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Journal of Prevention and Health Promotion

Which factors explain the effectiveness of school-based interventions to prevent dating and relationship violence and gender-based violence? Systematic review of mediation analyses in randomized trials

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Manuscript ID	JPHP-24-0017.R2
Manuscript Type:	Original Research Article
Keywords:	Adolescents, Interpersonal Violence, Program Evaluation, Systemic Review, Violence Prevention
Abstract:	<p>Adolescent interpersonal violence, particularly gender-based violence (GBV) and dating and relationship violence (DRV), are important public health issues frequently addressed through school-based interventions. This brief report systematically reviews the published evidence on mediational pathways for school-based interventions to effectively reduce GBV and DRV. As part of a larger systematic review funded by the National Institute for Health and Care Research (NIHR), we identified six randomized trials in which mediation analyses of either DRV or GBV perpetration or victimization outcomes for four different interventions were conducted. We synthesize findings narratively by outcome, type of mediator, and follow-up period (short-term or longitudinal). A total of eight mediators were analyzed across all studies. We found clear support for mediation through violence acceptance and delinquent behaviors; inconsistent support for mediation through knowledge, school belonging, belief in the need for help, and gender-inequitable beliefs; and no support for mediation through conflict management skills or bystander actions. These findings provide helpful suggestions on effective pathways for intervention efficacy. Overall, however, there is a need for mediation analyses to be conducted more often in GBV/DRV intervention evaluations. We discuss implications of these findings and suggest areas for future research on mediated pathways for GBV/DRV reduction.</p>

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3 1 **Which factors explain the effectiveness of school-based interventions to prevent gender-**
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5 2 **based violence and dating and relationship violence?**
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8 3 **Systematic review of mediation analyses in randomized trials**
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10 4 Adolescent interpersonal violence is an important public health issue frequently addressed
11
12 5 through school-based interventions. Experiences of both gender-based violence (GBV) and dating
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14 6 and relationship violence (DRV) peak during adolescence. For example, approximately one in eight
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16 7 U.S. high school students report experiencing DRV in the past year (Basile et al., 2020; UNESCO &
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18 8 UN Women, 2016). The definition of GBV includes acts and threats of sexual, physical, or
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20 9 psychological violence perpetrated because of or enforced by unequal gender power dynamics. DRV
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22 10 is used to describe instances when such behaviors occur between individuals in a dating or romantic
23
24 11 relationship.
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28 12 Although objective similarities exist between both types of interpersonal violence, research
29
30 13 studies often use different instruments and language to measure GBV and DRV experiences
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32 14 separately (e.g., see outcomes classifications in Farmer et al., 2023). As a result, research on these
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34 15 topics is siloed despite many overlapping elements. Notably, both GBV and DRV often occur in the
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36 16 context of educational settings, specifically, at school, on the way to school, or through school social
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38 17 networks (UNESCO, 2016). School-based interventions designed to focus only on preventing either
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40 18 GBV or DRV may even have an impact on both types of violence because they share many of the
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42 19 same risk and protective factors. These factors range from various individual traits, forms of
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44 20 knowledge, beliefs, past experiences, and even environmental characteristics that increase the
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46 21 likelihood of GBV/DRV victimization or perpetration occurring (Claussen et al., 2022; Crooks et al.,
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48 22 2018, 2019; Taquette & Monteiro, 2019).
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SYSTEMATIC REVIEW OF MEDIATION ANALYSES IN RANDOMIZED TRIALS

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3 1 Interventions to prevent GBV or DRV behaviors also frequently utilize similar theoretical
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5 2 frameworks, such as the theory of planned behavior, social learning, or the health belief model
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7 3 (Ajzen, 1991; Bandura, 1985; Orr et al., 2022; Rosenstock, 1974). These frameworks identify
8
9 4 different malleable risk and protective factors, which might be changed by prevention interventions in
10
11 5 order to indirectly reduce GBV and DRV behaviors themselves (Orr et al., 2022).

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14 6 In a recent meta-analysis of 68 school-based randomized trials in which interventions to
15
16 7 reduce GBV and/or DRV behaviors were evaluated, strong evidence of positive effects on
17
18 8 intermediary outcomes, including malleable risk and protective factors associated with violence, such
19
20 9 as acceptance of violence or knowledge of support resources, was documented (Farmer et al., 2023).
21
22 10 However, no examination was made to determine whether these positive effects were, in turn,
23
24 11 associated with a significant intervention effect to reduce actual GBV/DRV behaviors. Thus, while
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26 12 many prevention-focused, school-based interventions appear capable of changing intermediary
27
28 13 outcomes, the degree to which the intervention effects are mediated by changing these malleable
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30 14 factors is unclear. No review of evidence has yet examined this area of extant knowledge on
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32 15 mediation analyses or identified trends and gaps, which could inform novel intervention development
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34 16 and guide improvement efforts for existing prevention methods. This paper presents a systematic
35
36 17 review of published evidence on mediational pathways to reduce and prevent adolescent GBV/DRV
37
38 18 through school-based interventions.

19 **Risk & Protective Factors for GBV/DRV**

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21 20 Many social, psychological, and environmental variables are associated with committing or
22
23 21 experiencing GBV/DRV. Risk factors are variables believed to increase the likelihood of committing
24
25 22 or experiencing violence. Protective factors, in contrast, are variables believed to decrease the
26
27 23 likelihood of committing or experiencing violence (Claussen et al., 2022; Hébert et al., 2019). Many

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3 1 powerful risk and protective factors, such as individual demographic identities including race or prior
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5 2 violence victimization, cannot be changed. Although often designed to account for these variables
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7 3 (e.g., including program time to process intersections between racism and GBV/DRV and supporting
8
9 4 survivor disclosures), interventions do not change these factors. Instead, interventions seek to reduce
10
11 5 GBV/DRV through targeting risk and protective factors, which are malleable.
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14 6 **Potential Mediators of Intervention Effects**

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17 7 Interventions that address GBV/DRV have the main outcome of reducing perpetration
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19 8 behaviors and/or victimization experiences. However, in order to accomplish this goal, the
20
21 9 interventions typically also target an array of malleable risk and protective factors as intermediary
22
23 10 outcomes associated with reduced violence (for a review, see Orr et al., 2022). The intermediary
24
25 11 outcomes are thought to be associated causally with GBV/DRV, such that modifying them would
26
27 12 result in changes to the violent behaviors of interest. In other words, a change in these malleable
28
29 13 intermediary outcomes could potentially mediate a change in GBV/DRV behaviors or experiences
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31 14 (Fraser & Galinsky, 2010; Fraser et al., 2009).
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35 15 Potential mediators are typically (and ideally) identified before an evaluation of an
36
37 16 intervention is conducted. This is achieved through many formative steps, including critical
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39 17 theoretical modelling, cross-sectional analyses, and longitudinal studies to confirm that a potential
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41 18 mediator shows consistent variation in concert with the main outcomes to be targeted by an
42
43 19 intervention (Fishbein, 1995; Hagger et al., 2020). Considering the wide variety of behaviors and
44
45 20 experiences included in the combined GBV/DRV literatures, there are many different theorized and
46
47 21 empirically validated potential mediators that show potential malleability, either naturally over time
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49 22 or through organized deliberate intervention (Kovalenko et al., 2022). Common theorized mediators
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SYSTEMATIC REVIEW OF MEDIATION ANALYSES IN RANDOMIZED TRIALS

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1 include individual attitudes on the use of violence in a relationship, rape myth acceptance, or
2 adherence to rigid masculine gender norms (Crooks et al., 2019; Ezell, 2021; Kovalenko et al., 2022).

3 As a practical example of how such mediation might function, we consider violence
4 acceptance. Adolescents who believe that violence is more acceptable to use in certain situations also
5 feel more comfortable and justified engaging in GBV/DRV behaviors (Burt, 1980; Foshee, 1998;
6 Huesmann & Guerra, 1997; Payne et al., 1999). Therefore, reducing their belief in the acceptable use
7 of violence could also make these adolescents feel uncomfortable about using violence and believe
8 there is no justification to engage in GBV/DRV behaviors. There is a wide potential variety of
9 mediators, and no prior reviews have focused on mediation analyses of GBV/DRV intervention
10 effects. As a result, we did not limit the focus of this review to certain mediators but rather sought to
11 collect all the information that has been examined in the literature to date. For this same reason, we
12 reserve in-depth analysis of specific mediators for the discussion, focusing on only those that are
13 supported by existing evidence.

14 **Current Study**

15 This brief report systematically reviews the published evidence on mediational pathways for
16 school-based interventions to effectively reduce GBV and DRV. Our targeted synthesis of
17 mediational evidence contributes toward a better understanding of which mechanisms are likely to be
18 salient for the development of program theory, those that need more research, and those that might be
19 relevant when considering generalizability of interventions to local contexts.

20 **Methods**

21 **Inclusion, Exclusion, and Search Strategies**

22 This review of mediation analyses is part of a larger evidence synthesis project registered on
23 PROSPERO (CRD42020190463). Randomized-controlled trials (RCTs) with parallel or cluster

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1 designs and that were used to evaluate mediating factors of effective interventions were included.
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1 designs and that were used to evaluate mediating factors of effective interventions were included.
2 Comparisons with a control intervention included no intervention, waitlist, usual practice, or an active
3 control. Trial populations were children of compulsory school-age (5 to 18 years old). Interventions
4 were included if they were implemented within school settings and were partially or wholly targeted
5 at reducing DRV or GBV outcomes. No restriction was placed on the content of interventions or the
6 method of delivery. Analyses that were performed to investigate the mediation of either GBV or
7 DRV perpetration or victimization outcomes were included regardless of the mediating factor or the
8 findings.

9 A literature search using a combination of free-text terms and subject headings for schools
10 and GBV/DRV was conducted across a broad range of bibliographic databases in July 2020 and
11 updated in June 2021. Search results were not limited by date or language. Forward and backward
12 citation searching on included studies was also used, and the reference lists of relevant systematic
13 reviews and reports were reviewed. Grey literature searches were also conducted and included
14 targeted searches in Web of Science, Scopus, and Google Scholar and searches of key websites
15 including trial registries. Search results were downloaded into EndNote X9 (Clarivate Analytics) for
16 deduplication. These comprehensive search procedures (available from the first author upon request)
17 were conducted in July 2020 and updated in June 2021 based on the grant funding period (July 2020
18 to May 2022). For this report, as funding was no longer available, only forward citation searching
19 was conducted in March 2024 using the previously identified mediation studies (n=6). No new
20 eligible studies were obtained.

21 **Synthesis**

22 Due to a lack of agreed standards for appraisal of mediation evidence, we did not use a formal
23 appraisal tool. Instead, we provided an in-depth description of the analytic methods used. We

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1 synthesized findings narratively, organizing by outcome and type of mediator, and considered follow-
2 up period, defining less than 12 months from baseline as short term, more than 12 months from
3 baseline as long term, and longitudinal evidence where measurement waves were taken over short-
4 term and long-term findings. Violence outcomes were categorized as DRV if the behaviors were
5 committed by or targeted toward a former or current romantic, dating, or sexual partner; all other
6 outcomes were categorized as a specific type of GBV, when possible (i.e., “sexual harassment”), or as
7 overall GBV. Mediators were categorized based on direct review of item language and, when
8 possible, grouped by construct similarity, as supported by consultation of the literature and agreement
9 among all co-authors (e.g., scales for “approval of violence” and “DRV acceptance” were both
10 categorized as violence acceptance). All included mediators were measured using self-report surveys.

11 Results

12 Six papers (i.e., Coker et al., 2019; Espelage et al., 2015, 2017; Foshee et al., 1998a, 2005;
13 Joppa et al., 2016) relating to four outcome evaluation studies presented mediation analyses for GBV
14 and/or DRV victimization and/or perpetration. The PRISMA Flowchart is provided in Figure 1.

15 Characteristics of Included Interventions

16 Four different interventions were examined in these mediation papers: “Green Dot” by Coker
17 et al. (2019), “Second Step” by Espelage et al. (2015, 2017), “Safe Dates” by Foshee et al. (1998a,
18 2005), and the “Katie Brown Educational Program” or “KBEP” by Joppa et al. (2016). All four
19 interventions showed success in reducing at least one type of DRV/GBV in either the short- or long-
20 term, which is a necessary pre-condition prior to conducting mediation analyses. While each
21 intervention contained a unique blend of active components and material covered, all were delivered
22 in mixed-gender groups led by trained adult facilitators and utilized activities that were discussion

1 based; reflection based, such as workbooks or diaries; and guided practice, such as role-playing
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1 based; reflection based, such as workbooks or diaries; and guided practice, such as role-playing
2 responses to situations of GBV/DRV. Further intervention characteristics are provided in Table 1.

3 **Characteristics of Included Mediation Analyses**

4 Analytic methods used to test and estimate mediational relationships could be broadly classed
5 as structural equation modeling based (for example, path analysis or conditional process analysis,
6 which was used in five papers, i.e., Coker et al., 2019; Espelage et al., 2015, 2017; Joppa et al., 2016)
7 or causal steps-based (for example, checking for attenuation of intervention effect on the outcome
8 after inclusion of a mediator, which was used in three papers, i.e., Coker et al., 2019; Foshee et al.,
9 2005; Joppa et al., 2016). Three of the included papers, Coker et al. (2019), Espelage et al. (2017),
10 Foshee et al. (2005), considered outcomes longitudinally (i.e., looking at mediation impacts over
11 time). Of the three papers, two (i.e., Coker et al., 2019; Espelage et al., 2017) included only long-term
12 follow-up periods, and one (i.e., Foshee et al., 2005) included both short-term and long-term follow-
13 up periods. In four of the included papers, Coker et al. (2019), Espelage et al. (2015), Foshee et al.
14 (1998a), and Joppa et al. (2016), outcomes were considered cross-sectionally (i.e., looking at
15 endpoint differences). Of the four papers, two (i.e., Foshee et al., 1998a; Joppa et al., 2016) tested
16 mediation for short-term outcomes only, and two (i.e., Coker et al., 2019; Espelage et al., 2015) tested
17 mediation for long-term outcomes only. Additional study details are available from the first author
18 upon request.

19 **Synthesis of Included Mediation Evidence**

20 In the following sections, we provide a detailed description of the mediation analyses
21 conducted. They are organized by violence and intervention outcome type (DRV and GBV;
22 perpetration and victimization). Table 1 presents the evidence reviewed that supports mediation of
23 intervention effects organized by mediator.

SYSTEMATIC REVIEW OF MEDIATION ANALYSES IN RANDOMIZED TRIALS

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1 Mediation of DRV Perpetration Outcomes

2 In five analyses relating to four outcome evaluations, mediation for DRV perpetration was
3 considered (Coker et al., 2019; Espelage et al., 2017; Foshee et al., 1998a, 2005; Joppa et al., 2016).
4 Overall DRV perpetration outcomes were considered in two of the analyses (i.e., Espelage et al.,
5 2017; Joppa et al., 2016), emotional DRV perpetration outcomes were considered in three of the
6 analyses (i.e., Coker et al., 2019; Foshee et al., 1998a, 2005), physical DRV perpetration outcomes
7 were considered in three of the analyses (i.e., Coker et al., 2019; Foshee et al., 1998a, 2005), and
8 sexual DRV perpetration outcomes were considered in two of the analyses (i.e., Foshee et al., 1998a,
9 2005). In two analyses, subgroups defined by baseline dating experience were considered (i.e.,
10 Foshee et al., 1998a; Joppa et al., 2016), and in one analysis, subgroups defined by baseline DRV
11 perpetration were considered (i.e., Foshee et al., 1998a).

12 In four analyses relating to three outcome evaluations, mediation of impacts on DRV
13 perpetration via violence acceptance was tested (i.e., Coker et al., 2019; Foshee et al., 1998a, 2005;
14 Joppa et al., 2016). Longitudinal analysis of “Green Dot” over four years showed that rape myth
15 acceptance and dating violence acceptance did not attenuate intervention effects on physical DRV
16 perpetration. However, they did attenuate intervention effects on emotional DRV perpetration (Coker
17 et al., 2019). In the short-term analysis of mediation in “Safe Dates”, violence acceptance was
18 assessed by prescribed and proscribed norms and perceived positive and negative consequences of
19 using DRV (Foshee et al., 1998a). Prescribed norms attenuated intervention effects by more than
20 20%, meeting authors’ criteria for mediation, in all DRV perpetration outcomes tested in the full
21 sample. Perceived negative consequences of DRV mediated intervention impacts on sexual DRV
22 perpetration in the sample with baseline experience of DRV perpetration. No other violence
23 acceptance variables were found to mediate any of the DRV perpetration outcomes tested. However,

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1 a longitudinal analysis of this intervention conducted by Foshee et al. (2005) found that prescribed
2 norms attenuated longitudinal impacts over four years post-baseline for all DRV perpetration
3 outcomes tested: emotional DRV perpetration, physical DRV perpetration, and both moderate and
4 severe and sexual DRV perpetration. Finally, approval of retaliatory aggression and attitudes toward
5 dating violence mediated short-term intervention impacts on overall DRV perpetration in “KBEP”
6 (Joppa et al., 2016).

7 In three analyses relating to two outcome evaluations, mediation of impacts on DRV
8 perpetration via violence-related was tested (i.e., Foshee et al., 1998a, 2005; Joppa et al., 2016). In the
9 short-term mediation analysis of “Safe Dates” by Foshee et al. (1998a), awareness of community
10 services was tested in the full sample as a mediator for emotional DRV perpetration, physical DRV
11 perpetration in the current relationship, and sexual DRV perpetration. In the sample of those with
12 baseline DRV perpetration, awareness of community services was tested as a mediator for emotional
13 DRV perpetration and sexual DRV perpetration. Awareness of community services was a mediator
14 for emotional and sexual DRV perpetration but not for physical DRV perpetration in the current
15 relationship. Longitudinal mediation analysis of “Safe Dates” indicated that over four years,
16 awareness of community services mediated intervention effects on moderate physical and sexual
17 DRV perpetration but not emotional DRV perpetration or severe physical DRV perpetration. In the
18 short-term mediation analysis of “KBEP” by Joppa et al. (2016) DRV knowledge did not mediate
19 intervention impacts on overall DRV perpetration.

20 In the short-term and longitudinal mediation analyses of “Safe Dates” by Foshee et al. (1998a)
21 and Foshee et al. (2005), respectively, several other mediators were considered: gender inequitable
22 beliefs, belief in the need for help, and conflict management skills. Gender inequitable beliefs
23 mediated short-term intervention effects on emotional DRV perpetration and sexual DRV

SYSTEMATIC REVIEW OF MEDIATION ANALYSES IN RANDOMIZED TRIALS

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3 1 perpetration but not physical DRV perpetration. Similarly, gender-inequitable beliefs mediated
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5 2 longitudinal intervention effects for emotional DRV perpetration, moderate physical DRV
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7 3 perpetration, and sexual DRV perpetration but not severe physical DRV perpetration. Belief in the
8
9 4 need for help did not mediate any intervention effects in the short-term mediation analysis of “Safe
10
11 5 Dates”, where it was tested in the full sample. In the longitudinal mediation analysis of “Safe Dates”,
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13 6 belief in the need for help mediated intervention effects for sexual DRV perpetration but not
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15 7 emotional DRV perpetration, moderate physical DRV perpetration, or severe physical DRV
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17 8 perpetration. Finally, conflict management skills did not mediate any full-sample intervention effects
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19 9 in either the short-term mediation analysis or in the longitudinal mediation analysis, where
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21 10 intervention effects were not attenuated in any analysis.
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26 11 Bystander actions were tested as mediators in the longitudinal analysis of “Green Dot” (Coker
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28 12 et al., 2019). Bystander actions, both proactive and reactive, did not mediate intervention impacts on
29
30 13 physical DRV perpetration or emotional DRV perpetration.
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33 14 Finally, in the mediational analysis of “Second Step” by Espelage et al. (2017), longitudinal
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35 15 change in school belonging over three years post-baseline was tested as a mediator of longitudinal
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37 16 change in DRV perpetration over four to six years post-baseline, and a non-significant indirect effect
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39 17 was found.
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42 18 ***Mediation of DRV Victimization Outcomes***

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45 19 In three analyses relating to three outcome evaluations, mediation for DRV victimization was
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47 20 considered (Espelage et al., 2017; Foshee et al., 2005; Joppa et al., 2016). Overall DRV victimization
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49 21 outcomes were considered in two of the analyses (i.e., Espelage et al., 2017; Joppa et al., 2016). In
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51 22 one of the analyses, (i.e., Foshee et al., 2005) physical DRV victimization was considered.
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3 1 Mediation of DRV victimization outcomes via violence acceptance was assessed in two
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5 2 analyses. Longitudinal mediation analyses in the “Safe Dates” trial Foshee et al. (2005) indicated that
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7 3 prescribed norms attenuated intervention effects on moderate physical DRV victimization to non-
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9 4 significance. In “KBEP” approval of retaliatory aggression and, marginally, attitudes toward dating
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11 5 violence mediated short-term impacts on total DRV victimization.
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15 6 Mediation of DRV victimization outcomes via knowledge was also assessed in short-term
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17 7 analyses. In “Safe Dates,” inclusion of awareness of community services as a mediator in regression
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19 8 models attenuated the intervention effect (Foshee et al., 2005). However, in “KBEP,” the indirect
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21 9 effect of the intervention on DRV victimization through knowledge outcomes was not significant
22
23 10 (Joppa et al., 2016).
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27 11 For the longitudinal analysis of “Safe Dates,” a number of additional mediators were tested.
28
29 12 Gender inequitable beliefs, although not conflict management skills or belief in need for help,
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31 13 mediated longitudinal impacts on physical DRV victimization. Finally, in the longitudinal analysis of
32
33 14 “Second Step,” tested longitudinal change in school belonging over three years post-baseline as a
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35 15 mediator of longitudinal change in DRV victimization over four to six years post-baseline was tested
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37 16 and a non-significant indirect effect was found.
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40 ***Mediation of GBV Perpetration Outcomes***

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42 18 In three analyses relating to two outcome evaluations, mediation for GBV perpetration was
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44 19 considered (Coker et al., 2019; Espelage et al., 2015, 2017). Overall GBV perpetration outcomes
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46 20 were considered in all three analyses, homophobic GBV was considered in two of the analyses (i.e.,
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48 21 Espelage et al., 2015, 2017), and both verbal GBV victimization and physical GBV victimization
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50 22 were considered in one of the analyses (i.e., Coker et al., 2019). Mediators were disparate across
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52 23 included analyses, and in no two analyses was the same set of mediators considered.
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1 The mediational analysis of “Green Dot” by Coker et al. (2019) included both longitudinal
2 analyses and endpoint difference analyses of long-term outcomes. In longitudinal analyses over four
3 years, the mediating impacts of violence acceptance and bystander actions on various forms of GBV
4 perpetration were considered. Violence acceptance mediated all longitudinal intervention effects,
5 which were defined as attenuation of intervention significance to a significance level of $p > .01$,
6 specifically, for physical GBV perpetration (sexual violence), two forms of verbal GBV perpetration
7 (sexual harassment and stalking), and an overall measure of GBV perpetration. However, bystander
8 actions did not mediate physical GBV perpetration, emotional GBV perpetration defined as sexual
9 harassment, or an overall measure of GBV perpetration. Bystander actions did mediate longitudinal
10 effects on stalking as a form of emotional GBV perpetration. In a subsequent analysis, mediation of
11 endpoint differences in physical GBV perpetration defined as sexual violence was considered, and
12 long-term follow-up at the end of the second and fourth intervention years was examined. Significant
13 indirect effects for violence acceptance or bystander actions were produced in none of these analyses.

14 In the mediational analysis of “Second Step” by Espelage et al. (2015), outcomes after three
15 years were considered. The purpose of the analysis was to determine whether intervention impacts on
16 an overall measure of GBV perpetration and on homophobic GBV perpetration were mediated by
17 change in delinquency behaviors. In both cases, indirect effects were substantial and were significant
18 for overall GBV perpetration and marginally significant for homophobic GBV perpetration.

19 Finally, in the mediational analysis of “Second Step” by Espelage et al. (2017), longitudinal
20 change in school belonging over three years post-baseline as a mediator of longitudinal change in
21 GBV perpetration over four to six years post-baseline was tested, and a non-significant indirect effect
22 for overall GBV perpetration but a significant indirect effect for homophobic GBV perpetration were
23 found.

1 *Mediation of GBV Victimization Outcomes*

2 In one analysis, mediation for GBV victimization was considered (Espelage et al., 2017). In
3 the mediational analysis of “Second Step,” longitudinal change in school belonging over three years
4 post-baseline was tested as a mediator of longitudinal change in sexual harassment victimization and
5 homophobic teasing victimization over four to six years post-baseline. In both cases, an indirect
6 effect was significant for sexual harassment victimization and homophobic teasing victimization.
7 This indicated that the intervention reduced longitudinal increases in GBV victimization by causing
8 longitudinal improvements in school belonging.

9 **Discussion**

10 The goal of this review was to examine the evidence supporting the mediation of school-based
11 intervention effects on GBV/DRV outcomes by malleable risk and protective factors. The mediators
12 identified in the four included studies were multiple types of violence acceptance, violence-related
13 knowledge, gender-inequitable beliefs, belief in a need for help, feelings of school belonging, conflict
14 management skills, bystander behaviors, and delinquent behaviors. The amount and nature of the
15 evidence supporting each of these varied considerably.

16 Across multiple studies, we found strong support of both longitudinal and short-term evidence
17 that violence acceptance is a mediator of intervention effects on DRV perpetration and victimization
18 outcomes. Violence acceptance is also likely a mediator of general GBV outcomes, although there
19 was not sufficient evidence in the included studies to examine this relationship conclusively. This
20 construct is well studied in the violence literature and can broadly encompass the attitudes and beliefs
21 of individuals about the proper, reasonable, legitimate, or accepted uses of different forms of violence
22 in response to or because of different situations (DeGue et al., 2014; McMahon & Farmer, 2011;
23 Payne et al., 1999). Based on our findings, we suggest that prevention interventions should include

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1 content that addresses violence acceptance as relevant to the focus of each intervention, for example,
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3 through debunking rape myths or providing normative feedback to counter false assumptions about
4
5 the acceptable use of violence. We acknowledge that because it may need to consider and address
6
7 local norms or knowledge, quality content of this nature is not always simple to include. To be
8
9 addressed thoroughly in intervention content, a degree of customization or localization would be
10
11 necessary. We believe our findings in this review support investing the degree of effort that would be
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13 needed.
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19
20 Violence-related knowledge also mediates intervention effects on DRV outcomes, especially
21
22 in longitudinal analyses. However, the mediation was not consistent across DRV subtypes. Having
23
24 this knowledge could reduce victimization and perpetration by allowing youths to label violent
25
26 behaviors as violence and feel less hesitation to seek help when violence is encountered, which could
27
28 counteract common social narratives that minimize the impact of violence (Foshee et al., 1998; Price
29
30 et al., 1999). This finding suggests that school-based DRV prevention interventions that address
31
32 specific DRV subtypes may be most effective when they focus on improving the subtype-specific
33
34 knowledge of adolescents: “What does it look like?”; “What are the consequences?”; and “What are
35
36 the potential support resources?”
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40 We note that intervention effects on severe physical DRV outcomes and general DRV
41
42 outcomes (an aggregation of both moderate and severe behaviors) were not mediated by violence-
43
44 related knowledge. However, effects on moderate physical DRV were mediated by violence-related
45
46 knowledge. One potential explanation for this may be the ceiling effect. As physical DRV is the most
47
48 literally and culturally visible subtype of DRV, adolescents may already have greater knowledge of
49
50 physical DRV, particularly more severe physical DRV behaviors. This finding offers the tentative
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52 suggestion that school-based DRV prevention interventions that address physical DRV may actually
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2
3 1 be enhanced if less time is spent on reviewing general/basic knowledge that adolescents already have
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5 2 and if intervention time is instead reallocated to other risk and protective factors. Future research is
6
7 3 needed on the nuances between DRV subtypes, as impacted by prevention interventions, particularly
8
9 4 studies in which moderate versus severe behaviors within each DRV subtype are examined.

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12 5 School belonging appears to mediate only general GBV outcomes, not DRV outcomes.
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14 6 However, this evidence comes from only one study, warranting more studies for confirmation. We
15
16 7 tentatively suggest that this finding reflects the more social/public setting of general GBV, which
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18 8 could include behaviors such as harassment, social stigma, or other ostracization based on the
19
20 9 victim's gender identity or perceived identity. Acts such as sexual harassment are often deliberately
21
22 10 perpetrated in front of other community members in order to inflict greater harm and create a hostile
23
24 11 environment that further isolates the target (Wirtz et al., 2020). In contrast, DRV can take place in
25
26 12 front of others but often occurs away from public observation. We tentatively suggest that only
27
28 13 interventions to address types of GBV that occur in social settings would be enhanced by including
29
30 14 content on school belonging. The content, focused on increasing general feelings of supportiveness
31
32 15 and value-sharing among students and teachers, would work to disrupt violence that happens in the
33
34 16 presence of those other students and teachers (Allen et al., 2018; Wang & Degol, 2016). Interventions
35
36 17 to address forms of GBV/DRV that are not as public may be less improved by including school
37
38 18 belonging-focused content. The reason is because such violence often occurs in private settings (Stop
39
40 19 Street Harassment, 2019).

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43 20 Conflict management skills showed no evidence of mediation for DRV outcomes. In future
44
45 21 mediation analyses of prevention intervention effects, one potential explanation to be considered is
46
47 22 that conflict management skills are a moderated mediator, with adolescent gender as the likely
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49 23 moderator. Messaging and normative expectations may influence how intervention content in this
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SYSTEMATIC REVIEW OF MEDIATION ANALYSES IN RANDOMIZED TRIALS

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1 area is perceived by adolescents: Boys are taught to use these skills instead of committing violence,
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3 whereas girls are taught to use these skills to deescalate men's violence (for example, see Baiocchi et
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8 al., 2017). Moderated mediation was not assessed in the included studies. However, additional
9
10 research is warranted, as conflict management skills are routinely included not only in violence
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12 prevention interventions but also in broader school health promotion efforts that address well-being
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14 and social-emotional learning (e.g., Kovalenko et al., 2022; Wigelsworth et al., 2022).
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17 Delinquent behaviors were shown to mediate general GBV outcomes and homophobic
18
19 teasing, although this evidence comes from a single study. Engaging in sexual harassment and
20
21 homophobic name-calling behaviors may be seen by adolescents as similar to other acting-out
22
23 delinquent behaviors such as stealing and graffiti—all of which are things that teachers, parents, and
24
25 adults generally tell adolescents not to do (Dahlberg et al., 2005). We tentatively suggest that to
26
27 enhance school-based prevention interventions that address homophobia-related GBV and other
28
29 forms of GBV that tend to occur in social settings, content to address delinquent behaviors generally
30
31 should be included. Doing so would also enable future intervention evaluations to examine the role of
32
33 delinquent behaviors as mediators and provide more evidence in support of or against this tentative
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35 finding.
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39 **Limitations**

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42 Despite the rigorous nature of our search, our review is limited to only a handful of studies
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44 where mediation analyses were conducted. Mediation analyses tend to be conducted ancillary to the
45
46 main outcome evaluation and, thus, can often be deprioritized by scholars in favor of reports and
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48 publications that deal directly with the aims of current or potentially future funded work. The
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50 evaluated interventions in the studies included in this review represent several of the most
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52 successfully and widely implemented GBV/DRV prevention programs. This review provides helpful
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1 context to understand the mechanics that support their continued use. Mediators were measured only
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3 with self-report measures, which can introduce bias. We also note the challenging limitation of
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5 heterogeneous measurement used for nominally similar mediators, even across the few studies
6
7 included. Most mediators were evaluated in the context of a single intervention only. Violence
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9 acceptance and violence-related knowledge were the only mediators examined against more than one
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11 prevention intervention and provided the most robust evidence base on which to make
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13 recommendations. This report is also limited by the date when the original search was conducted
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15 (June 2021), with only limited forward-citation searching of records published thereafter (until March
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17 2024) to update the included studies prior to the publication of this report.
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24 **Future Research**

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26 The most pressing gap in the literature is mediation analyses of intervention effects on
27
28 specific and general GBV outcomes. Awareness of the impact of GBV and the systemic and
29
30 structural influences that perpetuate GBV is growing each year, with additional efforts being
31
32 mobilized at every level to address GBV (for example, see Villardón-Gallego et al., 2023).
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34 Prevention researchers who conduct intervention outcome evaluations should include specific plans
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36 for mediation analyses as they evaluate new interventions. Funding agencies should also prioritize
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38 this type of evidence, encouraging the inclusion of instruments to evaluate pathways to GBV/DRV
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40 outcomes and ensuring that proposed plans specify how and when mediation pathways will be
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42 analyzed, reported, and shared with the broader scientific community. Future iterations of this
43
44 systematic review and synthesis should also consider including bystander-focused interventions and
45
46 bystander-behavioral outcomes (e.g., Cook-Craig et al., 2014). Although bystander actions did not
47
48 mediate longitudinal change in perpetration of GBV or DRV, this evidence is from a single study.
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54 The role of gender-inequitable beliefs as a mediator should also be a focus in future evaluations.
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3 1 There is both short- and long-term support for the mediating role of gender-inequitable beliefs on
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5 2 DRV. However, such beliefs have not been evaluated in relation to general GBV.
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8 3 Our findings confirm multiple effective pathways for the reduction of GBV/DRV perpetration
9
10 4 and victimization across several prevention interventions, through targeting violence acceptance and
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12 5 knowledge, school belonging, and delinquency behaviors. These topics should be incorporated into
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14 6 violence prevention interventions alongside promising but untested mediators to blaze new pathways
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16 7 for reducing adolescent interpersonal violence.
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Table 1.

Characteristics of included interventions

Intervention	Theoretical Basis	Audiences & Active Components	Content/Topics
Green Dot (Coker et al., 2019)	<ul style="list-style-type: none"> - Bystander psychology (Latane & Darley, 1970) - Diffusion of innovation (Rushton & Campbell, 1977) - Perpetrator characteristics (e.g., Lisak & Miller, 2002) 	<ul style="list-style-type: none"> - Students: Group discussions; films, videos, etc.; games (general); role play; scenarios/vignettes; guided practice; workbooks/worksheets/writing; individual reading material 	<ul style="list-style-type: none"> - For students: Definitions of sexual violence and related forms of interpersonal violence; skills to recognize potential bystander situations; and safe methods of bystander intervention for those situations.
Second Step (Espelage et al., 2015, 2017)	<ul style="list-style-type: none"> - Risk and protective factor theory (Coie et al., 1993) - Social learning theory (Bandura, 1977) - Social control theory (Hirschi, 2002) 	<ul style="list-style-type: none"> - Students: Group discussions; partner/pair discussions; films, videos, etc.; guided practice; individual reading material; reading or hearing stories/narratives - School Personnel (as facilitators): Training activities/manual; tracking fidelity/progress 	<ul style="list-style-type: none"> - For students: Identifying different types of violence; rights in relationships; personal power and self-esteem; conflict resolution; communication skills; components of healthy relationships; taking responsibility for choices and actions; expectations of dating relationships; stereotypes/the media’s portrayal of gender roles; the cycle of violence; and warning signs of dating violence.
Safe Dates (Foshee et al., 1998, 2005)	<ul style="list-style-type: none"> - Precaution adoption theory (Weinstein, 1989) - Social norms theory (Fishbein & Ajzen, 1975) - Cognitive developmental theories (e.g., Bem, 1981) 	<ul style="list-style-type: none"> - Students: Group discussions; partner/pair discussions; posters, visual campaigns; role play; scenarios/vignettes; workbooks/worksheets/writing; individual reading material; sharing personal stories (vic/perp); theatre/performance - School Personnel (as facilitators): Training activities/manual - Parents: Educational materials - Environment/Structural: Common space visual materials; service-in-reach 	<ul style="list-style-type: none"> - For students: Definition of dating violence; seeking help when in a violent relationship; cognitive aspects of belief in the need for help; information on community resources; potential negative consequences of relationship violence; past experiences with gender stereotyping; conflict management skills; communication skills; warning signs of an abusive relationship; and ways to help a friend in a violent relationship. - For parents: Positive parenting and ways to communicate effectively with their children about healthy relationships.

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3 Katie Brown - Social learning theory - **Students:** Group discussions; games - **For students:** Empathy and communication;
4 Educational (Bandura, 1977) (general); role play; scenarios/ bullying (e.g., responding, cyberbullying,
5 Program (KBEP) vignettes; workbooks/worksheets/ sexual harassment, stereotypes, prejudice, and
6 (Joppa et al., writing dating); emotion regulation; problem solving/
7 2016) goal setting; and substance abuse prevention.
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Table 2.

Evidence supporting mediation of intervention effects on DRV and GBV outcomes by included mediators

Mediators Examined			Intervention Effects (IE) on Violence Outcomes ¹	
Type	Subtype	Description	Perpetration Behaviors	Victimization Experiences
Violence Acceptance	Rape Myth Acceptance	Endorsing stereotypical or false cultural beliefs about rape and sexual assault, victims, and perpetrators that support violence against women (Burt, 1980; Payne et al., 1999).	+ (L) Mediates IE on psychological DRV ² ∅ (L) Does not mediate IE on physical DRV ² + (L) Mediates IE on sexual violence ² + (L) Mediates IE on sexual harassment ² + (L) Mediates IE on stalking ² + (L) Mediates IE on overall GBV ²	- No analyses conducted
	DRV Acceptance	Endorsing beliefs about the appropriate use of violence in romantic or dating relationships (Foshee et al., 1998; Price et al., 1999).	+ (L) Mediates IE on psychological DRV ² ∅ (L) Does not mediate IE on physical DRV ² + (S) Mediates IE on overall DRV ⁷ + (L) Mediates IE on sexual violence ² + (L) Mediates IE on sexual harassment ² + (L) Mediates IE on stalking ² + (L) Mediates IE on overall GBV ²	+ (S) Mediates IE on overall DRV ⁷
	Acceptance of DRV Prescribed Norms	Endorsing beliefs that DRV is acceptable under certain conditions (Foshee, 1998).	+ (L) Mediates IE on psychological DRV ⁶ + (S) Mediates IE on psychological DRV ^{5a} + (L) Mediates IE on physical DRV ⁶ + (S) Mediates IE on physical DRV ^{5a} + (L) Mediates IE on moderate sexual DRV ⁶ + (L) Mediates IE on severe sexual DRV ⁶ + (S) Mediates IE on sexual DRV ^{5a}	+ (L) Mediates IE on moderate physical DRV ⁶
	Perceived Negative Consequences of DRV	Endorsing a belief that unwanted social/personal consequences occur after committing DRV (Foshee, 1998).	+ (S) Mediates IE on sexual DRV ^{5b}	- No analyses conducted
	Approval of Retaliatory Aggression	Endorsing a belief that violence is acceptable as retaliation (Huesmann & Guerra, 1997).	+ (S) Mediates IE on overall DRV ⁷	+ (S) Mediates IE on overall DRV ⁷

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Mediators Examined			Intervention Effects (IE) on Violence Outcomes ¹	
Type	Subtype	Description	Perpetration Behaviors	Victimization Experiences
Violence-Related Knowledge	Awareness of Community Services	Having knowledge of county services for victims and perpetrators of dating violence (Foshee, 1998).	Ø (L) Does not mediate IE on psychological DRV ⁶ + (S) Mediates IE on psychological DRV ^{5a} + (L) Mediates IE on moderate physical DRV ⁶ Ø (S) Does not mediate IE on physical DRV ^{5a} Ø (L) Does not mediate IE on severe physical DRV ⁶ + (L) Mediates IE on sexual DRV ⁶ + (S) Mediates IE on sexual DRV ^{5a}	+ (L) Mediates IE on moderate physical DRV ⁶
	DRV Knowledge	Having knowledge of DV and healthy relationship topics covered in KBEP curriculum (Joppa et al., 2016).	Ø (S) Does not mediate IE on overall DRV ⁷	Ø (S) Does not mediate IE on overall DRV ⁷
Gender Inequitable Beliefs	n/a	Endorsing a belief that certain actions are more/less acceptable for boys than for girls and vice versa (Foshee, 1998).	+ (L) Mediates IE on psychological DRV ⁶ + (S) Mediates IE on psychological DRV ^{5a} + (L) Mediates IE on moderate physical DRV ⁶ Ø (L) Does not mediate IE on severe physical DRV ⁶ Ø (S) Does not mediate IE on physical DRV ^{5a} + (L) Mediates IE on sexual DRV ⁶ + (S) Mediates IE on sexual DRV ^{5a}	+ (L) Mediates IE on moderate physical DRV ⁶
School Belonging	n/a	Feeling accepted, respected, trusted, and included by peers and adults in one's school community (Wang & Degol, 2016).	Ø (L) Does not mediate IE on overall DRV ⁴ + (L) Mediates IE on homophobic teasing ⁴ Ø (L) Does not mediate IE on overall GBV ⁴	+ (L) Mediates IE on homophobic teasing ⁴ + (L) Mediates IE on sexual harassment ⁴ Ø (L) Does not mediate IE on overall DRV ⁴
Belief in Need for Help	n/a	Endorsing a belief that teens who are victims of dating violence or are violent toward their dates need to get help from others (Foshee, 1998).	Ø (L) Does not mediate IE on psychological DRV ⁶ Ø (S) Does not mediate IE on psychological DRV ^{5a} Ø (L) Does not mediate IE on moderate physical DRV ⁶ Ø (S) Does not mediate IE on moderate physical DRV ^{5a} Ø (L) Does not mediate IE on severe physical DRV ⁶ Ø (S) Does not mediate IE on severe physical DRV ^{5a} + (L) Mediates IE on sexual DRV ⁶ Ø (S) Does not mediate IE on sexual DRV ^{5a}	Ø (L) Does not mediate IE on moderate physical DRV ⁶

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Mediators Examined			Intervention Effects (IE) on Violence Outcomes ¹	
Type	Subtype	Description	Perpetration Behaviors	Victimization Experiences
Conflict Management Skills	n/a	Responding to a disagreement with another person using constructive communication (e.g., tried to first calm down, stated how I felt, asked what they were feeling) (Foshee, 1998).	Ø (L) Does not mediate IE on psychological DRV ⁶ Ø (S) Does not mediate IE on psychological DRV ^{5a} Ø (L) Does not mediate IE on moderate physical DRV ⁶ Ø (S) Does not mediate IE on moderate physical DRV ^{5a} Ø (L) Does not mediate IE on severe physical DRV ⁶ Ø (S) Does not mediate IE on severe physical DRV ^{5a} Ø (L) Does not mediate IE on sexual DRV ⁶ Ø (S) Does not mediate IE on sexual DRV ^{5a}	Ø (L) Does not mediate IE on moderate physical DRV ⁶
Bystander Behaviors	n/a	Responding to situations where another youth was harassed or hurt or looked upset, or where someone was talking about forced sex or DRV (Cook-Craig et al., 2014).	Ø (L) Does not mediate IE on psychological DRV ² Ø (L) Does not mediate IE on physical DRV ² Ø (L) Does not mediate IE on sexual violence ² Ø (L) Does not mediate IE on sexual harassment ² Ø (L) Does not mediate IE on stalking ² Ø (L) Does not mediate IE on overall GBV ²	– No analyses conducted
Delinquent Behaviors	n/a	Committing non-violent problem behaviors (e.g., stealing, being suspended, graffiti) (Dahlberg et al., 2005).	+ (L) Mediates IE on homophobic teasing ³ + (L) Mediates IE on overall GBV ³	– No analyses conducted

Notes. **IE** = Intervention effects; **DRV** = Dating and relationship violence; **GBV** = Gender-based violence; + = evidence supports mediation of IE on this outcome by this mediator; Ø = evidence does not support mediation of IE on this outcome by this mediator; (L) = evidence is based on a follow-up period of 12 months or longer from baseline; (S) = evidence is based on a follow-up period of 12 months or less from baseline; (n/a) = no subtype applicable, as all analyses used the same measure for this mediator.

¹ In the included studies, not all measured outcomes were tested for mediation; only outcomes with significant IE were considered in mediation analyses.

² Evidence is from Coker et al. (2019) (*Green Dot*)

³ Evidence is from Espelage et al. (2015) (*Second Step*)

⁴ Evidence is from Espelage et al. (2017) (*Second Step*)

^{5a} Evidence is from Foshee et al. (1998) analyses conducted with the full sample (*Safe Dates*)

^{5b} Evidence is from Foshee et al. (1998) analyses conducted with the subsample with baseline experience of DRV perpetration (*Safe Dates*)

⁶ Evidence is from Foshee et al. (2005) (*Safe Dates*)

⁷ Evidence is from Joppa et al. (2016) (*KBEP*)

Figure 1*PRISMA Flowchart*