main partner (Darbes et al., 2014; Hoff, Chakravarty, Beougher, Neilands, & Darbes, 2012). These findings align with the existing research on factors contributing to the avoidance of condoms with a main partner.

It is important to note that four studies also explored the associations between attachment styles and episodes of IPV among men in a same-sex relationship (Bartholomew et al., 2008; Craft et al., 2008; Gabbay & Lafontaine, 2017a, 2017b). Overall, those studies suggested that insecure attachment styles are associated with both perpetration and victimization of either physical or psychological partner violence.

The *Relationship Process and Health* framework suggests that relationship functioning should mediate the relationship between attachment and health outcomes, yet in this review relatively few studies had access to longitudinal prospective data, which permitted a rigorous testing of mediation (Darbes et al., 2014; Hoff et al., 2012; Starks et al., 2015; Starks & Parsons, 2014). Despite the limited number of longitudinal studies, there is data to support the pathway that relationship dynamics are associated with sexual behaviors through an indirect effect between attachment and reports of HIV transmission risk behaviors (i.e. CAS with a casual partner of unknown status or who is HIV-positive) (Darbes et al., 2014; Hoff et al., 2012). Yet, other data found a strong and positive association between avoidant attachment and number of CAS acts with casual partners (Starks & Parsons, 2014), as well as reports of global mental health problems (i.e. depression and anxiety) (Starks et al., 2015).

Discussion

Pietromonaco, Uchino, et al. (2013) proposed a framework in which individual factors and health-related outcomes are associated through relationship (dyadic) level factors. The current expands on their work and provides initial support for applying this framework to men in a same-sex relationship. Both relationship functioning and attachment are associated with health-related outcomes, specifically HIV transmission risks. In turn, attachment was consistently associated with relationship functioning; however, no study has examined the mechanisms in which attachment is associated with health-related outcomes among men in a same-sex relationship. Findings from this review suggest that relationship functioning may be one prospective mechanism in which attachment style is associated with health-related outcomes, either HIV-specific as well as other health problems, among men in a same-sex relationship.

Health outcomes can change within the context of the relationship. Positive relationship functioning has often been associated with better overall health outcomes (Brown & Keel, 2015; Starks et al., 2017). This is particularly true among men in a same-sex relationship and their sexual risk taking (Gamarel, Starks, et al., 2014; Newcomb & Mustanski, 2016; Starks et al., 2014). In general, partners who report positive communication, trust, commitment, and satisfaction within their relationship take fewer sexual risks with casual partners (Gomez et al., 2012) and with partners who are living with HIV (Starks et al., 2014). In contrast, reports of negative relationship functioning, such as “feeling trapped” or being less satisfied with the relationship, engaged in greater HIV risk behaviors (Newcomb & Mustanski, 2016). These overall associations are consistent with Couples Interdependence Theory (CIT; Rusbult & Van Lange, 2003; Rusbult et al., 1991). Partners who perceive better relationship functioning may be more invested in the sexual health of the couple. Conversely, it is possible that partners who perceive fewer positives to their relationship are less concerned with the health of the overall couple and engage in greater sexual risk.

Health outcomes can also change within the context of intra-individual factors. Specifically, attachment is an important correlate of sexual health among partnered GBM. Across studies, secure attachment styles were associated fewer incidences of CAS with a causal partner (Darbes et al., 2014; Starks & Parsons, 2014). In contrast, a partner with an insecure attachment style engaged in more incidences of CAS with a casual partner (Starks & Parsons, 2014). These findings are consistent with attachment theory and suggest that securely attached partners’ engage in protective behaviors that lower the risk HIV and other STIs.

In addition to health outcomes, attachment was associated with overall relationship functioning for GBM in a relationship. Consistent throughout the literature, secure attachment style is associated with greater relationship functioning. Those securely attached often reported more positive communication with their partners, as well as greater relationship quality (Cooper et al., 2017), and relationship satisfaction (Boesch et al., 2007). In contrast, men with greater attachment anxiety or avoidance indicated lower relationship quality (Cooper et al., 2017), lower trust (Gabbay & Lafontaine, 2017a), and poorer communication patterns (Mohr et al., 2013).

Collectively, these studies suggest a prospective mechanism through which attachment styles are associated with health outcomes. Consistent with the *Relationship Process and Health* framework (Pietromonaco, Uchino, et al., 2013), it is possible that relationship functioning is one mechanism that links attachment style to health-related outcomes among GBM in a relationship. Together, these studies imply that securely attached partners’ often have greater relationship functioning and engage in fewer risk behaviors related to sexual health. Conceptually this is consistent with both attachment theory and CIT.

According to attachment theory, a partner’s attachment style provides intra-individual schemas for relationship functioning (Collins, Ford, Guichard, Kane, & Feeney, 2010). Specifically, attachment styles (secure versus insecure) differ among partners as to how they seek proximity to an attachment figure as a strategy to provide comfort and support within their relationship (Bowlby, 1969). This is an important point to consider when thinking of

the interdependence between couples, as it is likely related to a partner's ability to influence their partner's behaviors and accommodate shared goals. Consistent with CIT, a partner who has an understanding of their own as well as their partner's unique needs have greater overall functioning and are able to navigate their shared goals (Rusbult & Van Lange, 2003).

Attachment and episodes of IPV

While it is beyond the scopes of this paper, attachment may also play an integral role in predicting experiences of IPV within a couple. The current review found four studies that examined the association between attachment style and IPV. Specifically, insecure attachment is associated with episodes of both perpetration and victimization of IPV (Bartholomew et al., 2008; Craft et al., 2008; Gabbay & Lafontaine, 2017a, 2017b) and attachment style may be one mechanism through which relationship stress is associated with perpetration of IPV (Craft et al., 2008).

The Lack of physiological research

Pietromonaco, DeBuse, et al. (2013) emphasized distinctions between relationship processes, and the physiological processes that underlie the dyadic- and individual-level influence of health-related outcomes. They suggested that distinguishing among these constructs would facilitate a thorough investigation of their inter-related nature. Yet, no research has been conducted on the variability of health-related outcomes and underlying biological processes as a function of relationship functioning and attachment styles among GBM in relationships. In contrast, research has been conducted with heterosexual couples and has found differences in physiological responses as a function of attachment (Diamond & Hicks, 2005; Feeney & Kirkpatrick, 1996). Specifically, insecure attachment has been found to be negatively associated with vagal tone (or activity of the vagus nerve) (Feeney & Kirkpatrick, 1996) and show poorer physiological responses to stress (Diamond & Hicks, 2005).

One area of emerging inquiry that is specific to GBM is the effect that sexual minority stress has on physiological responses (Doyle & Molix, 2016; Lick, Durso, & Johnson, 2013). Current evidence suggests that experiences of minority stress, such as discrimination related to sexual orientation, is positively associated with physiological stress responses (Doyle & Molix, 2016). Relatedly, some researchers have begun to examine specific minority stressors related to partnered GBM. One study found that experiences of relationship-based stigma was correlated with poorer relationship functioning among partnered GBM (Rosenthal & Starks, 2015). The impact of relationships, relationship-based stigma, and attachment on physiological responses remain unstudied and should be noted as an area of future research.

Practice Implications

The findings from the current review provide support for the application of interventions targeting relationship functioning to reduce health-related risk. One exemplar of this approach is the 2GETHER project, a couples-based HIV prevention and relationship education intervention, which has been successful at promoting relationship functioning and reducing HIV risk among partnered GBM (Newcomb et al., 2017). Additionally, the findings of the current review support the development of individually delivered

interventions that aims to enhance communication skills and potentially address maladaptive cognitive schemas that may inhibit the engagement of successful relationships. Dyadic-focused interventions delivered to individuals may provide a platform for partnered GBM who are unable or unwilling to receive services with their partner jointly. This individually delivered modality may expand services for GBM seeking relationship-specific counseling, but otherwise could not be able to in traditional couples-focused paradigms.

Limitations

This review is not without limitations. Unlike a meta-analysis, this narrative review did not provide a mathematical analysis of the effect sizes associated with various pathways in the *Relationship Process and Health* model (Pietromonaco, Uchino, et al., 2013). Second, we limited our search to published articles in English and to articles indexed in the three databases, thus the current review did not focus on any unpublished literature, conference abstracts, and non-English language papers. Third, the current review was limited to examining the associations between attachment style, relationship functioning, and health-related outcomes. Finally, it is important to acknowledge the existence of diversity within romantic relationships, and the role diversity may play in the health-related outcomes associated with the heterogeneous build of romantic relationships (Hammack, Frost, & Hughes, 2019). For example, some GBM subscribe to consensual non-monogamy that may include additional romantic partners, which introduces further interdependence that may be associated with myriad of health behaviors and health outcomes that are not captured in the current review. Given these limitations, the current review was unable to examine other individual differences (e.g. family value, gender roles, and religion/spirituality) and structural-level factors (e.g. racism, HIV endemic neighborhoods) that may affect the relationship-specific factors and health.

Conclusion

These findings reflect the emerging body of relationship science research illustrating the association between attachment, relationship functioning, and health. Specifically, attachment style and relationship functioning are important correlates of sexual health among GBM in relationships. The current review also provides prospective support for utilizing the *Relationship Process and Health framework* when developing studies specific to partnered GBM and their health.

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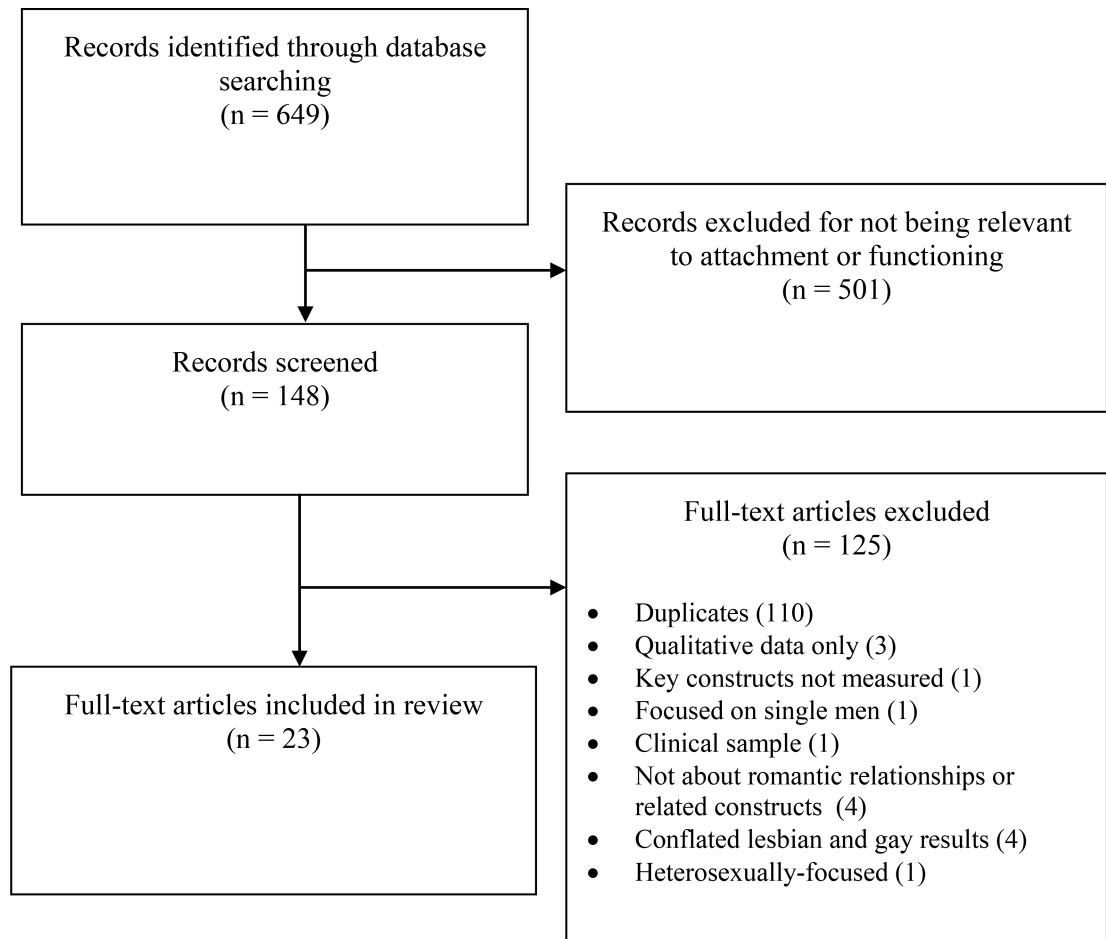


Figure 1:
Flow diagram of search strategy

Table 1:

Example of Search Strategy: Relationship Science Literature

Database	Term 1	Term 2	Term 3	Term 4	Results	Screened	Duplicates*	Identified
PubMed	couples	satisfaction	msm	health	7	2	0	2
PubMed	couples	satisfaction	gay	health	20	5	1	3
PubMed	couples	satisfaction	same-sex	health	29	3	3	0
PubMed	couples	commitment	same-sex	health	6	4	0	2
PubMed	couples	commitment	msm	health	3	3	1	0
PubMed	couples	conflict	msm	health	3	0	0	0
PsycINFO	couple	communication	gay	health	29	6	3	1
PsycINFO	couple	satisfaction	gay	health	24	6	4	0
PsycINFO	couple	satisfaction	msm	health	1	1	0	0
PsycINFO	couple	satisfaction	gay	risk behavior	4	2	1	1
PsycINFO	couple	--	gay	risk behavior	23	7	4	1
PsycINFO	relationships	attachment	gay men	--	34	8	0	3
PsycINFO	relationships	attachment	gay	--	86	7	3	5
PsycINFO	couples	attachment	same-sex	--	30	10	8	2

* Duplicates of those already accounted for in the identified column

MSM = men who have sex with men

Table 2:

Methodological Quality Scoring Summary

Methodological Characteristic	Scoring Options* (Maximum Total Score = 20 Points)	Distribution of Characteristics: (N =23)
		Frequency, n (%)
A. Definition of focused construct	0 Not reported	0 (0)
	1 Global	9 (39.1)
	2 Facet-Specific	14 (60.9)
B. Validity data for focused-variable scores	0 Not reported	1 (4.4)
	1 Reported	22 (95.6)
C. Reliability data for focused-variable scores	0 Not reported	3 (13.0)
	1 Reported	20 (87.0)
D. Validity/reliability data for other variables in study	0 Not reported	3 (13.0)
	1 Reported	20 (87.0)
E. Theoretical framework presented	0 Did not present	10 (43.5)
	1 Presented	13 (56.5)
F. Research paradigm	1 Quantitative	19 (82.6)
	2 Mixed Methods	4 (17.4)
G. Study design	1 Correlational or cross sectional	16 (69.6)
	2 Longitudinal	7 (30.4)
H. Sample Size	0 Undetermined	0 (0)
	1 <100	4 (17.4)
	2 >100 to <300	14 (60.9)
	3 >300	5 (21.7)
I. Sample design	0 Convenience/nonprobability	21 (91.3)
	1 Random/probability but not nationally representative	2 (8.7)
	2 Random/probability and nationally representative	0 (0)
J. Data analysis	1 Quant/univariate/descriptive	1 (4.4)
	2 Bivariate/ANOVA	0 (0)
	3 Multiple/logistic regression	11 (47.8)
	4 Multivariate	11 (47.8)
K. Appropriate inferences of causality	0 Inappropriate	2 (8.7)
	1 Appropriate	21 (91.3)

Table 3:

Methodological Quality Score for Each Study Reviewed

Study	A	B	C	D	E	F	G	H	I	J	K	MQS Score
Bartholomew et al., 2008	2	1	1	1	0	2	1	2	1	4	1	16
Boesch et al., 2007	2	1	1	1	0	2	2	2	0	4	1	16
Brown & Keel, 2015	1	1	1	1	1	1	2	1	0	3	1	13
Cooper et al., 2017	1	1	1	1	1	2	2	1	0	4	0	14
Craft et al., 2008	2	1	1	1	1	1	1	1	0	4	1	14
Darbes et al., 2014	1	1	1	1	1	1	2	3	0	4	0	15
Elizur & Mintzer, 2003	2	1	1	1	1	1	1	2	0	3	1	14
Gabbay & Lafontaine, 2017a	1	1	1	1	1	1	1	2	0	4	1	14
Gabbay & Lafontaine, 2017b	1	1	1	1	0	1	1	1	0	4	1	12
Gamarel et al., 2014	2	1	0	0	1	1	1	2	0	3	1	12
Gomez et al., 2012	2	1	1	1	0	1	2	3	0	3	1	15
Hoff et al., 2012	1	1	1	1	0	1	1	3	0	3	1	13
Mitchell et al., 2012a	2	1	1	1	0	1	1	2	0	3	1	13
Mitchell et al., 2012b	2	1	0	0	0	1	1	2	0	3	1	11
Mitchell, 2014	2	0	0	0	0	1	1	3	0	3	1	11
Mohr et al., 2013	1	1	1	1	1	1	1	3	0	4	1	15
Newcomb & Mustanski, 2016	1	1	1	1	0	1	2	2	1	3	0	13
Passerelli & Vidotto, 2016	2	1	1	1	1	1	1	2	0	4	1	15
Ramirez et al., 2010	2	1	1	1	0	2	1	2	0	1	1	12
Starks & Parsons, 2014	2	1	1	1	1	1	1	2	0	4	1	15
Starks et al., 2014	2	1	1	1	1	1	1	2	0	3	1	14
Starks et al., 2015	1	1	1	1	1	1	2	2	0	4	1	15
Starks et al., 2017	2	1	1	1	1	1	1	2	0	3	1	14

A, definition of construct; B, validity data or citation for construct measures; C, reliability data or citation for construct measures; D, validity and reliability data for other variables; E, theoretical framework; F, research paradigm; G, study design; H, sample size; I, sample design; J, data analysis; K, appropriate inferences of causality

Summary of Reviewed Articles

Table 4:

Authors	Location/Time	Sample Description (M = Mean, SD = Standard Deviation)	Dyadic Sample (Y/N)	Design/Method	Primary Aims or Primary Outcomes	Main Findings
Bartholomew et al. (2008)	British Columbia, Canada Time: Not Provided	(1) N = 186 (2) Not Provided (3) M = 38.53 (SD = 9.44) (4) 45.7% British/English; 27.4% Other European; 17.8% Canadian; 6.5% Other; 2.7% Not specified (5) 73% HIV-negative; 21% HIV-Positive	No	Cross-Sectional Mixed-Methods Quantitative Survey & Qualitative Interviews Participant Recruitment: Digit-plus method (phone calls) (Secondary analysis)	Examining predictors of intimate partner violence (IPV) in male same-sex couples	Results from both quantitative and qualitative measures found attachment anxiety positively correlated in both directions of physical abuse and with perpetration of psychological abuse. Interview-based data on attachment avoidance was negatively associated with both directions of physical abuse and with receipt of psychological abuse. Self-reported avoidance was not significantly associated with both physical and psychological abuse. After controlling for abuse bidirectionality; interview ratings of anxiety were positively associated with psychological perpetration and interview ratings of psychological perpetration and interview ratings of avoidance were negatively associated with physical perpetration
Boesch et al. (2007)	Washington D.C. Time: Not Provided	(1) Time 1: 53 Couples (N=106); Time 2: 34 Couples (N=68) (2) Not Provided (3) M = 44.59 (SD = 10.36) (4) 89% White; 11% African American; 5% Other (5) Not Provided	Yes	Longitudinal (4-years) Mixed-Methods Quantitative Survey & Qualitative Interviews (in-person) Participant Recruitment: Venue-based; newspaper ads; professional referrals; word-of-mouth	Predicting current and future relationship satisfaction and commitment in gay male couples	Couples reports for current attachment was significantly correlated with T1 satisfaction, this correlation indicated that current attachment was related to T1 satisfaction for both dyads and individuals. Current attachment also predicted T2 satisfaction. Overall, this correlation indicated that current attachment was correlated with T2 satisfaction for dyads, but not significant for individuals. Current attachment predicting future commitment; self-reports of current attachment level correlated significantly with commitment at both T1 and T2. Overall, within dyads, the partner with the higher level of current attachment at T1 tended to be the more committed partner at T2.
Brown and Keel (2015)	Location: Not Provided Time: Not Provided	(1) N = 51 (2) Not Provided (3) M = 27.40 (SD = 9.09) (4) Not Provided (5) Not Provided	No	Longitudinal Quantitative Survey-Based data collection Participant Recruitment: Convenience sampling	Examined predictors of the drive for thinness	Relationship satisfaction at baseline predicted decreases in Drive for Thinness scores over 10 years. Relationship satisfaction was associated with reduced bulimic symptoms
Cooper et al. (2017)	Alabama and Arizona	(1) 81 couples (N = 162); 58 lesbian couples (N = 116); 23 gay male couples (N = 46)	Yes	Longitudinal (Daily Diary - 14 days) Mixed-Methods	Exploring how daily sacrifice motives and attachment insecurity	Positive association between daily approach motives, and a negative association between avoidance motives, and relationship quality

Authors	Location/Time	Sample Description (M = Mean, SD = Standard Deviation)	Dyadic Sample (Y/N)	Design/Method	Primary Aims or Primary Outcomes	Main Findings
Craft et al. (2008)	Midwestern metropolitan city Time: Not Provided	(1) N total = 87; N = 41 (women); N = 46 (male) (2) M = 4.6 years (SD = 4.85) (3) M = 33.52 (SD = 8.97) (4) 56.5% White; 32.6% African American; 10.9% Other (5) Not Provided	No	Quantitative Survey & Qualitative Daily Diary Participant: Venue-based; online (listersvs/social media); word-of-mouth	might predict relationship quality	Approach motives were associated with greater relationship quality; avoidance motives associated with lower relationship quality -- moderated by gender -- women low in attachment insecurity and men high in attachment insecurity Men in high attachment anxiety reported higher relationship quality on days when they had more approach motives for sacrifices Men high in attachment avoidance reported lower relationship quality on days when they had more avoidance motives
Darbes et al. (2014)	San Francisco, CA Time: June 2005 - February 2007	(1) Time 1: 566 Couples (N = 1,132); Time 6: 291 Couples (N = 582) (2) M = 6.9 years (range = 0.25–48 years) (3) M = 42 (range = 18–83) (4) 47% Interracial; 45% White (5) 56% seroconcordant negative; 18% seroconcordant positive; 26% serodiscordant	Yes	Cross-sectional Quantitative Survey-Based data collection Participant: Professional referrals; community outreach; newspaper advertisements	Examine the impact of attachment style and stress on the perpetration of IPV among same-sex partners	A relationship between perceived stress and the perpetration of violence was mediated by an insecure attachment style. Mediation model suggests that 43% of variance in perpetration of violence is explained by the relationship between stress and attachment style Psychological aggression was the most frequently reported form of relationship violence Insecure individuals are suggested to be more emotionally reactive to stress
Elizur and Mintzer (2003)	Israel Time: Not Provided	(1) 108 couples (2) Not Provided (3) M = 32.0 (4) 89% Israeli; 8% North African or Asian; 3% Other (5) Not Provided	No	Longitudinal Quantitative Survey-Based data collection Participant: Venue-based; street-intercept; listersvs; online and newspaper advertisements	Investigate relationship dynamics and psychosocial predictors of unprotected anal intercourse with outside partners of serodiscordant or unknown HIV serostatus as well as unprotected anal intercourse with primary partner in serodiscordant couples	Couples with greater relationship dynamics were less likely to engage in unprotected anal intercourse with an outside partner. For serodiscordant couples, higher attachment and intimacy reports were associated with greater likelihood of engaging in unprotected anal intercourse with a primary partner. Positive relationship dynamics exerted a greater influence on the couple as a whole as opposed to the individual partners. This suggests that as positive relationship dynamics increase, at the couple-level, the individual partners are less likely to report unprotected anal intercourse with an outside partner.
Elizur and Mintzer (2003)	Israel Time: Not Provided	(1) 108 couples (2) Not Provided (3) M = 32.0 (4) 89% Israeli; 8% North African or Asian; 3% Other (5) Not Provided	No	Cross-Sectional Quantitative Survey-Based data collection Participant: Venue-based; street-intercept; listersvs; online and newspaper advertisements	Examined interpersonal factors as potential predictors of gay men's relationship durability and satisfaction	Attachment security mediated the association of perceived friends support and self-acceptance with relationship quality Perceived support and acceptance provided by friends rather than family related to gay men's attachment security and relationship quality Extreme versus balanced defensive attachment dispositions reported less relationship durability

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Gabbay and Lafontaine (2017a)	Canada Time: Not Provided	(1) N total = 310; N = 203 (women); N = 107 (men) (2) M = 4.98 years (SD = 4.83) (3) M = 46.88 (SD = 12.46) (4) 25.1% White; 3.6% African American; 6.3% Other (5) Not Provided	No	Cross-Sectional Quantitative Survey-Based data collection Participant Recruitment: Venue-based; street-intercept; listservs; online and newspaper advertisements	Examined how dyadic trust and sexual intimacy mediates the relationship between insecure romantic attachment and perpetrated sexual violence occurring between same-sex intimate partners	Participants who reported higher scores on both attachment anxiety and/or attachment avoidance also had elevated scores on sexual same-sex intimate partner violence (SSIPV) perpetration Participants who were high on attachment anxiety and/or attachment avoidance also reported lower rates of dyadic trust and had lower sexual intimacy scores Using a serial mediation model; a positive relationship between attachment insecurity and perpetration of Sexual SSIPV mediated the relationship between both attachment anxiety and attachment avoidance vis-à-vis sexual SSIPV perpetration
Gabbay and Lafontaine (2017b)	Canada Time: Not Provided	(1) N total = 310; N = 203 (women); N = 107 (men) (2) M = 4.98 years (SD = 4.83) (3) M = 46.88 (SD = 12.46) (4) 25.1% White; 3.6% African American; 6.3% Other (5) Not provided	No	Cross-Sectional Quantitative Survey-Based data collection Participant Recruitment: Venue-based; street-intercept; listservs; online and newspaper advertisements	Examining the relationship between the attachment system and same-sex intimate partner violence	Most consistent findings were positive associations between avoidance of intimacy and overall physical violence Zero-order correlations suggest that attachment insecurity and dysfunctional caregiving are both linked to perpetration and victimization of IPV Greater attachment avoidance was associated with increased incidences of physical violence Men in same-sex relationships who report high attachment avoidance may be more inclined to perpetrate physical IPV, compared to women.
Gamarel et al. (2014)	San Francisco, CA Time: Not Provided	(1) 116 Couples (N = 232) (2) M = 90.40 (SD = 93.54) (3) M = 46.70 (SD = 10.96) (4) 61.6% White; 16.8% Latino; 11.6% Black; 10.0% Other (5) 100% serodiscordant couples	Yes	Cross-Sectional Convenience Sampling Survey-Based data collection Participant Recruitment: Passive community recruitment and provider referrals	Examined the association between both partner's perceived sexual satisfaction and cognitive interdependence with CAS among serodiscordant couples	HIV-positive partners' perceptions of sexual satisfaction were negatively associated with the occurrence of PAI. HIV-negative partner's perceptions of sexual satisfaction scores were positively associated with the occurrence of PAI HIV-positive partners who endorsed higher levels of autonomy were also at increased odds of engaging in protected sex HIV positive partners who endorsed higher scores on the IOS scale were at increased odds of engaging in protected sex HIV-positive partners' perceptions of sexual satisfaction were negatively associated with abstinence from anal sex, compared with those who engaged in UAI
Gomez et al. (2012)	San Francisco, CA Time: 2005 to 2007	(1) 263 Couples (N=526) (2) Not Provided (3) Not Provided (4) Not Provided	Yes	Longitudinal Convenience Sampling Survey-Based data collection	Examined the association between relationship factors and	Members of couples with higher scores for commitment, mutual constructive communication, dependability, predictability, faith, and social support had lower odds of reporting a broken agreement.

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Hoff et al. (2012)	San Francisco, CA Time: June 2005 - February 2007	(5) 189 concordant HIV-negative couples & 74 HIV-discordant couple (1) 566 couples (N = 1,132) (2) M = 6.9 years (range = 0.25–48 years) (3) M = 42 (range = 18–83) (4) 47% Interracial; 45% White; 5% Black; 3% Other (5) 56% seroconcordant negative; 18% seroconcordant positive; 26% serodiscordant	Yes	Participant Recruitment: Passive community-based recruitment Cross-Sectional Quantitative Survey-Based data collection Participant Recruitment: Venue-based; street-intercept; listservs; online and newspaper advertisements	breaks in a couple's sexual agreement Examined predictors of unprotected anal intercourse among MSM couples	Attachment and intimacy were associated with an increased likelihood of unprotected anal intercourse with primary partner Among concordant positive couples, greater perceived dependability of partner was associated with lower odds of unprotected anal intercourse with a primary partner. However, greater attachment was associated with higher odds of unprotected anal intercourse with a primary partner. Among discordant couples, greater attachment was associated with higher odds of unprotected anal intercourse with a primary partner
Mitchell et al. (2012)	Portland, OR & Seattle, WA Time: June - November 2009	(1) 144 couples (N = 288) (2) 58% with partner less than 5 years (3) M = 34.1 (SD = 8.4) (4) 95% Non-Hispanic; 85% White (5) 95% HIV-negative	Yes	Cross-Sectional Quantitative Survey-Based data collection Participant Recruitment: Convenience sampling and peer recruitment. Passive community-based recruitment and e-mail list serves	Examined the association between relationship factors and characteristics with MSM having CAS with a casual partner.	Engaging in UAI with a secondary sex partner were negatively associated with commitment to a sexual agreement
Mitchell et al. (2012b)	Portland, OR & Seattle, WA Time: June - November 2009	(1) 144 couples (N = 288) (2) 58% with partner less than 5 years (3) M = 34.1 (SD = 8.4) (4) 95% Non-Hispanic; 85% White (5) 95% HIV-negative	Yes	Cross-Sectional Quantitative Survey-Based data collection Participant Recruitment: Convenience sampling	Examined the association between relationship factors and planned condom use with a primary partner and with casual partners	Perceived social norms scores were lower for those who perceived they had lower quality of alternatives. Perceived behavioral control toward future condom use with the main partner was higher for those with higher relationship satisfaction. Attitude scores toward planned condom use with a secondary sexual partner were higher for those with more commitment to the relationship Behavioral control scores for planned condom use with a secondary sexual partner were lower among participants who had been in their current relationship for 2 years or less.
Mitchell (2014)	Location Not Provided Time: Summer 2011	(1) 275 Couples (N = 550) (2) M = 56.8 (SD = 61.9) (3) M = 31.4 (SD = 10.0) (4) 81% White; 6% Hispanic/Latino; 6% Mixed race; 3% African	Yes	Cross-Sectional Quantitative Survey-Based data collection Participant Recruitment:	Identified factors associated with attitudes towards couples-based voluntary HIV/STI counseling and testing (CVCT)	Positive attitudes toward using CVCT were associated with couples who had higher scores on relationship satisfaction, viewed their partner as being dependable for trustworthiness, had faith in their partner for being trustworthy, and communicated constructively.

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Mohr et al. (2013)	Washington D.C. Time: Not Provided	(1) 188 couples (N = 415) (2) M = 6.41 years (SD = 5.76) (3) M = 36.54 (SD = 9.49) (4) 85.4% White; 2.8% Hispanic/Latino(a); 2.7% Black/African American; 5.8% Other (5) Not Provided	Yes	Cross-Sectional Quantitative Survey-Based data collection Participant Recruitment: Venue-based; street-intercept; listserve; online and newspaper advertisements	Investigate links between romantic attachment and relationship functioning	Less positive attitudes toward using CVCT were associated with couples who had been in their relationship longer than the sample's average had higher scores of communication by avoidance and withholding. Greater differences between the partners regarding attitudes towards using CVCT were associated with greater differences in valuing their sexual agreement. APIM analysis - Attachment insecurity in both self and partner were linked with poor relationship functioning (satisfaction, commitment, trust, communication, and problem intensity) Monogamy was positively associated with relationship quality only when participants or their partners reported moderate or high levels of attachment anxiety -- Non-monogamy was negatively associated with relationship satisfaction and commitment when self or partner anxiety levels were moderate or high (actor effects) Actor Anxiety was positively related to partner Avoidance -- people with high attachment anxiety are more like than others to be with partners who are high in avoidance Own avoidance level was linked with lower trust and poorer communication processes, whereas partner avoidance was linked with less aversive communication
Newcomb and Mustanski (2016)	Chicago, IL Time: Not Provided	(1) N = 114 (2) Not Provided (3) M = 18.53 (SD = 1.21) (4) 48.4% Black, 18.9% White, 12.3% Hispanic, 9% Other (5) Not Provided	No	Longitudinal Quantitative Survey-Based data collection Participant Recruitment: Convenience sampling and peer recruitment	Examine the developmental change in relationship characteristics and condomless anal intercourse (CAI)	Relationship characteristics (i.e., large age differences and experiences of IPV) were associated with greater rates of condomless anal intercourse. Associations between relationship characteristics and CAI increased in strength as younger men developed and moved into late adolescence and emerging adulthood. A desire or need for the relationship to last, feeling "trapped", and power differences was associated with higher rates of CAI
Passarelli and Vidotto (2016)	Italy Time: Not Provided	(1) N = 177 (2) Not Provided (3) M = 28.52 (SD = 9.6) (4) Not Provided (all participants were Italian, but no demographic breakdown provided) (5) Not Provided	No	Cross-Sectional Quantitative Survey-Based data collection Participant Recruitment: Venue-based; street-	Predictors of sexual and sentimental relationships among gay men	Participants reporting high avoidance tend to be less interested in relationships characterized by closeness, trust, and emotional intimacy Participants high in anxiety reported a greater desire for uncommitted sex compared to avoidance A weak but significant effect for those reporting high attachment anxiety was associated with greater desirability of casual sex

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Ramirez and Brown (2010)	Australia Time: Not Provided	(1) N = 135 (2) M = 4.9 years (SD = 6.29) (3) M = 36.44 (SD = 10.60) (4) Not Provided (5) Not Provided	No	Cross-Sectional Quantitative Survey-Based data collection Participant Recruitment: Venue-based; street-intercept; listservs; online and newspaper advertisements	Characteristics of open and closed relationships among Gay men	Gay men in open relationships were not more avoidantly attached compared to gay men in closed relationships. Attachment styles did not have a relationship on the decision to have open or closed relationships Gay men with established rules and guidelines regarding their open relationship were more likely to report being satisfied with their relationship compared to men with no rules.
Starks and Parsons (2014)	New York City and Los Angeles Time: Not Provided	(1) 172 Couples (N = 344) (2) M = 72.61 months (SD = 72.93) (3) M = 38.57 (SD = 9.39) (4) 60.5% White; 20.1% Latino; 12.8% Other; 6.7% African American (5) 86% HIV-negative/unknown; 12.2% HIV-Positive	Yes	Cross-Sectional Quantitative Survey-Based data collection Participant Recruitment: Venue-based; street-intercept	Evaluate the associations between attachment patterns and unprotected anal intercourse with casual partners and relationship quality with main partner	Securely attached individuals reported the highest levels of sexual communication Avoidantly attached men reported significantly more casual unprotected anal intercourse (UAI) partners, and an increased number of UAI partners Adult attachment style suggested being relevant to the sexual lives, sexual safety, and relationship quality of partnered gay men.
Starks et al. (2014)	San Francisco, CA Time: Not Provided	(1) 91 Couples (N = 182) (2) M = 98.41 months (SD = 95.0) (3) M = 46.9 (SD = 10.3) (4) 61.0% White; 17.6% Latino; 11.5% Black; 9.9% Other (5) 100% serodiscordant relationships	Yes	Cross-Sectional Quantitative Survey-Based data collection Participant Recruitment: Passive recruitment; participant and provider referrals	Examined how relational factors are associated with sexual risk taking and strategic positioning as well as unprotected anal intercourse (UAI) within serodiscordant same-sex male couples	Only HIV-negative partners' reports of relationship commitment were positively associated with the odds of engaging in strategic positioning UAI vs. no UAI HIV-negative partners' reports of sexual satisfaction and intimacy were negatively associated with engaging in risk taking vs. no UAI. HIV positive partners' reports of sexual satisfaction were positively associated with engaging in risk taking vs. no UAI A higher level of sexual satisfaction among HIV-negative partners was associated with a lower likelihood of engaging in risk behavior vs. strategic positioning.
Starks et al. (2015)	Chicago, IL Time: 2007 – 2012	(1) N = 219 (n = 117 male) (2) Not Provided (3) M = 18.8 (SD=1.49) (4) 56.6% Black; 16.4% Other/Multiracial; 13.7% White; 13.2% Latino/a (5) Not Provided	No	Longitudinal Quantitative Survey-Based data collection Participant Recruitment: Venue-based; street-intercept	Early adolescent peer and parental attachment are associated with general mental health and relationship quality in later adolescence and early adulthood	Those who reported dating initiation at age 15 + reported significantly higher parental attachment scores compared to those reporting dating initiation at age 14 or younger. Participants who reported an average relationship length of 13 months + also reported higher peer attachment on average compared to those who reported an average relationship length of a year or less. High levels of parental and peer attachment in early adolescence was associated with lower average global severity index scores in later adolescence and young adulthood.

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Starks et al (2017)	US National Sample Time: December 2011 - February 2013	(1) 128 Couples (N = 256) (2) M = 58.1 months (SD = 72.3) (3) M = 32.6 (SD = 10.6) (4) 67.2% White; 13.3% Latino; 12.5% Other; 7% Black/African American (5) 84% HIV-positive; 16% HIV-negative	Yes	Cross-Sectional Quantitative Survey-Based data collection Participant Recruitment: Convenience Sampling, passive community based & targeted online recruitment	Explore associations among intimacy development, relationship satisfaction, and depression among same-sex male couples	adulthood Mediational Pathways - Neither peer nor did parental attachment have a significant direct effect on relationship adjustment scores. Higher levels of EPSI Intimacy were associated with lower reported depression scores. Men with higher relationship satisfaction and those whose partners were more satisfied had lower depression scores. Relationship satisfaction had an indirect effect on intimacy and depression at the actor and partner levels.