



HHS Public Access

Author manuscript

Drug Alcohol Depend. Author manuscript; available in PMC 2018 May 01.

Published in final edited form as:

Drug Alcohol Depend. 2017 May 01; 174: 47–57. doi:10.1016/j.drugalcdep.2017.01.012.

Marijuana use and physical dating violence among adolescents and emerging adults: A systematic review and meta-analysis

Renee M Johnson^a, Michael LaValley^b, Kristin E Schneider^a, Rashelle J Musci^a, Kayley Pettoruto^b, and Emily F Rothman^b

^aJohns Hopkins Bloomberg School of Public Health; Baltimore, MD

^bBoston University School of Public Health; Boston, MA

Abstract

Background—As restrictions on marijuana are loosened, there is concern of a coming increase in marijuana use among adolescents and emerging adults, which could be coupled with commensurate increases in behavioral problems associated with use, such as physical dating violence (PDV). To summarize what is known about the association between marijuana use and PDV victimization and perpetration among 11–21 year olds, we conducted a systematic review and meta-analysis of the relevant literature published between 2003 and 2015.

Methods—Candidate articles were identified with a systematic search, and we used inclusion and exclusion criteria to review titles, abstracts, and the full text of studies for consideration. There were 13 articles examining marijuana in association with PDV; five addressed victimization and 11 addressed perpetration.

Results—Findings suggest that marijuana use is associated with a 54% increase in the odds PDV victimization, and a 45% increase in the odds of perpetration.

Conclusions—Findings suggest that dating violence is a correlate of marijuana use, and that association is strongest among adolescents (vs. emerging adults) and girls (vs. boys). Therefore, it should be routinely included as a core data item in marijuana surveillance systems, so as to allow for behavioral monitoring.

Correspondence to: Renee M Johnson.

PhD, MPH, Johns Hopkins Bloomberg School of Public Health; Department of Mental Health, 624 North Broadway, 8th Floor, Room 898; Baltimore MD 21205-1999, Tel.: (410) 955-7073, Fax: (410) 955-9088.

Contributors: Renee M. Johnson and Kristin E. Schneider coordinated the literature search; Michael LaValley conducted the analysis; and all authors assisted with writing and data interpretation.

Financial disclosure: No financial disclosures were reported by the authors of this paper.

Conflicts of Interest

None

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Keywords

marijuana/cannabis; dating violence/partner violence; adolescents; emerging adults; systematic review; meta-analysis

1. Introduction

In the U.S., marijuana policy is changing rapidly at the state level. Statutes that effectively end sanctions for marijuana use by adults (>21 years) have been passed in Washington D.C., Washington, Oregon, Colorado, and Alaska. Additionally, Washington D.C. and 20 states have removed criminal penalties for use and possession (i.e., decriminalization), and 35 states have passed laws allowing for medical use (National Conference on State Legislatures [NCSL], 2016a; NCSL, 2016b). Policy changes may have notable implications for adolescents and emerging adults because they have the highest rates of marijuana use (Johnston et al., 2014; Johnston et al., 2015; Table 1), and are at developmentally sensitive time periods. Nationally-representative data from 2013 show that 23% of high school students and 20% of 18–25 year olds report past 30-day marijuana use (Substance Abuse and Mental Health Services Administration [SAMSHA], 2014; Kann et al., 2014). As restrictions on marijuana are loosened, there is concern of a coming increase in marijuana use among adolescents and emerging adults, which could be coupled with commensurate increases in behavioral problems associated with use (Testa and Brown, 2015).

We have limited knowledge about the associations between marijuana use and behavioral problems, but are in a period in time when such information is very much needed. It is necessary to develop a comprehensive understanding of the associations between marijuana use and specific public health problems in general, and among adolescents and emerging adults in particular, given their high levels of use and developmental stage (American Academy of Pediatrics, 2015; Ghosh et al., 2016). This knowledge can inform policy decisions, and can enable the public health sector to anticipate how changes in marijuana policy and use might impact other behavioral problems, so as to mitigate adverse consequences.

Dating violence is an example of a behavioral problem that could be influenced by marijuana use, though there is not yet a scientific consensus as to the association between the two (Testa and Brown, 2015). The fact that there is strong support for an association between alcohol and partner violence among youth (Rothman et al., 2012; Shorey et al., 2011) highlights the importance of considering substance use as a risk factor for partner violence. To fill this knowledge gap, we review and summarize the existing literature describing what is known about the association between marijuana use and physical dating violence (PDV) among adolescents and emerging adults in the U.S.

1.1. Marijuana Use and Physical Dating Violence (PDV)

Approximately 10% of U.S. high school students report having experienced PDV victimization in the past year (Rothman and Xuan, 2013; Kann et al., 2014). Estimates of the prevalence of PDV perpetration among the same population range from 12%-31% (Rothman

et al., 2010; Taylor and Mumford, 2016; Haynie et al., 2013; Coker et al., 2014). Although population-based estimates of PDV among emerging adults are harder to obtain, results from nationally-representative surveys and studies of college students suggest that the prevalence is also high (Berger et al., 2012; Smith et al., 2003; Black et al., 2011). Approximately 10%-40% of 18–21 year olds report PDV in a relationship (Johnson et al., 2015a; Johnson et al., 2015b; Halpern et al., 2009).

The consequences of PDV can be serious. Those who are victimized are at increased risk for multiple negative outcomes including physical health problems, depressive symptomatology, unhealthy eating behavior, academic difficulties, and physical injury (Fletcher, 2010; Bonomi et al., 2013; Ackard et al., 2007; Coker et al., 2000; Exner-Cortens et al., 2013). Youth who perpetrate PDV also have significant psychosocial problems, and are at an increased risk for perpetrating partner violence in adulthood (Gidycz et al., 2007; Smith et al., 2003).

Two recent reviews highlight relevant information about the association between marijuana use and dating violence (Testa and Brown, 2015; Vagi et al., 2013). First, Vagi et al. reviewed longitudinal studies (published from 2000–2010) to identify risk and protective factors for dating violence perpetration among 10–24 year olds. Of the 20 studies included in that review, just one examined marijuana use as a risk factor, and results were not statistically significant (Foshee et al., 2010). An important lesson from Vagi et al.'s (2013) work is that marijuana has been infrequently examined in etiological research on dating violence, particularly in comparison to alcohol.

Second, Testa and Brown (2015) conducted a narrative review of 30 studies (published since 2008) that addressed marijuana use and dating violence perpetration among youth and adults. They concluded that there is likely a modest positive association between marijuana use and partner aggression globally, i.e., an association between the two over a given time period, or at two or more different time points. However, they further note that the two behaviors have not been shown to be linked in studies that examine “event-level” associations, i.e., marijuana use occurring on the same day as dating violence. The limited information from event-level studies raises the possibility that global associations could simply reflect two co-occurring, but not mechanistically related, behaviors. Both reviews suggest important next steps for research on marijuana use and PDV, which we address in this study. First, neither summarizes marijuana use in association with PDV victimization, which is a notable gap. Second, at this stage in the science, a systematic review and meta-analysis on the topic are warranted. Results would provide a quantitative, summative estimate of the association between marijuana use and PDV to provide additional context to the existing reviews. Third, results of existing studies should be viewed in terms of both their study design as well as the theorized mechanisms, so as to better understand how marijuana use might be associated with PDV globally, and at the event level (Testa and Brown, 2015). There are several theoretical explanations for how marijuana use could increase risk for partner violence, and we review them below.

1.2. Marijuana Use and Physical Dating Violence (PDV): Theoretical Explanations

1.2.1. PDV Perpetration—One class of potential mechanisms linking marijuana use to partner violence relates to how the substance impacts users' physiological and psychological state. First, use impairs cognition and creates perceptual distortions (Pope and Yurgelun-Todd, 1996; Goldstein, 1995). Consequently, people who have used marijuana may interpret others' actions as aggressive even if they are not, and respond combatively. Second, marijuana may impair the ability to tamp down aggressive impulses, and thereby increase the risk for aggressive behavior in conflict situations (Moore and Stuart, 2005; Yanowitch and Coccaro, 2011; Temple et al., 2013; Friedman, 1998). Third, marijuana can make some users feel paranoid, anxious, or panicky, which could elevate risk for conflict (Moore and Stuart, 2005). Relatedly, marijuana use increases heart rate, and the physiological arousal associated with an increased heart rate may increase the likelihood of aggressive behavior (Moore and Stuart, 2005). A fourth explanation relates to symptoms of withdrawal; which may contribute to irritability and, therefore, increase the risk for conflict and aggression (Moore and Stuart, 2005; Smith et al., 2013; Smith, 2002; Testa and Brown, 2015).

Further explanations relate to the interaction between people and their social environments. Specifically, an association between marijuana use and PDV perpetration could be situational purchasing and using marijuana may bring one into settings and social contexts where violence is more likely (Bean, 2001). Friedman (1998) identifies a “systematic dimension” model, which suggests that those who use marijuana may become involved in violence because it is intrinsic to the selling of illicit substances. Among youth, this may be reflected in friendship with peers who use or sell illicit drugs and/or who engage in high levels of violence.

A final explanation relates to “problem behavior theory.” The premise of problem behavior theory is that adolescents have psychosocial motivations to engage in a variety of risk behaviors such as dating violence and substance use (Jessor, 1987). This theory would suggest that there are antecedent variables that increase risk for both marijuana use and PDV, and that their co-occurrence reflects those antecedent motivations rather than one behavior “causing” the other.

1.2.2. PDV Victimization—Because adolescents and emerging adults who use marijuana often have partners who use it as well, the theoretical explanations linking marijuana use to PDV perpetration described above may also increase risk for victimization (Shorey et al., 2008). Additionally, marijuana use may contribute to impaired relationship decision-making (Grant et al., 2012), which could: (1) increase susceptibility to entering into unhealthy or violent dating relationships, (2) reduce capacity to end such relationships, and (3) decrease the ability to pick up on cues that a partner may be dangerous (Shorey et al., 2008). A final explanation for an association between marijuana use and PDV is that adolescents and emerging adults may use marijuana to cope with the emotional distress and anxiety associated with being in a violent relationship (Weiss et al., 2014; Shorey et al., 2016).

1.3. The Current Study

Given the changing marijuana policy landscape, there is concern that youth marijuana use will increase, which could lead to commensurate increases in associated risk behaviors, including dating violence (Testa and Brown, 2015). To summarize what is known about the association between marijuana use and PDV victimization and perpetration among adolescents and emerging adults, we conducted a theory-based systematic review and meta-analysis of the relevant literature. We focused on adolescents and emerging adults aged 11–21 because they have high levels of marijuana use, and because relationships among this population are distinct from relationships among those in older age groups. Specifically, younger couples are less likely to cohabit, be married, and have children together, and their relationships tend to be shorter in duration and have lower levels of commitment and trust (Shorey et al., 2008, 2011; Johnson et al., 2015b).

2. Methods

PRISMA is an evidence-based minimum set of items for reporting the procedures involved in systematic reviews and meta-analyses (Moher et al., 2009). Using guidelines outlined in the PRISMA Statement, we reviewed articles examining the association between marijuana use and PDV that had been published in peer-reviewed academic journals. We reviewed articles that included: (1) an assessment of marijuana use; (2) an assessment of PDV victimization, perpetration, or both; and (3) a quantitative estimate of the measure of association between the two. We conducted narrative syntheses and meta-analyses examining marijuana use in association with PDV.

2.1. Selection Criteria

We defined PDV as non-sexual physically aggressive behavior among current or former romantic, sexual/intimate, or dating partners. We excluded sexual violence. We only included articles in which marijuana use was assessed as a singular variable (i.e., not combined with alcohol use, tobacco use, or use of other illicit substances), and in which respondents were aged 11–21 years at the time of the PDV assessment. We also excluded articles focused on: pregnant women, incarcerated people, commercial sex workers, people in treatment for substance use disorders, populations outside the U.S., and intervention studies targeted at preventing violence or substance use.

We aimed to review empirical research that could address the question of whether marijuana use could lead to PDV. Establishing that marijuana use precedes PDV (in longitudinal studies), or establishing the possibility that marijuana use could have preceded PDV (in cross-sectional studies) allows the meta-analyses to address this specific theoretical pathway. The temporality criterion for including studies reflects our conceptualization of the marijuana use-PDV association. We included cross-sectional studies in which the time period for assessment of marijuana use and PDV fully overlapped, or partially overlapped and in which marijuana use had a longer timeframe (e.g., past 12-month marijuana use and past 30-day dating violence). We excluded those longitudinal studies in which marijuana use was determined to have been initiated after PDV.

2.2. Search Strategy and Data Abstraction

We searched for articles using PubMed, which accesses the MEDLINE database. To identify candidate articles, we first conducted the following three text word searches:

1. dating (i.e., dating *or* courtship *or* intimate *or* partner *or* “intimate partner”);
2. violence (i.e., violence *or* abuse *or* aggression *or* perpetration *or* victimization *or* fighting *or* assault *or* “dating violence” *or* “domestic violence” *or* “date fighting”); and
3. marijuana (i.e., marijuana *or* cannabis *or* drug *or* substance).

Next, we combined those three searches with “*and*” to generate a list of potential articles to be included in this review. We then limited the search results to English-language articles that had been published between January 1, 2003 and December 31, 2015. To identify additional potential articles for inclusion, we searched PsycInfo using the text word search strategy described above.

Once candidate articles were identified, research assistants worked in pairs and used the inclusion and exclusion criteria to screen titles and abstracts, and to review the full text of candidate articles for inclusion (Figure 1). The initial PubMed search yielded 2,316 citations. Most were not relevant and were excluded based on a title review (2,090), and 103 were excluded after an abstract review. One hundred and twenty-three articles were reviewed in full, and 11 of those were included (Table 2). The supplemental PsycInfo search yielded two additional articles (Shorey et al., 2014b; Foshee et al., 2010). In total, 13 articles were included in this review; two examined victimization (Eaton et al., 2007; Yan et al., 2010), eight examined perpetration (Foshee et al., 2010, McNaughton Reyes et al., 2014, Nabors, 2010, Rothman et al., 2010, Shorey et al., 2014a, Shorey et al., 2014b, Temple et al., 2011, Walton et al., 2009), and three examined both victimization and perpetration (Epstein-Ngo et al., 2013; Melander et al., 2010, Shorey et al., 2015). Relevant information about the studies (i.e., sample, design, measurement and prevalence of PDV and marijuana use, and measures of association) is summarized in Table 2.

2.3. Narrative Synthesis

In the narrative syntheses, we qualitatively reviewed study findings in the context of study design and characteristics, including: demographic profile of respondents (i.e., age, race/ethnicity, and sex), setting, study design, analysis, measurement of marijuana use and PDV, and measures of association for PDV victimization and perpetration. Narrative syntheses were conducted separately for PDV victimization and perpetration. Because of sex differences in the prevalence and nature of marijuana use and PDV (Rothman et al., 2010; Johnson et al., 2015b), we described sex-stratified measures of association if they were available, in addition to sex-pooled measures.

When available from the underlying articles, we based the narrative on adjusted estimates of the measures of association between marijuana use and PDV, as well as the level of statistical significance. Otherwise, we based it on unadjusted estimates. Our rationale for this

strategy was that the authors of the individual studies had used the best information available to them in determining how to provide unbiased assessments of the association.

2.4. Meta-Analyses

The goal of a meta-analysis is to review existing studies and generate a “combined odds ratio (OR)”, which is a summary statistic that uses data from all relevant studies to represent the common association between two variables (Egger et al., 1997a). As a first step toward conducting the meta-analysis, we compiled estimates of the measures of association between marijuana use and PDV from each study. As with the narrative synthesis, we used adjusted estimates when available. If sex-specific estimates were provided in the underlying articles, we included those in the meta-analysis. Otherwise, we included the sex-pooled estimate.

Some studies presented two estimates of measures of association with the same reference group; for example, results might include the odds of both severe and moderate PDV perpetration relative to no perpetration. Both ORs could not be entered into the meta-analysis because it would bias estimation of the combined OR and its confidence interval. In these cases, we included the estimate that represented a larger proportion of the population in the meta-analysis.

The second step in the meta-analysis was to standardize all estimates of the measure of association. For those estimates in the form of ORs or adjusted ORs (aORs), no conversion was needed. We converted all other types of estimates into ORs and 95% confidence intervals (CIs) using established methods and the *compute.es* library in the *R* statistical software package (Borenstein, 2009; Johnson et al., 2002). Next, we calculated log ORs, 95% CIs, and inverse-variance weighted log ORs, for all of the ORs that would be entered into the meta-analysis. We generated the combined OR and 95% CI with a maximum-likelihood implementation of random effects using the MIXED procedure in SAS version 9.4 (Normand, 1999). Afterward, we used the results from the meta-analyses to generate forest plots, which illustrate the relative strength of the associations between marijuana use and PDV across the studies, as well as the combined OR. We plotted the y-axis on a logarithmic scale so that the CIs appear symmetrical.

Heterogeneity in meta-analysis refers to the variation in study outcomes across studies, and is an indicator of the level of comparability across studies. To assess heterogeneity across estimates we calculated Cochrane’s *Q* test, which is the weighted sum of squared differences between individual estimates across studies (Cochran, 1954). If the results of the *Q* test were statistically significant, we inferred the presence of heterogeneity. To quantify the amount of heterogeneity, we generated an I^2 statistic, which provides an estimate of the proportion of variation across measures of association due to heterogeneity in study characteristics. We evaluated heterogeneity as low, moderate, or high on the basis of I^2 values of 25%, 50%, and 75%, respectively (Sterne et al., 2011). Finally, we used the Egger test to empirically assess the likelihood of publication bias (i.e., the likelihood that findings with positive results were more likely to have been published) (Egger et al., 1997b). The Egger test evaluates the slope of a linear regression when the measure of association is taken to be the outcome and the standard error is used as the predictor; estimates are weighted by their precision. A statistically significant results with a positive slope was considered an indicator of possible

publication bias. We generated contour-enhanced funnel plots to provide a visual representation of the potential that publication bias impacted the results. Each log OR was plotted against its own measure of precision, and we interpreted symmetry as evidence that the probability of publication bias was low.

3. Results

3.1. PDV Victimization

3.1.1. Overview—Five studies examined marijuana use in association with PDV victimization, and the results vary by the age group of respondents. Although the studies do not provide evidence for an association between the two variables among emerging adults, they do offer support for an association among adolescents. Below we describe results by age group of study participants.

3.1.2. Narrative Synthesis Adolescents—In crude (i.e., unadjusted) models, each of the three studies with adolescent samples demonstrated a statistically significant association between marijuana use and PDV victimization either in sex-pooled (Yan et al., 2010; Shorey et al., 2015) or sex-stratified analyses (Eaton et al., 2007; Yan et al., 2010). Shorey et al. (2015) did not include adjusted models, but the other two studies did. After adjustment, results from the Yan et al. (2010) study were not statistically significant overall or for either sex. By contrast, results of the Eaton et al. (2007) study were statistically significant for girls, but not boys. Findings suggest that the strength of the association may be stronger among girls (Eaton et al., 2007; Yan et al., 2010).

All three studies were cross-sectional. Eaton and colleagues (2007) presented data from a large, nationally-representative sample of U.S. high school students, Yan and colleagues (2010) used a small convenience sample of Latino youth aged 11–13 in the Washington, D.C. area, and Shorey and colleagues (2015) used a sample of high school students in Southeast Texas. Eaton et al. (2007) and Shorey et al. (2015) used lifetime marijuana use as the predictor variable, whereas Yan et al. (2010) used past 12-month use. In two studies (Eaton et al., 2007; Yan et al., 2010), the outcome variable was past 12-month PDV victimization using a single item inquiring about acts of victimization, i.e., having been hit, slapped, or physically hurt by a partner. By contrast, Shorey and colleagues (2015) assessed PDV victimization using the Conflict in Adolescent Dating Relationships Inventory [CADRI].

3.1.3. Narrative Synthesis Emerging Adults—The two studies that failed to provide support for an association were based on older youth populations; including a nationally-representative sample of 6,563 youth aged 18–27 (mean=22 years) (Melander et al., 2010), and 14–24 year-old females ($n=243$) recruited from an emergency department in Flint, MI (Epstein-Ngo et al., 2013). The assessment of PDV victimization in both studies included questions about specific acts of victimization experienced. Melander et al. (2010) examined past 30-day marijuana use in adolescence (grades 7–12), and unadjusted results did not indicate an association with past 12-month PDV victimization in emerging adulthood (aged 18–27 years); adjusted results were not presented. That study was unique in that it investigated reports of perpetration and victimization, and classified respondents into four

groups: PDV victimization without perpetration, PDV perpetration without victimization, PDV perpetration and victimization, and no PDV (reference group). The measure of association reported above represents the association between marijuana and PDV victimization among those had not reported perpetration, relative to no PDV. Epstein-Ngo et al. (2013) conducted a timeline followback [TLFB] study (Sobell and Sobell, 1992), in which respondents retrospectively reported each incident of victimization and each day that marijuana had been used over the past 30-days. In a multilevel model adjusted for age, race/ethnicity, and use of alcohol, cocaine, and sedatives, days of marijuana use were not significantly associated with days of moderate or severe PDV victimization among females. Results for males were not presented (Epstein-Ngo et al., 2013).

3.1.4. Meta-Analysis—Collectively, the five studies provided six measures of association that were included in the meta-analysis; Eaton et al. (2007) provided estimates for both sexes (Figure 2). The individual ORs ranged from 0.85 to 2.11, and the random effects combined estimate (OR=1.54, 95% CI: 1.22, 1.93) showed a 54% increase in the odds of victimization given marijuana use. Results indicate that the amount of heterogeneity across studies was moderate, as evidenced by a *Q* test with a *p* value of 0.075, and an *I*² statistic of 50%. There was minimal evidence of publication bias, as evidenced by a visual inspection of the funnel plot (Figure 3), and the results of the Egger test (slope=-1.11, *p*=0.397).

3.2. PDV Perpetration

3.2.1. Overview—Eleven studies presented estimates of the measure of association between marijuana use and PDV perpetration. Six focused on adolescents (Foshee et al., 2010; McNaughton Reyes et al., 2014; Rothman et al., 2010; Shorey et al., 2015; Temple et al., 2013; Walton et al., 2009), and five focused on emerging adults (Epstein-Ngo et al., 2013; Melander et al., 2010; Nabors, 2010; Shorey et al., 2014a; Shorey et al., 2014b). The studies provide evidence for an association between marijuana use and PDV perpetration, particularly among adolescent girls. There were notable methodological differences in studies of emerging adults, as compared to adolescents. First, they were more diverse in study design, and included cross-sectional, longitudinal, daily diary, and TLFB designs. Second, most of the reported measures of association (four out of five) had been adjusted for alcohol use (Nabors, 2010; Shorey et al., 2014a; Shorey et al., 2014b; Epstein-Ngo et al., 2013), a well-established predictor of PDV perpetration (Rothman et al., 2012). Third, they had demographically homogenous samples; three of the five studies of emerging adults were based on college student samples, each of which was comprised of at least 70% Whites (Nabors, 2010; Shorey et al., 2014a; Shorey et al., 2014b).

3.2.2. Narrative Synthesis Adolescents—All six of the studies with adolescent samples presented estimates of the measure of association between marijuana use and PDV perpetration for both sexes combined, and results provide some evidence for an association. Although none were nationally-representative, the samples were sex-balanced (the percentage of girls ranged from 49%-56%), and diverse in terms of race/ethnicity. In five of the studies, samples were based on middle and high school samples of youth in North Carolina (McNaughton Reyes et al., 2014; Foshee et al., 2010), Boston, MA (Rothman et al., 2010); and the Houston area of Texas (Temple et al., 2013; Shorey et al., 2015). The sixth

had an emergency-department-based sample of 14–18 years olds in Flint, MI (Walton et al., 2009).

Four of the six studies reported a statistically significant association between marijuana use and PDV perpetration in sex-pooled analyses. Three of those used cross-sectional methods (Rothman et al., 2010; Shorey et al., 2015; Walton et al., 2009), and one was longitudinal (McNaughton Reyes et al., 2014). Rothman et al. (2010) reported the age-adjusted association between past 30-day marijuana use and past 30-day PDV perpetration ($n=1,398$), and Walton et al. (2009) reported the crude association between past 12-month marijuana use and past 12-month PDV perpetration ($n=1,128$). McNaughton Reyes et al. (2014) analyzed four waves of data from students ($n=2,455$) followed four times over three years. A hierarchical growth model was used to assess the average level of association between past 3-month weekly frequency of marijuana use and past 3-month PDV perpetration, after adjustment for psychosocial factors and use of other substances (McNaughton Reyes et al., 2014).

By contrast, two of the six studies that examined marijuana use and PDV perpetration among adolescents did not provide support for an association (Foshee et al., 2010; Temple et al., 2013); both were longitudinal studies. Temple et al. (2013) examined lifetime marijuana use in association with PDV perpetration one year later using a structural equation model (Bollen and Noble, 2011) that included demographic characteristics and key risk factors for PDV ($n=734$). Foshee et al. (2010) showed that youth who reported lifetime marijuana use but not PDV perpetration at baseline were not significantly more likely to report PDV perpetration at follow-up ($n=1,666$).

Results suggest that the association between marijuana use and PDV perpetration may be stronger among girls than boys. Foshee et al. (2010) and McNaughton Reyes et al. (2014) examined sex as a moderator of the effect of marijuana use on PDV perpetration, and in both studies, the conclusion was that marijuana use was a significant predictor of PDV perpetration among girls, but not among boys. In the only study of adolescents that provided sex-stratified estimates (Rothman et al., 2010), the measures of association were statistically significant among boys and girls.

3.2.3. Narrative Synthesis Emerging Adults—Five studies examined marijuana use in association with PDV perpetration among emerging adults (Epstein-Ngo et al., 2013; Melander et al., 2010; Nabors, 2010; Shorey et al., 2014a; Shorey et al., 2014b), and results do not provide support for an association. Three of the samples were comprised of college students (Nabors, 2010; Shorey et al., 2014a; Shorey et al., 2014b), one was a nationally-representative sample (Melander et al., 2010), and the remaining study had an emergency-department-based sample (Epstein-Ngo et al., 2013).

Only two of the five studies reported sex-pooled findings; one provides support for an association (Nabors, 2010), and the other did not (Melander et al., 2010). Melander et al. (2010) examined past 30-day marijuana use in adolescence (grades 7–12), and unadjusted results did not indicate an association with past 12-month PDV perpetration in emerging adulthood (aged 18–27 years). Nabors (2010) was the only cross-sectional study of

marijuana use and PDV perpetration among emerging adults; the measure of association represented past 12-month marijuana use and past 12-month PDV perpetration, adjusted for demographic characteristics and substance use ($n=1,379$). Four of the five studies presented sex-stratified results, and none reported statistically significant associations between marijuana use and PDV perpetration among either men (Nabors, 2010; Shorey et al., 2014a) or women (Epstein-Ngo et al., 2013; Nabors, 2010; Shorey et al., 2014b).

Three of the five studies providing estimates of the association between marijuana use and PDV perpetration among emerging adults were designed to examine event level associations, and none reported statistically significant measures of association. Epstein-Ngo et al. (2013) conducted a TLFB study and found no association between days of marijuana use and moderate or severe PDV perpetration in a multilevel model adjusted for age, race/ethnicity, and use of alcohol, cocaine, and sedatives. Shorey et al. (2014a) conducted a daily diary study with 67 male college students. Each day for up to 90 days, participants reported their alcohol use, PDV perpetration, and marijuana use; analyses showed that the odds of PDV perpetration were no higher on marijuana use days (vs. days without marijuana use), after adjustment for alcohol use. Shorey et al. (2014b) conducted a daily diary study with 173 female college students who reported their past day alcohol use, PDV perpetration, level of angry affect, and marijuana use each day for up to 90 days. The estimate of the measure of association does not show an increase in the odds of PDV perpetration on marijuana use days versus days without marijuana use, after adjustment for alcohol use and angry affect.

3.2.4. Meta-Analysis—Collectively, the 11 studies provided 13 measures of effect that were included in the meta-analysis. Six studies provided sex-pooled estimates (Temple et al., 2013; Melander et al., 2010; McNaughton Reyes et al., 2014; Foshee et al., 2010; Walton et al., 2009; Shorey et al., 2015), two provided stratified estimates for both females and males (Rothman et al., 2010; Nabors, 2010), two provided estimates for females only (Shorey et al., 2014b; Epstein-Ngo et al., 2013), and one provided estimates for males only (Shorey et al., 2014a). The individual ORs ranged from 0.66 to 2.50, and the random effects combined estimate (OR=1.45, 95% CI: 1.20, 1.76) indicated a 45% increase in the odds of PDV perpetration given marijuana use. There was a substantial amount of heterogeneity, as determined by a statistically significant Q test ($p=0.001$), and an I^2 estimate of 75%, which is in the moderate to high range. There was minimal evidence of publication bias, as evidenced by a visual inspection of the funnel plot and the results of the Egger test (slope=0.49, $p=0.687$) (Figure 5).

4. Discussion

We conducted a systematic review and meta-analysis to summarize the evidence supporting an association between marijuana use and physical dating violence (PDV) victimization and perpetration among adolescents and emerging adults. Findings suggest an association between the two, and also demonstrate that the magnitude of the association is strongest among adolescent girls. Results are consistent with a prior meta-analysis that reported an association between marijuana use and partner violence among adults (Moore et al., 2008). Along with the existing literature, this work provides strong evidence that marijuana use is (at least) a correlate of PDV among young people, signaling that we should expand public

health efforts to monitor and address both behaviors in combination, as well as independently.

4.1. Description of Studies

There was homogeneity across studies in how marijuana use and PDV were assessed. Measures of marijuana use usually included any: lifetime, past 12-month, or past 30-day use. Most studies used “acts” scales to measure victimization or perpetration, i.e., respondents indicated whether they engaged in or were the victim of specific aggressive acts within a given time period. Despite that partner violence among youth is often bi-directional, meaning that many would report both victimization and perpetration, only one studied conceptualized partner violence as such (Melander et al., 2010).

By contrast, there was substantial diversity across studies in their design. Five studies had cross-sectional designs (Eaton et al., 2007; Nabors, 2010; Rothman et al., 2010, Walton et al., 2009; Shorey et al., 2015, Yan et al., 2010), and the remaining nine were longitudinal. There were four types of longitudinal studies: (1) *traditional*, i.e., those that assessed marijuana use at one time point, and PDV and at one or more time points (Foshee et al., 2010; Melander et al., 2010; Temple et al., 2013); (2) *growth models*, i.e., multiple assessments of co-occurring marijuana use and PDV within a cohort at two or more time points (McNaughton Reyes et al., 2014); (3) *daily diary studies*, in which the association between days of marijuana use and days of PDV were assessed prospectively (Shorey et al., 2014a; Shorey et al., 2014b), and (4) a *timeline follow back study*, in which the association between days of marijuana use and days of PDV were assessed retrospectively (e.g., Epstein-Ngo et al., 2013).

4.2. Summary of Findings

Only five studies examined marijuana use in association with PDV victimization, highlighting that more research is needed to further understand this association (Shorey et al., 2011). The meta-analysis showed an overall 54% increase in the odds of PDV victimization given marijuana use (OR=1.54, 95% CI:1.22–1.93). The strongest evidence for an association was observed for adolescent girls. Eleven studies examined marijuana use and PDV perpetration, and the meta-analysis showed a 42% increase in the odds of perpetration given marijuana use (OR=1.42, 95% CI: 1.20–1.76). This is slightly lower than the observed common OR (1.70, 95% CI: 1.39–2.08) for alcohol use and PDV perpetration from a previous systematic review (Rothman et al., 2012), suggesting that marijuana may be less strongly associated with dating violence than alcohol. This conclusion is consistent with existing social science and psychopharmacological research comparing violence in concert with marijuana and alcohol use (Rothman et al., 2016; Perna et al., 2016).

Despite that there was an overall increase in odds, studies of emerging adults were less likely to report statistically significant associations as compared to studies of adolescents. Although this difference could reflect a true difference in the association between marijuana use and PDV among adolescents vs. emerging adults, it is likely due to study characteristics. First, three of the five studies of emerging adults were conducted with primarily White college students, whereas studies of adolescents had more demographically diverse samples.

Therefore, findings may reflect that there is a lower likelihood of an association among White college students specifically, versus emerging adults as a population. More studies of emerging adults who are not in college are needed. Second, four of the five studies of emerging adults reported the association between marijuana use and PDV perpetration *after* adjustment for alcohol, which is a well-established risk factor for violence perpetration (Rothman et al., 2012). Adjustment likely attenuated the estimate of the true association between marijuana and PDV.

4.3. What This Review Tells Us About the Nature of the Association Between Marijuana Use and PDV

We sought to contextualize the studies by considering their design, so as to better understand how marijuana use might lead to PDV globally, and at the event level (i.e., did marijuana contribute to a specific incidence of partner violence?). The differences in design across studies have implications for our understanding of the theoretical mechanisms underlying the marijuana-PDV association, and may also impact the meaning of the common odds ratio. Based on an examination of the findings by study design, we conclude that there is strong support for a global association between the two behaviors, but minimal support for longitudinal or event level associations.

Cross-sectional and growth modeling studies can establish that the two behaviors co-occur within a given time period. There were seven such studies examining marijuana use and PDV, and all reported statistically significant associations (Eaton et al., 2007; Nabors, 2010; Rothman et al., 2010; Shorey et al., 2015; Walton et al., 2009; Yan et al., 2010; McNaughton Reyes et al., 2014). Thus, there is strong evidence for a global association between marijuana use and PDV victimization and perpetration among youth. This conclusion is consistent with findings from a recent review (Testa and Brown, 2015).

Few longitudinal studies provided support for an association between marijuana use and PDV; therefore, we cannot conclude that marijuana use at one time point is associated with later PDV. To better understand whether marijuana use is a predictor of future PDV, the theory underlying why the two may be associated at different time points may need further development. Three studies examined marijuana use and later PDV, and the time in between assessments ranged from months to years (Foshee et al., 2010; Melander et al., 2010; Temple et al., 2013). None reported statistically significant results, which could have been due to varied duration in between follow-up assessments, age at follow-up assessments, or other study characteristics. Additional longitudinal studies are needed to further examine the association, and these studies would be strengthened if they identified theoretical frameworks for timing of initiating marijuana use in relation to physical dating violence.

Because of limited support for an association between marijuana use and PDV from daily diary and timeline follow-back studies, we cannot conclude that the two are likely to co-occur on specific days. However, the observed associations had been adjusted for alcohol use, which, as described above, may have attenuated any existing association of violence with marijuana use. Additional retrospective and prospective daily behavior studies that distinguish the unique effects of marijuana use from alcohol use are needed to more fully understand whether there is an event-level association between marijuana use and PDV.

4.4. Limitations

Findings should be viewed with appropriate caution. Our conclusions are based on a relatively small number of studies, which have their own individual limitations, which may limit precision. Additionally, there was substantial heterogeneity in study design, which may impact comparability. One source of limited comparability is statistical adjustment for covariates. There was little consistency across studies regarding which covariates were included in models. A larger number of studies and increased standardization of analyses across studies would contribute to more precise meta-analytic results.

5. Conclusion

Our rationale for conducting this research was to provide needed information about a prevalent risk behavior, dating violence, and its association with marijuana use. This work responds to calls to prioritize research assessing the public health effects of marijuana use given the evolving policy landscape (Azofeifa et al., 2016). Our findings show that dating violence is associated with marijuana use among youth, although the reasons why remain unclear and there is no indication that marijuana “causes” dating violence.

Given the current state of the literature, it is difficult to estimate how changes in marijuana use (subsequent to policy change) would impact the prevalence of dating violence. If marijuana increases the likelihood of specific incidents of dating violence, increases in use would likely result in increases in violence. However, if marijuana co-occurs, but does *lead* to violence, an increase in marijuana use would result in only minimal changes in dating violence. Additional research that examines mechanisms underlying the association between marijuana use and dating violence is needed to more fully understand how changing patterns of marijuana use would impact dating violence. The good news is that, so far, there is limited evidence that state-level loosening of restrictions on marijuana have contributed to increases in use by adolescents (Johnson et al., 2015; Hasin et al., 2015).

There is an association between marijuana use and dating violence, and this knowledge should inform research, practice, and clinical work. Specifically, we recommend that dating violence be routinely included as a core data item in marijuana surveillance systems, so as to allow for behavioral monitoring, intervention development, and evaluation. We further suggest that both risk behaviors be monitored in combination with one another

Acknowledgments

Role of Funding Source: Funding for this study was provided by grants from NIH: K01DA031738 (PI: Johnson), K01AA017630 (PI: Rothman), and T32DA007292 (PI: Johnson; Schneider). The study sponsor had no role in determining study design; data collection, analysis, or interpretation; writing the report; or the decision to submit the report for publication.

We appreciate the assistance of multiple graduate students who worked on this review, including: Dr. Anna Flynn, Courtney Kaczmarzsky, Taylor Parnham, and Erin Anderson Goodell.

References

- Ackard DM, Eisenberg ME, Neumark-Sztainer D. Long-term impact of adolescent dating violence on the behavioral and psychological health of male and female youth. *J Pediatr.* 2007; 151:476–481. [PubMed: 17961688]
- American Academy of Pediatrics [AAP], Committee on Substance Abuse, Committee on Adolescence. Policy statement: The impact of marijuana policies on youth: Clinical, research, and legal update. *Pediatr.* 2015; 135:584–587.
- Azofeifa A, Mattson ME, Grant A. Monitoring marijuana use in the United States: Challenges in an evolving environment. *JAMA.* 2016; 316:1765–1766. [PubMed: 27583699]
- Bean, P. Violence and substance abuse. In: Pinard, G., Pagini, L., editors. *Clinical Assessment of Dangerousness: Empirical Contributions.* Cambridge University Press; New York: 2001. p. 216–237.
- Berger A, Wildsmith E, Manlove J, Stewart-Streng N. Relationship violence among young adult couples. *Child Trends Research Briefs 2012–14.* 2012
- Black, MC., Basile, KC., Breiding, MJ., Smith, SG., Walters, ML., Merrick, MT., Stevens, MR. National Intimate Partner and Sexual Violence Survey (NISVS): 2010 Summary Report. National Center for Injury Prevention and Control, Centers for Disease Control and Prevention; Atlanta, Georgia: 2011.
- Bollen KA, Noble MD. Structural equation models and the quantification of behavior. *Proc Nat Acad Sci USA.* 2011; 108(Suppl 3):15639–15646. [PubMed: 21730136]
- Bonomi AE, Anderson ML, Nemeth J, Rivara FP, Buettner C. History of dating violence and the association with late adolescent health. *BMC Public Health.* 2013; 13:821. [PubMed: 24015863]
- Borenstein, M. Effect sizes for continuous data. In: Cooper, H., Hedges, L., Valentine, J., editors. *The Handbook of Research Synthesis and Meta-Analysis.* 2. Russell Sage Foundation; New York: 2009.
- Cochran WG. The combination of estimates from different experiments. *Biometrics.* 1954; 10:101–129.
- Coker AL, Clear ER, Garcia LS, Asaolu IO, Cook-Craig PG, Brancato CJ, Williams CM, Bush HM, Fisher BS. Dating violence victimization and perpetration rates among high school students. *Violence Against Women.* 2014; 20:1220–1238. [PubMed: 25344558]
- Coker AL, McKeown RE, Sanderson M, Davis KE, Valois RF, Huebner ES. Severe dating violence and quality of life among South Carolina high school students. *Am J Prev Med.* 2000; 19:220–227. [PubMed: 11064224]
- Eaton DK, Davis KS, Barrios L, Brener ND, Noonan RK. Associations of dating violence victimization with lifetime participation, co-occurrence, and early initiation of risk behaviors among US high school students. *J Interpers Violence.* 2007; 22:585–602. [PubMed: 17429024]
- Egger M, Smith GD, Phillips AN. Meta-analysis: Principles and procedures. *BMJ.* 1997a; 315:1533–1537. [PubMed: 9432252]
- Egger M, Smith GD, Schneider M, Minder C. Bias in meta-analysis detected by a simple, graphical test. *BMJ.* 1997b; 315:629–634. [PubMed: 9310563]
- Epstein-Ngo QM, Cunningham RM, Whiteside LK, Chermack ST, Booth BM, Zimmerman MA, Walton MA. A daily calendar analysis of substance use and dating violence among high risk urban youth. *Drug Alcohol Depend.* 2013; 130:194–200. [PubMed: 23219602]
- Exner-Cortens D, Eckenrode J, Rothman E. Longitudinal associations between teen dating violence victimization and adverse health outcomes. *Pediatr.* 2013; 131:71–78.
- Fletcher J. The effects of intimate partner violence on health in young adulthood in the United States. *Soc Sci Med.* 2010; 70:130–135. [PubMed: 19819603]
- Foshee VA. Gender differences in adolescent dating abuse prevalence, types and injuries. *Health Ed Res.* 1996; 11:275–286.
- Foshee VA, Reyes HL, Ennett ST. Examination of sex and race differences in longitudinal predictors of the initiation of adolescent dating violence perpetration. *J Aggress Maltreat Trauma.* 2010; 19:492–516. [PubMed: 25484571]
- Friedman AS. Substance use/abuse as a predictor to illegal and violent behavior: A review of the relevant literature. *Aggress Violent Behav.* 1998; 3:339–355.

- Ghosh T, Van Dyke M, Maffey A, Whitley E, Gillim-Ross L, Wolk L. The public health framework on legalized marijuana in Colorado. *Am J Public Health*. 2016; 106:21–27. [PubMed: 26562117]
- Gidycz CA, Warkentin JB, Orchowski LM. Predictors of perpetration of verbal, physical, and sexual violence: A prospective analysis of college men. *Psychol Men Mascul*. 2007; 8:79.
- Goldstein PJ. The drugs/violence nexus: A tripartite conceptual framework. *J Drug Issues*. 1985; 15:493–506.
- Grant JE, Chamberlain SR, Schreiber L, Odraug BL. Neuropsychological deficits associated with cannabis use in young adults. *Drug Alcohol Depend*. 2012; 121:159–162. [PubMed: 21920674]
- Halpern CT, Spriggs AL, Martin SL, Kupper LL. Patterns of intimate partner violence victimization from adolescence to young adulthood in a nationally representative sample. *J Adolesc Health*. 2009; 45:508–516. [PubMed: 19837358]
- Hasin DS, Wall M, Keyes KM, Cerda M, Schulenberg J, O'Malley PM, Galea S, Pacula R, Feng T. Medical marijuana laws and adolescent marijuana use in the USA from 1991 to 2014: Results from annual, repeated cross-sectional surveys. *Lancet Psychiatry*. 2015; 2:601–608. [PubMed: 26303557]
- Haynie DL, Farhat T, Brooks-Russell A, Wang J, Barbieri B, Iannotti RJ. Dating violence perpetration and victimization among US adolescents: Prevalence, patterns, and associations with health complaints and substance use. *J Adolesc Health*. 2013; 53:194–201. [PubMed: 23664626]
- Jessor R. Problem-behavior theory, psychosocial development, and adolescent problem drinking. *Br J Addict*. 1987; 82:331–42. [PubMed: 3472582]
- Johnson RM, Fairman B, Gilreath T, Xuan Z, Rothman EF, Parnham T, Furr-Holden CDM. Past 15-year trends in adolescent marijuana use: Differences by race/ethnicity and sex. *Drug Alcohol Depend*. 2015; 155:8–15. [PubMed: 26361714]
- Johnson WD, Semaan S, Hedges LV, Ramirez G, Mullen PD, Sogolow E. A protocol for the analytical aspects of a systematic review of HIV prevention research. *J Acquir Immune Defic Syndr*. 2002; 30:S62–S72. [PubMed: 12107361]
- Johnson WL, Giordano PC, Manning WD, Longmore MA. The age-IPV curve: Changes in the perpetration of intimate partner violence during adolescence and young adulthood. *J Youth Adolesc*. 2015a; 44:708–729. [PubMed: 25081024]
- Johnson WL, Manning WD, Giordano PC, Longmore MA. Relationship context and intimate partner violence from adolescence to young adulthood. *J Adolesc Health*. 2015b; 57:631–636. [PubMed: 26592332]
- Johnston, LD., O'Malley, PM., Bachman, JG., Schulenberg, JE., Miech, RA. Monitoring the Future National Survey Results on Drug Use, 1975–2013: Volume 2, College Students and Adults Ages 19–55. Ann Arbor: Institute for Social Research, The University of Michigan; 2014.
- Johnston, LD., O'Malley, PM., Miech, RA., Bachman, JG., Schulenberg, JE. Monitoring the Future National Survey Results on Drug Use: 1975–2014: Overview, Key Findings on Adolescent Drug Use. Ann Arbor: Institute for Social Research, The University of Michigan; 2015.
- Kann L, Kinchen S, Shanklin S, Flint KH, Hwakins J, Harris WA, Lowry R, Olsen EO, McManus T, Chyen D, Whittle L, Taylor E, Demissie Z, Brener N, Thorton J, Moore J, Zaza S. Youth risk behavior surveillance -- United States, 2013. *MMWR Morb Mortal Wkly Rep*. 2014; 63:1–68. [PubMed: 24402465]
- McNaughton Reyes HL, Foshee VA, Bauer DJ, Ennett ST. Proximal and time-varying effects of cigarette, alcohol, marijuana and other hard drug use on adolescent dating aggression. *J Adolesc*. 2014; 37:281–289. [PubMed: 24636688]
- Melander LA, Noel H, Tyler KA. Bidirectional, unidirectional, and nonviolence: A comparison of the predictors among partnered young adults. *Violence Victims*. 2010; 25:617–630. [PubMed: 21061868]
- Moher D, Liberati A, Tetzlaff J, Altman DG. Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *Ann Intern Med*. 2009; 151:264–269. [PubMed: 19622511]
- Moore TM, Stuart GL. A review of the literature on marijuana and interpersonal violence. *Aggress Violent Behav*. 2005; 10:171–192.

- Moore TM, Stuart GL, Meehan JC, Rhatigan DL, Hellmuth JC, Keen SM. Drug abuse and aggression between intimate partners: a meta-analytic review. *Clin Psychol Rev*. 2008; 28:247–274. [PubMed: 17604891]
- Nabors EL. Drug use and intimate partner violence among college students: An in-depth exploration. *J Interpers Violence*. 2010; 25:1043–1063. [PubMed: 19952373]
- National Conference of State Legislatures [NCSL]. [Last accessed May 3, 2016] Marijuana Overview. 2016a. from <http://www.ncsl.org/research/civil-and-criminal-justice/marijuana-overview.aspx>
- National Conference of State Legislatures [NCSL]. [Last accessed May 3, 2016] State medical marijuana laws. 2016b. from <http://www.ncsl.org/research/health/state-medical-marijuana-laws.aspx>
- Normand SL. Meta-analysis: formulating, evaluating, combining and reporting. *Stat Med*. 1999; 18:321–359. [PubMed: 10070677]
- Perna EDSF, Theunissen EL, Kuypers KPC, Toennes SW, Ramaekers JG. Subjective aggression during alcohol and cannabis intoxication before and after aggression exposure. *Psychopharmacology*. 2016; 233:3331–3340. [PubMed: 27422568]
- Pope HG, Yurgelun-Todd D. The residual cognitive effects of heavy marijuana use in college students. *JAMA*. 1996; 275:521–527. [PubMed: 8606472]
- Rothman EF, Linden JA, Baughman AL, Kaczmarek C, Thompson M. “The alcohol just pissed me off”: Views about how alcohol and marijuana influence adolescent dating violence perpetration, results of a qualitative study. *Youth Soc*. 2016; 48:366–382.
- Rothman EF, McNaughton Reyes L, Johnson RM, LaValley M. Does the alcohol make them do it? Dating violence perpetration and drinking among youth. *Epidemiol Rev*. 2012; 34:103–119. [PubMed: 22128086]
- Rothman EF, Xuan Z. Trends in physical dating violence victimization among U.S. high school students, 1999–2011. *J Sch Violence*. 2013; 13:277–290.
- Rothman EF, Johnson RM, Azrael D, Hall DM, Weinberg J. Perpetration of physical assault against dating partners, peers, and siblings among a locally representative sample of high school students in Boston, Massachusetts. *Arch Pediatr Adolesc Med*. 2010; 164:1118–1124. [PubMed: 21135340]
- Shorey RC, Cornelius TL, Bell KM. A critical review of theoretical frameworks for dating violence: Comparing the dating and marital fields. *Aggress Violent Behav*. 2008; 13:185–194.
- Shorey RC, Fite PJ, Choi H, Cohen JR, Stuart GL, Temple JR. Dating violence and substance use as longitudinal predictors of adolescents’ risky sexual behavior. *Prev Sci*. 2015; 16:853–861. [PubMed: 25797949]
- Shorey RC, McNulty JK, Moore TM, Stuart GL. Being the victim of violence during a date predicts next-day cannabis use among female college students. *Addiction*. 2016; 111:492–498. [PubMed: 26449928]
- Shorey RC, Stuart GL, McNulty JK, Moore TM. Acute alcohol use temporally increases the odds of male perpetrated dating violence: A 90-day diary analysis. *Addict Behav*. 2014a; 39:365–368. [PubMed: 24199932]
- Shorey RC, Stuart GL, Cornelius TL. Dating violence and substance use in college students: a review of the literature. *Aggress Violent Behav*. 2011; 16:541–550. [PubMed: 22125415]
- Shorey RC, Stuart GL, Moore TM, McNulty JK. The temporal relationship between alcohol, marijuana, angry affect, and dating violence perpetration: A daily diary study with female college students. *Psychol Addict Behav*. 2014b; 28:516. [PubMed: 24274434]
- Smith NT. A review of the published literature into cannabis withdrawal symptoms in human users. *Addiction*. 2002; 97:621–632. [PubMed: 12084124]
- Smith PH, Homish GG, Leonard KE, Collins RL. Marijuana withdrawal and aggression among a representative sample of US marijuana users. *Drug Alcohol Depend*. 2013; 132:63–68. [PubMed: 23380439]
- Smith PH, White JW, Holland LJ. A longitudinal perspective on dating violence among adolescent and college-age women. *Am J Public Health*. 2003; 93:1104–1109. [PubMed: 12835193]

- Sobell, LC., Sobell, MB. Timeline followback: A technique for assessing self-reported alcohol consumption. In: Litten, RZ., Allen, JP., editors. *Measuring Alcohol Consumption: Psychosocial and Biochemical Methods*. Humana Press; Totowa, New Jersey: 1992.
- Sterne JA, Sutton AJ, Ioannidis JP, Terrin N, Jones DR, Lau J, Carpenter J, Rucker G, Harbord RM, Schmid CH, Tetzlaff J, Deeks JJ, Peters P, Macaskill MP, Schwarzer G, Duval S, Altman DG, Moher D, Higgins JP. Recommendations for examining and interpreting funnel plot asymmetry in meta-analyses of randomised controlled trials. *BMJ*. 2011; 343:d4002. [PubMed: 21784880]
- Substance Abuse and Mental Health Services Administration [SAMHSA]. Results from the 2013 National Survey on Drug Use and Health: Summary of National Findings. Rockville, MD: 2014. (NSDUH Series H-46, HHS Publication No. (SMA) 14-4863)
- Taylor BG, Mumford EA. A national descriptive portrait of adolescent relationship abuse: Results from the National Survey on Teen Relationships and Intimate Violence. *J Interpers Violence*. 2016; 31:963-988. [PubMed: 25548142]
- Temple JR, Shorey RC, Fite P, Stuart GL, Le VD. Substance use as a longitudinal predictor of the perpetration of teen dating violence. *J Youth Adolesc*. 2013; 42:596-606. [PubMed: 23187699]
- Testa M, Brown WC. Does marijuana use contribute to intimate partner aggression? A brief review and directions for future research. *Curr Opin Psychol*. 2015; 5:6-12. [PubMed: 25839050]
- Vagi KJ, Rothman E, Latzman NE, Tharp AT, Hall DM, Breiding MJ. Beyond correlates: A review of risk and protective factors for adolescent dating violence perpetration. *J Youth Adolesc*. 2013; 42:633-649. [PubMed: 23385616]
- Walton MA, Cunningham RM, Goldstein AL, Chermack ST, Zimmerman M, Bingham CR, Shope JT, Stanley R, Blow FC. Rates and correlates of violent behaviors among adolescents treated in an urban ED. *J Adolesc Health*. 2009; 45:77-83. [PubMed: 19541253]
- Weiss NH, Duke AA, Sullivan TP. Evidence for a curvilinear dose-response relationship between avoidance coping and drug use problems among women who experience intimate partner violence. *Anxiety Stress Coping*. 2014; 27:722-732. [PubMed: 24592874]
- Yan FA, Howard DE, Beck KH, Shattuck T, Hallmark-Kerr M. Psychosocial correlates of physical dating violence victimization among Latino early adolescents. *J Interpers Violence*. 2010; 25:808-831. [PubMed: 19584406]
- Yanowitch R, Coccaro EF. The neurochemistry of human aggression. *Adv Genet*. 2011; 75:151-169. [PubMed: 22078480]

Highlights

- Marijuana use is associated with increased odds of dating violence among youth
- The marijuana use-dating violence link is strongest among adolescent girls
- The marijuana use-dating violence link is weaker than alcohol-dating violence link

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

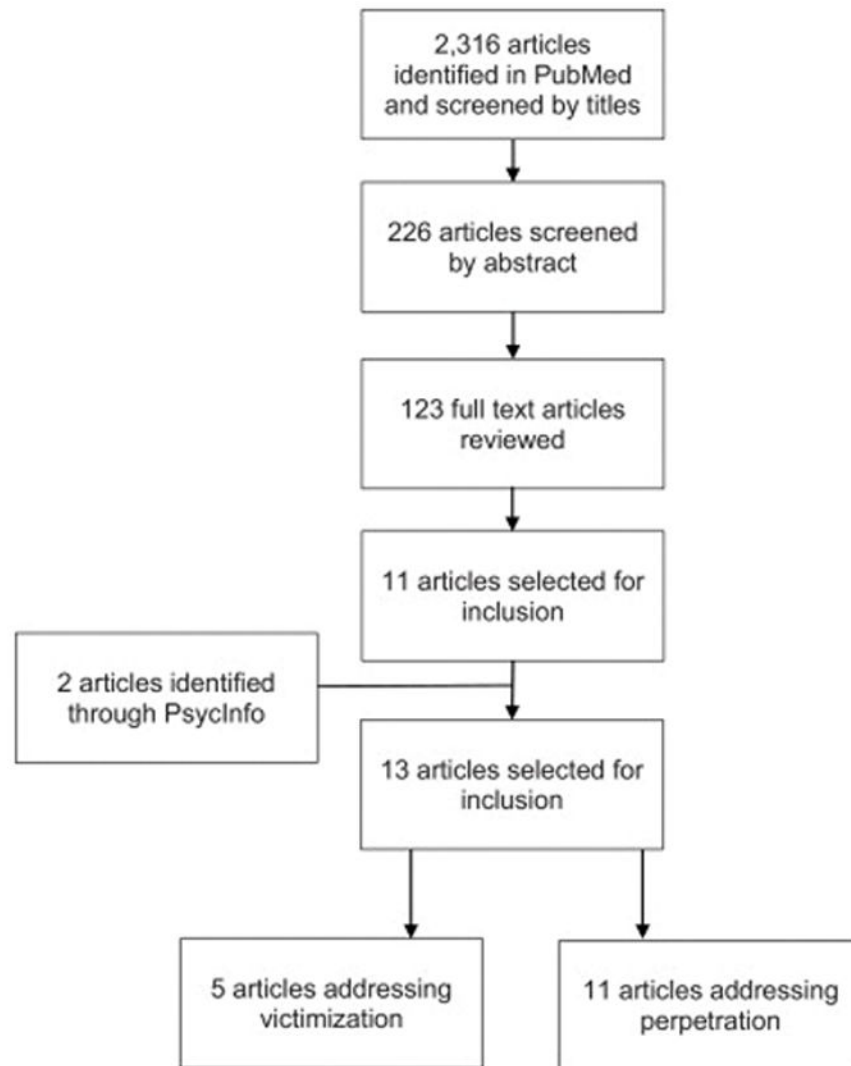


Figure 1. Flow diagram representing the search strategy and results for a systematic review of the association between marijuana use and physical dating violence among adolescents and emerging adults

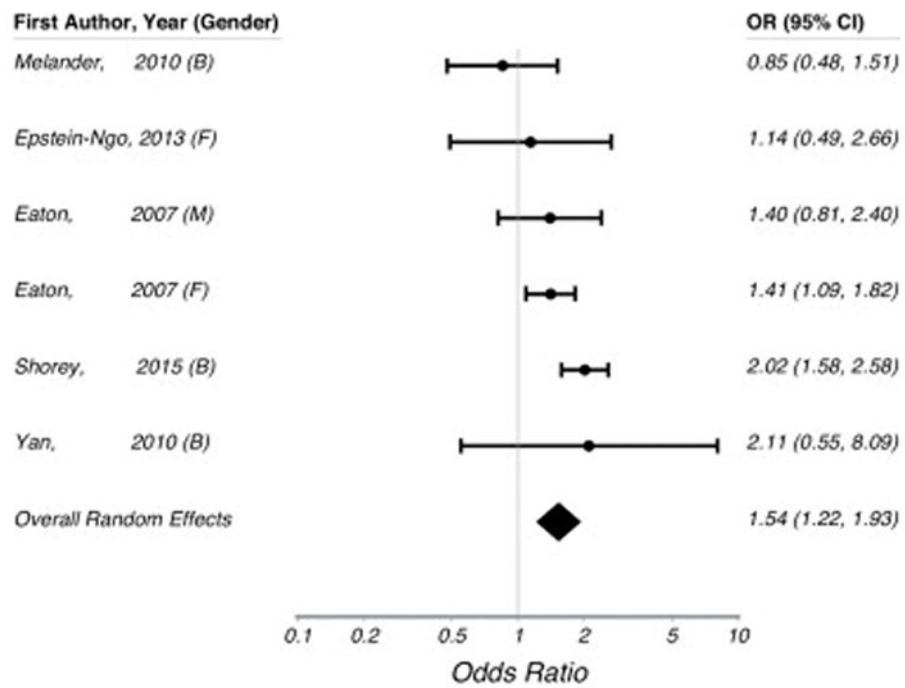


Figure 2. Forest plot representing results of a meta-analysis of estimates of the measure of association between marijuana use and physical dating violence victimization among adolescents and emerging adults

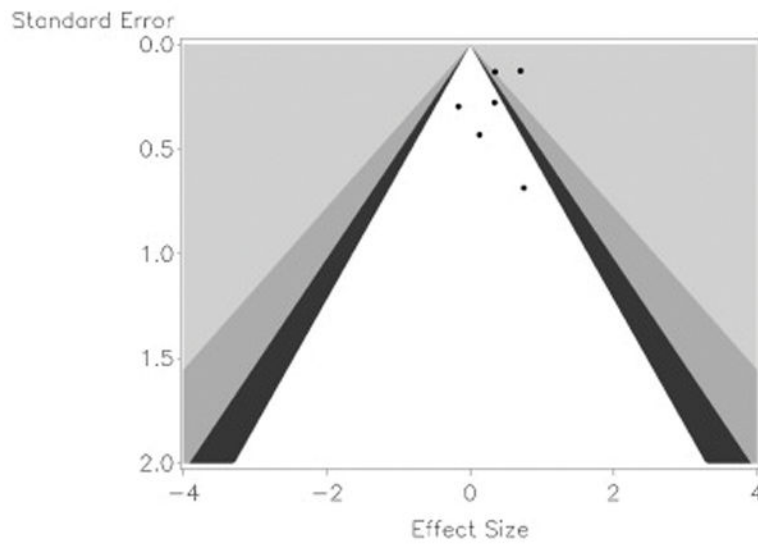


Figure 3. Contour enhanced funnel plot representing estimates of the measure of association between marijuana use and physical dating violence victimization among adolescents and emerging adults

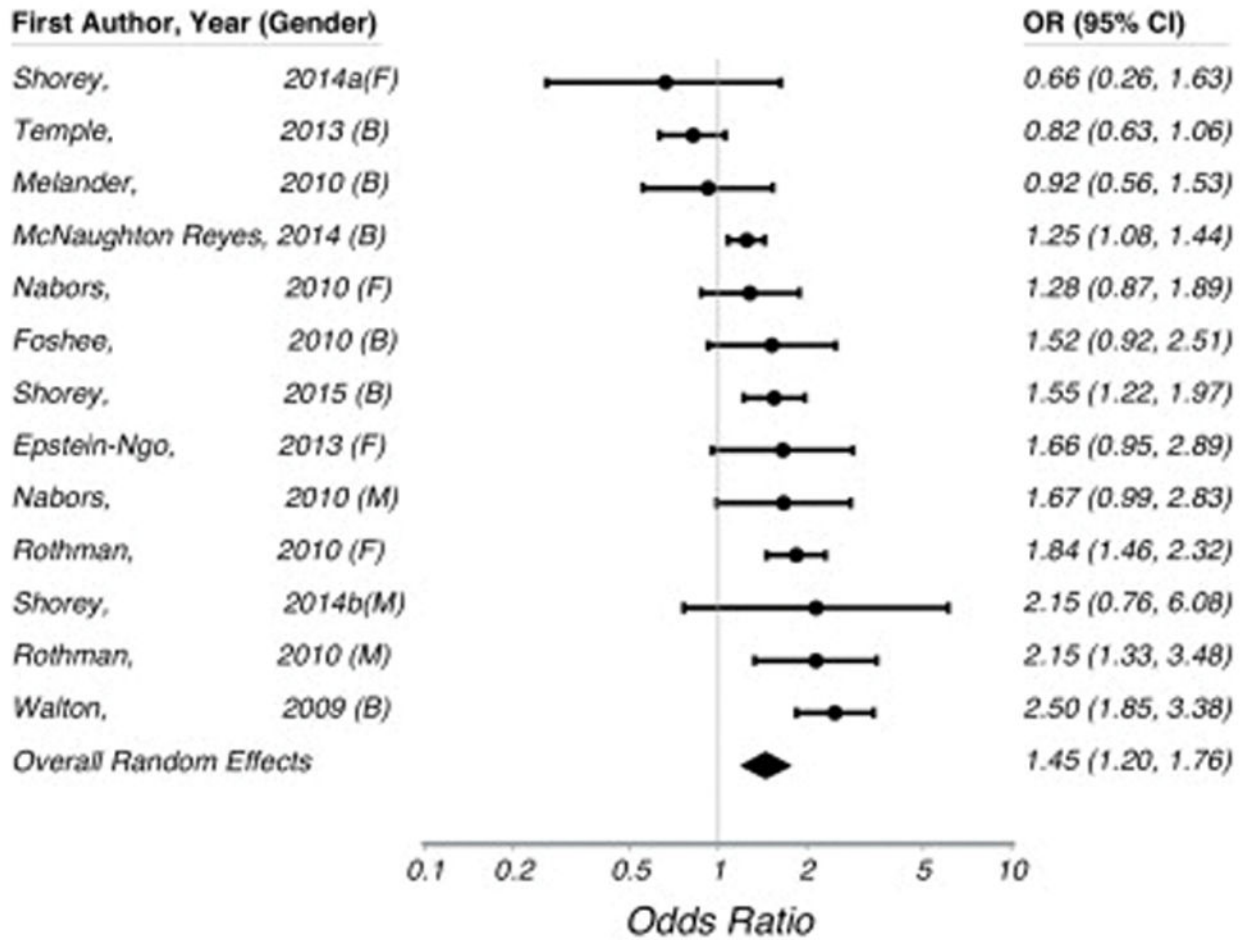


Figure 4. Forest plot representing results of a meta-analysis of estimates of the measure of association between marijuana use and physical dating violence perpetration among adolescents and emerging adults

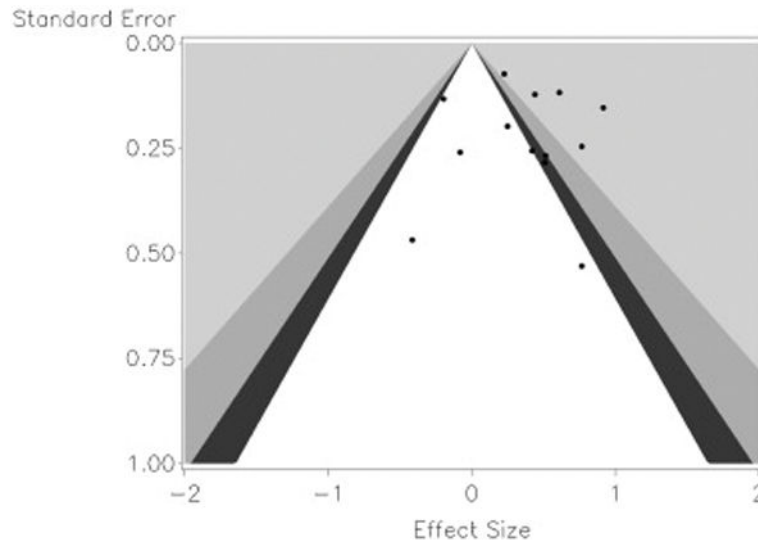


Figure 5. Contour enhanced funnel plot representing estimates of the measure of association between marijuana use and physical dating violence perpetration among adolescents and emerging adults

Percentage reporting past 30-day marijuana use, by age and population group, US, 2013

Table 1

Age Group ^a	
12–17 year olds	7%
18–25 year olds	20%
26–34 year olds	13%
35–49 year olds	6%
50+ year olds	3%
Population Group	
8th, 10th, and 12th grade students, combined ^b	16%
8 th grade students ^b	10%
10 th grade students ^b	20%
12 th grade students ^b	27%
High school students ^c	23%
Full-time college students ^d	21%
Adults 1–4 years post high school graduation, not enrolled in school full-time ^d	26%

Source.

^a Substance Abuse and Mental Health Services Administration [SAMHSA], 2014;

^b Johnston et al., 2015;

^c Kann et al., 2014;

^d Johnston et al., 2014.

Table 2 Findings from studies on the association between marijuana use and physical dating violence perpetration and victimization

Citation	Design, Sample & Respondents		Marijuana Use	Physical Dating Violence		Covariates	Measures of Effect
	Adolescents	Emerging Adults		PDVV	PDVP		
Eaton, et al., 2007	<p>Adolescents</p> <p>Design: Cross-sectional. Sample: Secondary analysis of data from the 2003 YRBS, a nationally-representative survey of high school students (n=15,123). Respondents: 48.7% female, 61.5% White, 13.9% Black, 16.6% Hispanic.</p>	<p>Emerging Adults</p> <p>Assessment: Any lifetime use (never; yes, before age 13; yes, at age 13 or later). Prevalence: 9.7% for age of initiation <13 years; 31.2% for age of initiation 13</p>	<p>PDVV</p> <p>Assessment: Past 12-month PDVV assessed with the following item: <i>During the past 12 months, did your boyfriend or girlfriend ever hit, slap, or physically hurt you on purpose?</i> Prevalence: 8.8% among females, 8.6% among males.</p>	<p>PDVP</p> <p>Assessment: Assessed daily PDVV and PDVP, using assault and injury items on the CTS2, and reported whether use of specific substances preceded the violent event. Prevalence: PDVV: 30.8% among females, 5.7% among males. PDVP: 23.9% among females, 3.7% among males.</p>	<p>Demographic: age, sex, race/ethnicity, and grades in school (mostly As, Bs, Cs, Ds, or Fs). Substance Use: lifetime use of cigarettes and alcohol (never; yes, before age 13; yes, at age 13 or later); number of sexual partners (lifetime).</p>	<p>Adjusted, Females: Among those who report lifetime MJ use and an age of initiation of <13 y, the OR for PDVV was 2.02 (95% CI: 1.29, 3.16). Among those who report lifetime MJ use and an age of initiation of 13 y, the OR for PDVV was 1.41 (95% CI: 1.09, 1.82). Crude, Males: Among those who report lifetime MJ use and an age of initiation of <13 y, the OR for PDVV was 1.46 (95% CI: 0.96, 2.24). Among those who report lifetime MJ use and an age of initiation of 13 y, the OR for PDVV was 1.40 (95% CI: 0.81, 2.40).</p>	
Epstein-Ngo, et al., 2013	<p>Adolescents</p> <p>Design: Retrospective, Timeline Followback Study. Sample: Participants aged 14–24 who reported past 6-month substance use were recruited from an ED in Flint, MI (m age for males=20.0 y, m age for females=20.1 y) (n=599). Respondents: 41% female, 65% Black, 34% White.</p>	<p>Emerging Adults</p> <p>Assessment: Assessed daily use. Prevalence: 55.7% among males, 46.3% among females.</p>	<p>PDVV</p> <p>Assessment: Assessed daily PDVV and PDVP, using assault and injury items on the CTS2, and reported whether use of specific substances preceded the violent event. Prevalence: PDVV: 30.8% among females, 5.7% among males. PDVP: 23.9% among females, 3.7% among males.</p>	<p>PDVP</p> <p>Assessment: Any lifetime PDVV was assessed at Wave 2 with one item asking about having lifetime use of physical force against a partner (e.g., hitting, punching, kicking, shoving). Prevalence: 16% at Wave 2.</p>	<p>Demographic: age, sex, race, parental educational attainment, family structure, and receipt of public assistance. Substance Use: past 30-day use of multiple substances (alcohol, cocaine, inhalants, heroin, extramedical use of prescription drugs).</p>	<p>Adjusted (Females Only): After adjustment (for age, race, alcohol use, cocaine use, and sedative use), the aOR for days of MJ use and moderate PDVV (vs. no PDVV) was 0.25 (95% CI: 0.05, 1.18), and the aOR for days of MJ use and severe PDVV was 1.14 (95% CI: 0.49, 2.66). After adjustment (for age, race, alcohol use, and sedative use) the aOR for days of MJ use and moderate PDVP and severe PDVP was 1.66 (95% CI: 0.95, 2.89).</p>	
Foshee, et al., 2010	<p>Adolescents</p> <p>Design: Longitudinal. Sample: School-based survey of 8th–10th graders in public school systems in 3 NC counties; two time points: fall 2003, spring 2004. (n=1,666). Respondents: 49% female, 25% Black, 75% White.</p>	<p>Emerging Adults</p> <p>Assessment: Any lifetime use. Prevalence: 23% at Wave 1.</p>	<p>PDVV</p> <p>Assessment: Any lifetime PDVV was assessed at Wave 2 with one item asking about having lifetime use of physical force against a partner (e.g., hitting, punching, kicking, shoving). Prevalence: 16% at Wave 2.</p>	<p>PDVP</p> <p>Assessment: Any lifetime PDVP was assessed at Wave 2 with one item asking about having lifetime use of physical force against a partner (e.g., hitting, punching, kicking, shoving). Prevalence: 16% at Wave 2.</p>	<p>Demographic: age, sex, race, parental educational attainment, family structure, and receipt of public assistance. Psychosocial: earned grades, prosocial activities, perceived school support, peer violence, anger, anxiety, depression, and social bonding. Substance Use: lifetime use of cigarettes and alcohol. Family & Peer Context: family conflict; parental</p>	<p>Adjusted: Among those who did not report PDVP at Wave 1, the OR for PDVP at Wave 2 given MJ use at Wave 1 was 1.52 (95% CI: 0.92, 2.51).</p>	

Citation	Design, Sample & Respondents		Marijuana Use	Physical Dating Violence		Covariates	Measures of Effect
McNaughton Reyes, et al., 2014	Adolescents	Emerging Adults	<p>Assessment: Past 3-month frequency of use, ranging from 0 to 10+ times. Prevalence: not reported.</p>	PDVV	PDVP	<p>Demographic: grade level, sex, race, and parental educational attainment. Psychosocial: peer aggression, family conflict, emotional distress, anxiety, depression, and PDVV. Substance Use: frequency of smoking, unhealthy alcohol use, and hard drug use.</p>	<p>Adjusted: Hierarchical growth models were conducted that adjusted for the four demographic covariates. In proximal effects models the frequency of MJ use was positively associated with PDVP score for both sexes combined ($\beta=0.03$, $SE=0.01$, $p<0.05$) and for females ($\beta=0.07$, $p<0.001$). The association was negative for boys ($\beta=-0.001$, $p=0.94$). In time-varying models, the association between frequency of MJ use and PDVP score was $\beta=0.01$ ($SE=0.01$, $p>0.05$).</p>
	Adolescents	Emerging Adults		PDVV	PDVP		
Melander, et al., 2010	Adolescents	Emerging Adults	<p>Assessment: Frequency of use in the past 30 days (Wave 1), ranging from none to daily/near daily. Prevalence: not reported.</p>	PDVV	PDVP	<p>Demographic: marital status; sex; age; race/ethnicity; respondent, parent, and partner level of educational attainment. Psychosocial: depressive symptoms. Substance Use: alcohol and other drug use. Family Context: physical abuse, sexual abuse or neglect during childhood.</p>	<p>Crude: Multinomial logistic regression models with four outcomes (no PDV, PDVP only, PDVV only, and bidirectional PDV); no PDV served as the referent group. ORs for bidirectional PDV, PDVP only, and PDVV are, respectively: 1.28 (95% CI: 0.89, 1.85); 0.92 (95% CI: 0.55, 1.55); and 0.85 (95% CI: 0.48, 1.51).</p>
	Adolescents	Emerging Adults		PDVV	PDVP		
Nabors, 2010	Adolescents	Emerging Adults	<p>Assessment: Any past 12-month use. Prevalence: 44.7% (47.3 among males, 43.1 among females)</p>	PDVV	PDVP	<p>Demographic: race/ethnicity; sex; year in university; parental educational attainment and income. Psychosocial: social desirability tendency, currently in a relationship. Substance Use: hallucinogens, stimulants, narcotics, inhalants, anabolic steroids, and alcohol use.</p>	<p>Adjusted: After adjustment for all the covariates, the aOR for MJ use and PDVP was 1.35 ($p<0.05$) for both sexes, and was 1.67 for males ($p>0.05$) and 1.28 ($p>0.05$) for females.</p>
	Adolescents	Emerging Adults		PDVV	PDVP		
Rothman, et al., 2010	Adolescents	Emerging Adults	<p>Assessment: Any past 30-day use. Prevalence: not reported.</p>	PDVV	PDVP	<p>Demographics: grade level, sex, race/ethnicity, nativity status, school. Violence: peer violence perpetration, sibling violence perpetration, delinquency, gang membership, witnessed</p>	<p>Adjusted: After adjustment for age and school, the OR for PDVP given MJ was 1.79 (95% CI: 1.41, 2.28) overall; 2.15 (95% CI: 1.33, 3.48) for males, and 1.84 (95% CI: 1.46, 2.32) for females.</p>
	Adolescents	Emerging Adults		PDVV	PDVP		

Citation	Design, Sample & Respondents	Marijuana Use	Physical Dating Violence	Covariates	Measures of Effect								
Shorey, et al., 2014a	<table border="1"> <tr> <th>Adolescents</th> <th>Emerging Adults</th> </tr> <tr> <td> Design: Longitudinal, daily diary study. Sample: College students (<i>m</i> age =19.7 y) reporting past 30-day alcohol use (<i>n</i>=67). Respondents: 100% male, 87% White, 5% Black. </td> <td> Assessment: Any MJ use precedent to PDVP over a 90-day period. Prevalence: not reported. </td> </tr> </table>	Adolescents	Emerging Adults	Design: Longitudinal, daily diary study. Sample: College students (<i>m</i> age =19.7 y) reporting past 30-day alcohol use (<i>n</i> =67). Respondents: 100% male, 87% White, 5% Black.	Assessment: Any MJ use precedent to PDVP over a 90-day period. Prevalence: not reported.	Assessment: Any MJ use precedent to PDVP over a 90-day period. Prevalence: not reported.	<table border="1"> <tr> <th>PDVV</th> <th>PDVP</th> </tr> <tr> <td> Assessment: Respondents completed daily surveys, any PDVP was assessed with the CTS2 scale for physical aggression. Prevalence: not reported. </td> <td> Assessment: Respondents completed daily surveys, any PDVP was assessed with the CTS2 scale for physical aggression. Prevalence: not reported. </td> </tr> </table>	PDVV	PDVP	Assessment: Respondents completed daily surveys, any PDVP was assessed with the CTS2 scale for physical aggression. Prevalence: not reported.	Assessment: Respondents completed daily surveys, any PDVP was assessed with the CTS2 scale for physical aggression. Prevalence: not reported.	community violence, Substance Use: past 30-day use of tobacco, Psychosocial: earned grades, truancy.	Adjusted: After adjustment for alcohol use preceding PDVP, the aOR for MJ use preceding acts of PDVP was 2.15 (0.76, 6.08).
	Adolescents	Emerging Adults											
Design: Longitudinal, daily diary study. Sample: College students (<i>m</i> age =19.7 y) reporting past 30-day alcohol use (<i>n</i> =67). Respondents: 100% male, 87% White, 5% Black.	Assessment: Any MJ use precedent to PDVP over a 90-day period. Prevalence: not reported.												
PDVV	PDVP												
Assessment: Respondents completed daily surveys, any PDVP was assessed with the CTS2 scale for physical aggression. Prevalence: not reported.	Assessment: Respondents completed daily surveys, any PDVP was assessed with the CTS2 scale for physical aggression. Prevalence: not reported.												
<table border="1"> <tr> <th>Adolescents</th> <th>Emerging Adults</th> </tr> <tr> <td> Design: Longitudinal, daily diary study. Sample: College students (<i>m</i> age =18.7 y) reporting past 30-day alcohol use (<i>n</i>=173). Respondents: 100% female, 86% White, 9% Black. </td> <td> Assessment: Any MJ use precedent to PDVP over a 90-day period. Prevalence: Not reported. </td> </tr> </table>	Adolescents	Emerging Adults	Design: Longitudinal, daily diary study. Sample: College students (<i>m</i> age =18.7 y) reporting past 30-day alcohol use (<i>n</i> =173). Respondents: 100% female, 86% White, 9% Black.	Assessment: Any MJ use precedent to PDVP over a 90-day period. Prevalence: Not reported.	Assessment: Any MJ use precedent to PDVP over a 90-day period. Prevalence: Not reported.	<table border="1"> <tr> <th>PDVV</th> <th>PDVP</th> </tr> <tr> <td> Assessment: Respondents completed daily surveys, and any PDVP was assessed with the CTS2 scale for physical aggression. Prevalence: not reported. </td> <td> Assessment: Respondents completed daily surveys, and any PDVP was assessed with the CTS2 scale for physical aggression. Prevalence: not reported. </td> </tr> </table>	PDVV	PDVP	Assessment: Respondents completed daily surveys, and any PDVP was assessed with the CTS2 scale for physical aggression. Prevalence: not reported.	Assessment: Respondents completed daily surveys, and any PDVP was assessed with the CTS2 scale for physical aggression. Prevalence: not reported.	Substance Use: any alcohol use precedent to PDVP over a 90-day period, frequency of alcohol use. Psychosocial: angry affect.	Adjusted: After adjustment for the covariates and interaction terms (alcohol use*angry affect, MJ use*angry affect), the aOR for MJ use being precedent to PDVP was 0.66 (95% CI: 0.26, 1.63).	
Adolescents	Emerging Adults												
Design: Longitudinal, daily diary study. Sample: College students (<i>m</i> age =18.7 y) reporting past 30-day alcohol use (<i>n</i> =173). Respondents: 100% female, 86% White, 9% Black.	Assessment: Any MJ use precedent to PDVP over a 90-day period. Prevalence: Not reported.												
PDVV	PDVP												
Assessment: Respondents completed daily surveys, and any PDVP was assessed with the CTS2 scale for physical aggression. Prevalence: not reported.	Assessment: Respondents completed daily surveys, and any PDVP was assessed with the CTS2 scale for physical aggression. Prevalence: not reported.												
<table border="1"> <tr> <th>Adolescents</th> <th>Emerging Adults</th> </tr> <tr> <td> Design: Cross-sectional analysis of longitudinal data Sample: High school students in southeast TX (<i>n</i>=882) Respondents: 56% female; 33% White, 32% Black, 35% Hispanic </td> <td> Assessment: Lifetime use of marijuana at baseline Prevalence: 39% of boys, 27% of girls </td> </tr> </table>	Adolescents	Emerging Adults	Design: Cross-sectional analysis of longitudinal data Sample: High school students in southeast TX (<i>n</i> =882) Respondents: 56% female; 33% White, 32% Black, 35% Hispanic	Assessment: Lifetime use of marijuana at baseline Prevalence: 39% of boys, 27% of girls	Assessment: Lifetime use of marijuana at baseline Prevalence: 39% of boys, 27% of girls	Substance Use: lifetime use of alcohol, marijuana, other illicit drugs	Crude: The bivariate association between PDVV and lifetime marijuana was $r=-0.19$ ($p<0.001$) for boys and girls combined. The bivariate association between PDVP and lifetime marijuana was $r=0.12$ ($P<0.001$) for boys and girls combined.						
Adolescents	Emerging Adults												
Design: Cross-sectional analysis of longitudinal data Sample: High school students in southeast TX (<i>n</i> =882) Respondents: 56% female; 33% White, 32% Black, 35% Hispanic	Assessment: Lifetime use of marijuana at baseline Prevalence: 39% of boys, 27% of girls												
<table border="1"> <tr> <th>Adolescents</th> <th>Emerging Adults</th> </tr> <tr> <td> Design: Longitudinal. Sample: Recruited from 7 Houston, TX-area high schools, limited to those with a dating partner (<i>n</i>=1,046). Baseline (<i>n</i>=828) and a follow-up a year later (<i>n</i>=734). Respondents: 56% female, 28% Black, 29% White, 31% Hispanic, 12% Other. </td> <td> Assessment: Any lifetime use (baseline), past 12-month use (follow-up). Prevalence: 34.2% at baseline; 30.9% at follow-up. </td> </tr> </table>	Adolescents	Emerging Adults	Design: Longitudinal. Sample: Recruited from 7 Houston, TX-area high schools, limited to those with a dating partner (<i>n</i> =1,046). Baseline (<i>n</i> =828) and a follow-up a year later (<i>n</i> =734). Respondents: 56% female, 28% Black, 29% White, 31% Hispanic, 12% Other.	Assessment: Any lifetime use (baseline), past 12-month use (follow-up). Prevalence: 34.2% at baseline; 30.9% at follow-up.	Assessment: Any lifetime use (baseline), past 12-month use (follow-up). Prevalence: 34.2% at baseline; 30.9% at follow-up.	Demographics: grade level, sex, race/ethnicity. Substance Use: use of alcohol, cocaine, inhalants, ecstasy, or amphetamines. Psychosocial: interparental violence.	Adjusted: Path coefficients for baseline MJ use predicting PDVP at follow-up: $\beta=-0.09$, $SE=0.06$, $p>.05$.						
Adolescents	Emerging Adults												
Design: Longitudinal. Sample: Recruited from 7 Houston, TX-area high schools, limited to those with a dating partner (<i>n</i> =1,046). Baseline (<i>n</i> =828) and a follow-up a year later (<i>n</i> =734). Respondents: 56% female, 28% Black, 29% White, 31% Hispanic, 12% Other.	Assessment: Any lifetime use (baseline), past 12-month use (follow-up). Prevalence: 34.2% at baseline; 30.9% at follow-up.												
<table border="1"> <tr> <th>Adolescents</th> <th>Emerging Adults</th> </tr> <tr> <td> Design: Cross-sectional. Sample: Consecutive sample of ED patients (14–18 y) (<i>n</i>=1,128), in Flint, MI. Respondents: 54.1% female, 58% Black, 36.1% White, 5.9% other race, 6% Hispanic. </td> <td> Assessment: Any past 12-month use. Prevalence: 36.9%. </td> </tr> </table>	Adolescents	Emerging Adults	Design: Cross-sectional. Sample: Consecutive sample of ED patients (14–18 y) (<i>n</i> =1,128), in Flint, MI. Respondents: 54.1% female, 58% Black, 36.1% White, 5.9% other race, 6% Hispanic.	Assessment: Any past 12-month use. Prevalence: 36.9%.	Assessment: Any past 12-month use. Prevalence: 36.9%.	Demographic & Psychosocial: age, race/ethnicity, sex, receipt of public assistance, earned grades in school, reason for ED visit. Substance Use: alcohol use, alcohol use problems, and cigarette use. Violent Behaviors: physical peer violence,	Crude: In a bivariate model, the risk ratio for PDVP given MJ use was 1.37 (95% CI: 1.27, 1.48) for moderate violence and 2.50 (95% CI: 1.85, 3.38) for severe violence.						
Adolescents	Emerging Adults												
Design: Cross-sectional. Sample: Consecutive sample of ED patients (14–18 y) (<i>n</i> =1,128), in Flint, MI. Respondents: 54.1% female, 58% Black, 36.1% White, 5.9% other race, 6% Hispanic.	Assessment: Any past 12-month use. Prevalence: 36.9%.												
Walton, et al., 2009	<table border="1"> <tr> <th>Adolescents</th> <th>Emerging Adults</th> </tr> <tr> <td> Design: Cross-sectional. Sample: Consecutive sample of ED patients (14–18 y) (<i>n</i>=1,128), in Flint, MI. Respondents: 54.1% female, 58% Black, 36.1% White, 5.9% other race, 6% Hispanic. </td> <td> Assessment: Any past 12-month use. Prevalence: 36.9%. </td> </tr> </table>	Adolescents	Emerging Adults	Design: Cross-sectional. Sample: Consecutive sample of ED patients (14–18 y) (<i>n</i> =1,128), in Flint, MI. Respondents: 54.1% female, 58% Black, 36.1% White, 5.9% other race, 6% Hispanic.	Assessment: Any past 12-month use. Prevalence: 36.9%.	Assessment: Past 12-month PDVP assessed via a modified version of the CADRI; coded as no violence, moderate violence (e.g., pushing, shoving, slapping) or severe violence (e.g., beat up, choked, kicked). Prevalence: 14.7% moderate only; 12.9% severe.	Demographic & Psychosocial: age, race/ethnicity, sex, receipt of public assistance, earned grades in school, reason for ED visit. Substance Use: alcohol use, alcohol use problems, and cigarette use. Violent Behaviors: physical peer violence,	Crude: In a bivariate model, the risk ratio for PDVP given MJ use was 1.37 (95% CI: 1.27, 1.48) for moderate violence and 2.50 (95% CI: 1.85, 3.38) for severe violence.					
Adolescents	Emerging Adults												
Design: Cross-sectional. Sample: Consecutive sample of ED patients (14–18 y) (<i>n</i> =1,128), in Flint, MI. Respondents: 54.1% female, 58% Black, 36.1% White, 5.9% other race, 6% Hispanic.	Assessment: Any past 12-month use. Prevalence: 36.9%.												

Citation	Design, Sample & Respondents	Marijuana Use	Physical Dating Violence	Covariates	Measures of Effect							
Yan, et al., 2010	<table border="1"> <tr> <th>Adolescents</th> <th>Emerging Adults</th> </tr> <tr> <td> Design: Cross-sectional. Sample: Youth (11–13 y) recruited from English as a Second Language classes in schools in a suburban county of Washington, DC (n=316). Respondents: 51.8% female, 100% Hispanic. </td> <td> Assessment: Any past 12-month use. Prevalence: not reported. </td> </tr> </table>	Adolescents	Emerging Adults	Design: Cross-sectional. Sample: Youth (11–13 y) recruited from English as a Second Language classes in schools in a suburban county of Washington, DC (n=316). Respondents: 51.8% female, 100% Hispanic.	Assessment: Any past 12-month use. Prevalence: not reported.	<table border="1"> <tr> <th>PDVV</th> <th>PDVP</th> </tr> <tr> <td> Assessment: Any past 12-month PDVV, using a single item from the YRBS. Prevalence: 13.5% </td> <td> </td> </tr> </table>	PDVV	PDVP	Assessment: Any past 12-month PDVV, using a single item from the YRBS. Prevalence: 13.5%		alcohol-related fighting, weapon carrying. Demographic: grade level, sex, age. Violence: gun and weapon carrying, physical fighting, gang membership Psychosocial: emotional distress, suicidal ideation, perceived self-worth, social competency, prosocial behaviors, parental monitoring and academic encouragement, family connectedness. Substance Use: alcohol use, binge drinking, other drug use.	Adjusted: The OR for MJ use and PDVV was 2.11 for both sexes (95% CI: 0.55, 8.09), was 0.44 for males (0.02, 9.07), and was 9.38 (0.79, 111.65).
Adolescents	Emerging Adults											
Design: Cross-sectional. Sample: Youth (11–13 y) recruited from English as a Second Language classes in schools in a suburban county of Washington, DC (n=316). Respondents: 51.8% female, 100% Hispanic.	Assessment: Any past 12-month use. Prevalence: not reported.											
PDVV	PDVP											
Assessment: Any past 12-month PDVV, using a single item from the YRBS. Prevalence: 13.5%												

Abbreviations: AddHealth (National Longitudinal Study of Adolescent Health); aOR (adjusted odds ratio); CADRI (Conflict in Adolescent Dating Relationships Inventory); CI (confidence interval); CTS/CTS2 (Conflicts Tactics Scales); ED (emergency department); m (mean); MJ (marijuana); OR (odds ratio); PDV (physical dating violence); PDVP (physical dating violence perpetration); PDVV (physical dating violence victimization); SD (standard deviation); SE (standard error); y (years); YRBS (Youth Risk Behavior Survey). Official abbreviations for states are also used.