Healthy Relationships Training Study:

A Comparison of Interventions to Reduce Dating Violence on College Campuses

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Objectives

Dating violence on college campuses is prevalent and problematic. Although existing psychoeducational programs successfully increase college students' knowledge about dating violence and change their attitudes towards dating violence, it is unclear if these programs are successful in changing actual behavior. Indeed, it is probable that college students do not have the skills needed to prevent their own perpetration of dating violence. One essential skill to prevent perpetration in the college context is effective emotion regulation skills, as many college students experience emotionally charged states and may use dating violence as an unhealthy avenue for emotion regulation (Eckhardt & Parrott, 2017; Mason & Smithey, 2012; Okuda et al., 2015). One avenue for teaching college students healthy emotion regulation is through mindfulness-based skills training, which numerous dating violence researchers advocate for (Barnes et al., 2007; Elmquist et al., 2016; Leisring, 2013; Shorey, Febres, Brasfield, & Stuart, 2011; Shorey et al., 2014).

Thus, the purpose of this study was to create and implement a mindfulness-based skills training (MBST) intervention to teach students how to regulate their emotions when resolving conflict with their romantic partners. The efficacy of the MBST intervention at reducing dating violence perpetration was compared to a psychoeducational intervention ("active control").

Aims and Hypotheses

Aim 1. To assess the effectiveness of the psychoeducational intervention at changing attitudes towards dating violence. As a manipulation check, we investigated whether the psychoeducational intervention improved attitudes towards dating violence. We hypothesized that the participants in the psychoeducational intervention would show an improvement in attitudes towards dating violence (specifically, they would show a

decrease in attitudes that *condone* dating violence) from baseline (before the intervention) to follow-up (after the intervention).

Aim 2. To assess the effectiveness of the MBST intervention at increasing mindfulness skills. As a manipulation check, we investigated whether the MBST intervention improved mindfulness skills. We hypothesized that participants in the MBST intervention would increase mindfulness skills from baseline (before the intervention) to follow-up (after the intervention). Specifically, we hypothesized that participants in the MBST intervention would increase their ability to observe, describe, accept without judgment, and act with awareness.

Aim 3. To assess the effectiveness of the MBST intervention at improving emotion regulation. As a manipulation check, we investigated whether the MBST intervention improved emotion regulation. We hypothesized that participants in the MBST intervention will improve emotion regulation skills from baseline (before the intervention) to follow-up (after the intervention). Specifically, we hypothesized that participants in the MBST intervention would improve their emotional awareness, emotional clarity, acceptance of emotional responses, impulse control, access to emotion regulation strategies, and ability to engage in goal-directed behavior.

Aim 4. To evaluate the effectiveness of the MBST intervention (treatment) and psychoeducational intervention (active control) at reducing the perpetration of dating violence (physical, sexual, and psychological).

    Aim 4a. To assess the effectiveness of the psychoeducational intervention at reducing the perpetration of dating violence. Before comparing the effectiveness of the interventions against one another, we first planned to assess each intervention

individually. We hypothesized that the psychoeducational intervention would reduce dating violence perpetration (physical, psychological, and sexual) from baseline (before the intervention) to follow-up (after the intervention); however, given the evidence that psychoeducational interventions are largely ineffective we did not expect the reduction to be statistically significant.

Aim 4b. To assess the effectiveness of the MBST intervention at reducing the perpetration of dating violence. We hypothesized that the MBST intervention would significantly reduce dating violence perpetration (physical, sexual, and psychological) from baseline (before the intervention) to follow-up (after the intervention).

Aim 4c. To assess the effectiveness of the MBST intervention compared to a psychoeducational intervention (active control) at reducing the perpetration of dating violence. We hypothesized that the MBST intervention will be more effective at reducing dating violence perpetration (physical, sexual, and psychological) as compared to the psychoeducational intervention.

Methods

Participants

100 participants were recruited through Kent State University's online subject pool. Sample size was determined using G*Power3 (Faul, Erdfelder, Lang, & Buchner, 2007). Ninety-one participants completed the initial baseline assessment, and three participants were excluded from the rest of the study for not meeting inclusion criteria (see below; 2 indicated being single, 1 indicated being married). Thus, this study reports on the remaining 88 participants' data.

To be eligible, participants were required to be over the age of 18, in a current dating relationship (of 6 months or longer) and were required to confirm that they had *not* been

diagnosed with psychopathology (Major Depressive Disorder, Post-Traumatic Stress Disorder, Borderline Personality Disorder). At baseline, participants did not differ between assigned treatment groups based on age, ethnicity, gender, depression, anxiety, externalizing behavior problems, or substance use.

Furthermore, only one member of the dating couple could participate in the study. To address issues surrounding contamination, participants were reminded throughout the course of the study that they could not discuss the intervention with anyone (except their romantic partner) until the end of the study.

Data collection was conducted online (except for the first two homework assignments which were handed in using paper copies, used for compliance data; see Data and Safety Monitoring Plan for details surrounding homework collection). Participants were asked to complete online surveys in private, though they could choose where that was (e.g., dorm room or elsewhere). The actual intervention took place on Kent State University's campus, specifically classrooms in Kent Hall (rooms 60, 102, 145, and 167). This study was approved by Kent State University's Institutional Review Board.

Trial design

This study utilized a two-armed, parallel-design. The allocation ratio was 1:1. The treatment group was the MBST intervention and the active control group was the psychoeducational intervention.

Participants were recruited to complete a baseline assessment, an intervention portion (consisting of three 50-minute sessions with homework in-between sessions), a seven-day daily diary, and a follow-up assessment. All participants completed the initial baseline assessment the fourth week of classes. During this assessment, data was collected on demographics, dating

violence (during the past month), emotion regulation, mindfulness skills, attitudes condoning dating violence, and other potential covariates (relationship length, relationship satisfaction, externalizing behavior problems, anxiety, depression, substance use, use of mindfulness practices in the past month, social desirability).

Following this baseline assessment, participants were randomized into either (1) the MBST intervention or (2) the psychoeducational intervention. Each intervention consisted of three 50-minute sessions that occurred during the sixth, seventh, and eighth week of the semester. In-between sessions all participants were asked to complete homework. Homework assignments were turned in the following week, with the final homework assignment being completed online as part of the first daily diary (since participants did not meet physically the week following the final session). There were two semesters of data collection total. All intervention sessions occurred at the same time (6:00 – 6:50 PM) on Tuesday nights. Conditions were counter balanced with graduate students leading the sessions, social support of groups, and homework. We attempted to counter balance based on room location, but the availability of rooms changed between semesters. However, no treatment condition was given in the same room twice and rooms were selected to be as similar as possible (number of desks, void of windows, etc.).

The week following the final intervention session, participants completed a seven-day daily diary assessment. During this assessment, participants in the MBST intervention were asked to report whether they had used any of the skills learned in the intervention (see below for detailed information on skills), and to describe what happened when they used the skill(s) (who they were with, if it helped, etc.). To balance the conditions, participants in the psychoeducation intervention were asked to indicate whether they had seen any examples of dating abuse in the

media that day. If they had, they were asked to describe who the victim, target, and bystanders were in each example.

Eleven weeks after the baseline assessment, all participants completed the follow-up assessment. During this assessment, participants completed another battery of assessments. Self-reported data was collected on dating violence (during the last month), attitudes condoning dating violence, emotion regulation, and mindfulness skills. The entire protocol carefully followed the CONSORT statement guidelines.

Interventions

Mindfulness-Based Skills Training (MBST) intervention. Some traditional mindfulness-based interventions teach mindfulness through the practice of meditation. However, the goal of this intervention was to teach students how to be mindful in a specific situation: when resolving conflict with their romantic partners. Thus, this intervention took a more "mindfulness applied" approach. The previously mentioned skills of observing one's own internal experiences and sensations, accepting one's own internal experience without judgment, being able to describe one's experience by putting it into words, and acting with awareness were still the basis for this intervention. However, these skills were taught in a "user-friendly" format that is specific to the context of resolving conflict with one's romantic partner. This format helped students learn how to mindfully become aware of when they were experiencing emotionally charged states, how to calm themselves down through mindful breathing, to put their experience into words, and to act with awareness as they communicated with their partners in a healthy and mindful way. The skills followed the "ABCDE" acronym. ABCDE stands for **a**wareness, **b**reathing, **c**hecking in with your feelings and thoughts, **d**escribing your experience, and **e**xpressing what you want to change. A variety of skills taught in the ABCDE intervention (paced breathing, observing

feelings, observing thoughts, decentering) are used in a variety of other skills trainings such as Dialectical Behavioral Therapy and Acceptance and Commitment Therapy (Linehan, 2014; Luoma, Hayes, & Walser, 2007). An advanced PhD student led the sessions, but the curriculum is designed so that anyone (teacher, staff member, etc.) can deliver it. Below is a brief description of what was included in each session (see appendices for detailed training manual).

Session 1. At the beginning of the session, students were informed that they would be learning skills to improve the quality of their romantic relationships. Specifically, they would be learning skills to manage conflict in their relationships. Students briefly discussed unhealthy tactics (e.g., calling your partner names, hitting your partner) versus healthy tactics (e.g., remaining calm, using your words to communicate) for managing conflict in romantic relationships. During this portion, participants were purposely given some overlapping information from the psychoeducational intervention to address possible demand characteristics (e.g., examples of unhealthy tactics such as "calling your partner names" and being told that these unhealthy tactics can lead to anxiety and depression). Following that, they were informed that sometimes people use unhealthy tactics in their romantic relationships when they are "overtaken" by emotions. They were then told that the purpose of the intervention is to give them the skills they need to go from automatically reacting to consciously responding during conflict with their partners. They were then introduced to the first skill: **a**wareness. This skill taught them how to observe their own internal experiences and sensations (in the specific context of conflict with their romantic partner). They were informed that if they can become aware of their bodies responding to emotionally charged states, it can serve as a warning sign that they might be in danger of engaging in unhealthy tactics. After learning about "awareness" they had a chance to practice it. They were then introduced to the **b**reathing skill which helps them to calm down after

they have noticed that they are getting overwhelmed with emotions. Specifically, they learned about the benefits of paced breathing (a technique where the exhale is longer than the inhale) and were given time to practice it. After a brief review of the A and B skills, students were given their homework (to practice awareness and breathing, and to fill out a worksheet about their experience practicing those skills).

 Session 2. At the beginning of the session, students briefly discussed their reactions to last week's homework. After reviewing the A and B skills, they were introduced to the C skill: <u>c</u>hecking in with their feelings and thoughts. This skill taught them how to accept their own internal experience without judgment and to describe their experience by putting it into words. They were informed that checking in with their feelings and thoughts would help them gain clarity and insight into the emotions they feel, as well as any thoughts surrounding those emotions. They were instructed to curiously ask themselves "What am I feeling?" and to answer it as if they were observing themselves from a distance. They were informed that this practice (which captures decentering) would help them to see the situation more objectively and would give their feelings less power over them. Indeed, observing and labeling feelings in this way decreases the intensity and duration of the emotions. They were given examples of how to check in with their feelings and then were given time to practice. Then they extended the practice to thoughts that they might be having using the same mindset (nonjudgmentally observing, as if from a distance). They were asked to observe their thoughts by making statements such as "I had the thought that my partner didn't care about me" instead of "My partner didn't care about me." They were given examples of how to check in with their thoughts, and then were given time to practice. Students then briefly reviewed the ABC skills and were given their homework (to

continue practicing awareness and breathing, but to also check in with their feelings and thoughts at least three times that week and to complete a worksheet about it).

Session 3. At the beginning of the session, students briefly discussed their reactions to last week's homework. After reviewing the A, B, and C skills, they were introduced to the D skill: **d**escribing their experience. Like the C skill, the D skill also taps into the skill of being able to describe their experience by putting it into words, but this time they were describing it to their partners (instead of themselves). Furthermore, they were taught to do this by acting with awareness. They were informed of the importance of describing their experience to their partner, since it is impossible for their partners to know what they are thinking and feeling. They were informed that "describing your experience" would help their partners to understand the issue at hand so they could address it effectively. They were told that when they are describing their experience they should (1) describe what sparked the conflict (focusing on behaviors), (2) describe the thought they had (while remaining objective and calm), and (3) describe how it made them feel (while remaining objective and calm). Examples were given and students had the chance to practice.

Next, they were introduced to the E skill: **e**xpressing what they want to change. They were instructed to try and act with awareness as they communicate with their partners. They were told that the goal is to clearly communicate what they want to change moving forward. They were instructed to do this with awareness by focusing on specific behaviors, being reasonable, respectful, calm, and focusing on the issue at hand (remaining in the present). They were be told to remain open to their partner's thoughts and feelings and to be open to compromise. They then worked through examples. Students reviewed all the ABCDE skills and were given their homework (to continue with the ABC skills, but to also describe their

experiences to their partners and to express what they want changed at least twice that week and to complete a worksheet about it).

Psychoeducational intervention. The Love is Not Abuse (LINA) curriculum (Liz Claiborne Education Development Center (n.d.)) was used as the psychoeducational treatment. The curriculum was created in conjunction with a variety of organizations (e.g., Break the Cycle, the National Network to End Domestic Violence). The curriculum can be modified depending on the time frame available; each section can be used on its own, or different pieces of information from each section can be put together to be conducted in just one session. The selected materials covered (a) what dating abuse[1] is (b) the pattern of abuse and (c) technology and dating abuse. The curriculum is interactive and includes handouts, activities, and discussion. Materials were selected based on what could feasibly be implemented within three 50-minute sessions. Portions that were excluded are as follows: a portion that informs students how they can intervene to help a friend or family member who is being abused, a portion that informs students how they can intervene to help a friend or family member who is abusing, discussing obstacles that young adults face in seeking help (e.g., not wanting to lose social status that might come with the relationship), reading a poem about the cycle of dating abuse to identify phases in the cycle, and discussing password-sharing and sexting as ways students use to show intimacy and trust in a relationship. An advanced PhD student lead the sessions, but the curriculum was designed so that anyone (teacher, staff member, etc.) would be able to deliver it. Below is a description of what was included in the intervention (see appendices for full intervention materials)

Session 1. During the first session (What is Dating Abuse?), students were introduced to the program and were given ground rules for the session (e.g., no question is stupid or wrong; no

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[1] Here, we use the term "abuse" as that is the terminology used in the LINA program. While "dating violence" is used throughout the paper, we maintain the word "abuse" in order to maintain the program's fidelity.

put downs are allowed). Then students were introduced to what dating abuse is and they identified the different forms of dating abuse after reading a narrative script of two individuals in an abusive relationship. Students were given definitions for the roles of the abuser, target, and bystander. Finally, there was a discussion of ways to increase their own safety in a dating relationship. At the end of the session students were given their homework assignment (to define the different types of dating abuse, to give examples, and to identify examples of dating abuse they have seen in the media).

Session 2. During the second session (The Pattern of Abuse in Dating Violence & Abuse), students discussed the pattern of abuse that occurs in some (but not all) dating relationships. They read a text that illustrated the phases of dating abuse and were asked to identify key components of the different phases. They also identified possible warning signs in dating relationships. At the end of the session students were given their homework assignment (to define the different stages in the cycle abuse, to explain each stage in their own words, to define warning signs in a relationship, and to provide examples).

Session 3. During the final session (Technology and Dating Abuse), students discussed how abuse can manifest itself through technology. They read a text that illustrated dating abuse through technology and were asked to identify key components of the phases of abuse (but this time including the use of technology). Then students reviewed steps to take to help a friend dealing with digital dating abuse. Finally, students reviewed steps for increasing their safety in abusive dating relationships and were given information on resources on and near campus.

Measures

Baseline: Potential covariates.

Age, ethnicity, and relationship length. Participants self-reported their age, ethnicity, and length of relationship using a Sociodemographic Questionnaire (SDQ)**.**

Relationship satisfaction. To assess relationship satisfaction, participants completed the Relationship Assessment Scale (RAS; Hendrick, 1988). This measure asked participants to answer seven questions on a five-point Likert scale. Example items include "How well does your partner meet your needs?", "How good is your relationship compared to most?", and "How often do you wish you hadn't gotten into this relationship?" Negative items were reverse scored, and a total unitary score was created by averaging all items such that higher scores indicate more satisfaction in the relationship. This measure demonstrates adequate test-retest reliability ($\alpha =$ 0.85) as well as concurrent and discriminant validity (Hendrick, 1998).

Externalizing behavior problems, anxiety, depression, substance use. We assessed externalizing behavior problems, anxiety, depression, and substance use because they are all risk factors for the perpetration of dating violence (see Capaldi et al., 2012 for a review). To do this, we used the Adult Self-Report (ASR; Achenbach & Resclora, 2003). This self-report measure assessed psychological functioning using two broadband scales: externalizing behavior problems and internalizing behavior problems. Within each broadband scale are narrowband scales. For this study, we utilized the broadband externalizing behavior problems scale which contains 35 items that assess aggressive behavior (e.g., "I get in many fights"), rule-breaking behavior (e.g., "I use drugs (other than alcohol and nicotine) for nonmedical purposes"), and intrusive behavior (e.g., "I am louder than others"). We also utilized narrowband scales from the internalizing behavior scale to measure anxiety and depression. The anxiety subscale contained seven items (e.g., "I worry a lot"). The depression subscale contained 12[2] items (e.g., "I cry a lot"). Items

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[2] The depression subscale contains 14 items, but we had to exclude two items ("harms self" and "thinks suicide") per our Institutional Review Board's request. Thus, our scale contained only 12 items.

were assessed on a 3-point Likert scale (0 = not true, 1 = somewhat or sometimes true, 2 = very often or often true). Additionally, to assess substance use we used items that assess how many times per day they used tobacco in the past six months, how many days they have been drunk in the past six months, and how many days they used drugs in the past six months. A total score was computed by averaging raw scores for tobacco use, alcohol use, and drug use. This self-report measure is widely used to assess psychopathology and substance use and has demonstrated adequate reliability and validity (Achenbach & Resclora, 2003).

Attitudes condoning dating violence. To assess attitudes condoning dating violence, participants completed the Intimate Partner Violence Attitudes Scale-Revised (IPVAS-R; Fincham, Cui, Braithwaite, & Pasley, 2008). This measure asks participants to indicate how strongly they agree or disagree with a series of 17 statements on a five-point Likert scale (1 = Strongly disagree, 5 = Strongly agree). There are three subscales: abuse (e.g., "During a heated argument, it is okay for me to bring up something from my partner's past to hurt him or her"), control (e.g., "It is okay for me to tell my partner not to talk to someone of the opposite sex"), and violence [e.g., "It would never be appropriate to hit or try to hit one's partner with an object" (reverse scored)]. A total score was derived by averaging all items. Higher scores indicate attitudes that condone dating violence. This measure demonstrates adequate test-retest reliability as well as concurrent and predictive validity (Fincham, Cui, Braithwaite, & Pasley, 2008). This scale was assessed at baseline (potential covariate) and at follow-up as an outcome measure (manipulation check, Aim 1).

Use of mindfulness practice. To assess how familiar participants were with mindfulness-based practices, we assessed how often they engaged in a variety of practices over the past month. For example, participants were asked "Have you ever practiced meditation?" If they

indicate they had, they were then asked, "How many times in the past month have you practiced meditation?" We used this format to assess use of meditation, yoga, and deep breathing.

Social desirability. To assess social desirability (which may impact participants' self-reporting biases), the Marlowe-Crowne Social Desirability Scale was used (Crowne & Marlowe, 1960). Participants were asked to quickly respond to 33 True/False item such as "Before voting I thoroughly investigate the qualifications of all the candidates" and "If I could get into a movie without paying and be sure I was not seen, I would probably do it" (reverse scored). Every time a participant indicated "true", his/her score increased by one point. All items were summed, with higher scores indicating a greater concern with social approval. This scale demonstrates good internal consistency and ($\alpha = 0.88$) test-retest reliability over a one-month period ($\alpha = 0.89$) (Crowne & Marlowe, 1960).

Intervention Sessions: Homework/Compliance.

MBST intervention. To assess compliance with the intervention, we collected data on whether participants in the MBST condition completed and handed in their homework. For the MBST intervention, 24 participants attended every single session and completed every single homework assignment.

Psychoeducational intervention. To assess compliance with the intervention, we collected data on whether participants in the psychoeducational condition completed and handed in their homework. For the psychoeducational intervention, 26 participants attended every single session and completed every single homework assignment.

Daily Diary: Application of Knowledge and Skills.

MBST intervention group's use of ABCDE skills. To assess if participants were using the skills taught in the intervention, participants were asked every day for seven days about whether they used the A, B, C, D, and/or E skill.

Psychoeducational intervention group's identification of dating abuse. To counterbalance the time spent completing daily diaries, the psychoeducational intervention group also completed a seven-day daily diary that asked whether they had seen examples of dating abuse in the media and to describe who was the bystander, target, and abuser in each example. See appendix for full survey.

Follow-up: Outcome variables.

Dating violence. The Conflict in Adolescent Dating Relationships Inventory (CADRI, Wolfe et al., 2001) was used to assess dating violence perpetration. This measure assesses dating violence that has occurred over the past month. There are five subscales that assess physical abuse, sexual abuse, verbal or emotional abuse (to assess psychological dating violence), threatening behavior, and relational aggression. There are also 10 items that assess conflict resolution behaviors to add balance. The CADRI has demonstrated adequate reliability, validity, and inter-partner agreement (Wolfe et al., 2001) and has been used in college samples in previous works (e.g., Roudsari, Leahy, & Walters, 2009; van Dulmen, Mata, & Klipfel, 2012). This measure was also used at baseline (to control for initial levels of dating violence).

Mindfulness skills. To assess mindfulness skills, participants completed the Kentucky Inventory of Mindfulness Skills (KIMS; Baer, Smith, & Allen, 2004). This measure has a total of 39 items with four subscales that map onto our conceptualization of mindfulness: observing (e.g., I notice when my moods begin to change), describing (e.g., I'm good at finding the words to describe my feelings), accepting without judgment [e.g., I criticize myself for having irrational or

inappropriate emotions (reverse scored)], and acting with awareness (e.g., When I'm doing something, I'm only focused on what I'm doing, nothing else). Participants rated each statement on a 5-point Likert scale (1 = never or very rarely true, 5 = almost always or always true). Items that describe the absence of the component of mindfulness were reverse scored. This scale has demonstrated good internal consistency, test-retest reliability, and validity (Baer et al., 2004). Mindfulness skills were also assessed at baseline (to control for initial levels of mindfulness skills). These scales demonstrated fair to good internal consistency for observing at baseline ($\alpha =$ 0.80) and follow-up ($\alpha = 0.90$), describing at baseline ($\alpha = 0.88$) and follow-up ($\alpha = 0.84$), accepting without judgment at baseline ($\alpha = 0.86$) and follow-up ($\alpha = 0.93$), and acting with awareness at baseline ($\alpha = 0.76$) and follow-up ($\alpha = 0.73$).

Emotion regulation. We assessed emotion regulation using the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004). This scale asked participants to indicate how often a series of items applies to them (36 items total), rated on a 5-point scale (1 = almost never, 2 = sometimes, 3 = about half of the time, 4 = most of the time, 5 = almost always). The six subscales are: lack of emotional awareness [e.g., "When I'm upset, I take time to figure out what I'm really feeling" (reverse scored)], lack of emotional clarity (e.g., "I have difficulty making sense out of my feelings"), nonacceptance of emotional responses (e.g., "When I'm upset, I become angry with myself for feeling that way"), impulse control difficulties (e.g., "When I'm upset, I lose control over my behaviors"), limited access to emotion regulation strategies (e.g., "When I'm upset, believe that wallowing in it is all I can do"), and difficulties engaging in goal-directed behavior (e.g., "When I'm upset, I have difficulty thinking about anything else"). Higher scores indicate more difficulties with emotion regulation. Emotion regulation was also assessed at baseline (to control for initial levels of emotion regulation).

Potential contamination. At the end of the study, all participants were asked whether they spoke to other students about their treatment condition (yes/no). Four participants indicated they discussed their treatment condition with other students.

Potential threat to non-independence of data. Participants were also asked to indicate whether their romantic partner participated in the same research study (yes/no). No participants indicated that their partner also participated in the study.

Participants' belief about treatment assignment. At the end of the study, all participants were asked whether they believed they were in the treatment group or the control group.

Analysis Plan

Preliminary analyses. We first conducted bivariate analyses to investigate whether participants who dropped out of the study differed from those who remained in the study on key characteristics. To do this, we created a variable that indicated whether a participant had dropped out of the study and used that variable to investigate associations with age, ethnicity, relationship length, relationship satisfaction, externalizing behavior problems, anxiety, depression, substance use, attitudes condoning dating violence, use of mindfulness, and social desirability at baseline. If the drop out variable was associated with any of the potential covariates, we included the covariate(s) in all subsequent analyses.

We then investigated the associations between potential covariates and each individual outcome. If a potential covariate was significantly associated with an outcome ($p < .05$), we included it in subsequent analyses. For example, we first investigated whether "attitudes condoning dating violence" at follow-up (IPVAS – R, Aim 1 outcome) was associated with age, ethnicity, relationship length, relationship satisfaction, externalizing behavior problems, anxiety,

depression, substance use, attitudes toward dating violence, use of mindfulness, and social desirability at baseline. If "attitudes condoning dating violence" was associated with any of the covariates, we controlled for them in my Aim 1 analyses. We then repeated for the rest of the aims (Aim 2; each subscale of mindfulness skills, Aim 3; each subscale of emotion regulation; Aim 4; dating violence)[3].

Furthermore, we investigated differences between treatment groups based on age, gender, attitudes, mindfulness skills, emotion regulation, and levels of dating violence perpetration at baseline for descriptive purposes.

Aim 1. To assess whether participants in the psychoeducational intervention improved their attitudes condoning dating violence [IPVAS – R] (a manipulation check), we examined mean differences using a paired t-test with covariates in Mplus (Muthén & Muthén, 2007). This technique also allows us to use the FIML estimator within Mplus and to intercorrelate covariates (e.g., anxiety and depression). Please note this analysis only included participants who were assigned to the psychoeducational intervention (and did not include those in the MBST intervention). Please note that a *decrease* in means indicates improvement, as higher scores on the IPVAS – R indicate attitudes that *condone* dating violence.

Aim 2. To assess whether participants in the MBST intervention improved their mindfulness skills (a manipulation check), we examined mean differences paired t-test with covariates. These tests compared the means of mindfulness skills at baseline to the mean of mindfulness skills at follow-up, controlling for covariates identified in preliminary analyses. Please note this analysis only included participants who were assigned to the MBST intervention

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[3] One potential concern with this analysis plan is that covariates depend on the outcome of interest, so differences in results may be due to differences in covariates included. To address this, we ran analyses with and without the unique covariates; findings remained the same.

(and did not include those in the psychoeducational intervention). Tests were run individually for all four subscales [observing (KIMS – OB), describing (KIMS – DE), acting with awareness (KIMS – AW), acceptance without judgement (KIMS – AC)].

Aim 3. To assess whether participants in the MBST intervention improved their emotion regulation (a manipulation check), we examined mean differences using paired t-tests with covariates. These tests compared the means of emotion regulation subscales at baseline to the mean of emotion regulation subscales at follow-up, controlling for covariates identified in preliminary analyses. Please note this analysis only included participants who were assigned to the MBST intervention (and did not include those in the psychoeducational intervention). Tests were run individually for all six subscales (lack of emotional awareness [DER – EA], lack of emotional clarity [DER – EC], nonacceptance of emotional responses [DER – NE], impulse control difficulties [DER – IC], limited access to emotion regulation strategies [DER – ER], and difficulties engaging in goal-directed behavior [DER – DE]). Please note that a *decrease* in means indicates improvement, as higher scores on the Difficulties in Emotion Regulation Scale indicate more problems with emotion regulation.

Aim 4a. To assess whether participants in the psychoeducational intervention reduced dating violence perpetration from baseline (before the intervention) to follow-up (after the intervention) we examined paired t-tests with covariates. These tests compared the mean of dating violence perpetration at baseline to the mean of dating violence perpetration at follow-up, controlling for covariates identified in preliminary analyses. Please note this analysis only included participants who were assigned to the psychoeducational intervention (and did not include those in the MBST intervention). Please also note analyses were run separately for each type of dating violence (physical, sexual, psychological).

Aim 4b. To assess whether participants in the MBST intervention reduced psychological dating violence perpetration from baseline (before the intervention) to follow-up (after the intervention) we examined mean differences using paired t-tests with covariates. These tests compared the mean of dating violence perpetration at baseline to the mean of dating violence perpetration at follow-up, controlling for covariates identified in preliminary analyses. Please note this analysis only included participants who were assigned to the MBST intervention (and did not include those in the psychoeducational intervention). Please also note analyses were run separately for each type of dating violence (physical, sexual, psychological).

Aim 4c. We used a regression framework to investigate the effectiveness of the MBST intervention at reducing dating violence perpetration as compared to the psychoeducational intervention. We chose to run my analyses within a regression framework in Mplus as this allowed for intercorrelations among predictors (e.g., anxiety and depression were included as covariates so we could account for their intercorrelation) and the use of FIML to handle missing data. We used dummy coding to create a variable to differentiate treatment groups. Within a regression framework, we used this dummy-coded variable to predict our outcome (dating violence). We controlled for baseline levels of dating violence perpetration and included other covariates based on preliminary analyses. This analysis, as compared to the analyses for Aims 1 – 3, included participants from both groups. Please also note analyses were run separately for each type of dating violence (physical, sexual, psychological).

Intent to treat analyses. As guided by the Consolidated Standards of Reporting Trials (CONSORT; Schulz, Altman, & Moher, 2010), the number of participants in each group were analyzed according to the intent-to-treat (ITT) principle. ITT is a collective strategy for design, conduct, and analysis in which all participants who are randomized to a group are treated as if

they complied with their assigned treatments (Gupta, 2011). Most likely, not all participants will comply with their assigned treatments and missing data will be an issue. To ensure a conservative estimate of treatment effects (and to avoid confounds of patient characteristics with treatment allocation) ITT analyses were used. We planned to report information on participants who deviated from their random allocation treatment, but no participants deviated into another group. We also reported information on missing data. Specifically, according to CONSORT guidelines we reported "numbers analysed" (number of participants included in each analysis and whether the analysis was by original assigned groups; Schulz, Altman, & Moher, 2010, p. 727).

Missing data. We used full information maximum likelihood (FIML) to handle missing data. FIML is superior to other traditional approaches, such as listwise deletion, as it uses all available information in all observations instead of deleting observations due to missing values (Muthén & Muthén, 2007). Furthermore, as described above, we conducted analyses to investigate if participants who dropped out of the study differed systematically from those who remained in the study. Key characteristics were identified and were controlled for in all analyses.

Randomization. Following baseline data collection, all participants were randomly assigned (see information on blinding below) to either the MBST intervention or the psychoeducational intervention. Randomization represents best practices in research and aims to ensure that each participant is no more likely than the next to be assigned to a particular group. Specifically, we used restricted random allocation to ensure equally-sized groups. To do this the lab coordinator gave the co-PI fake participant IDs for the semester in an excel spreadsheet (e.g., a list of 50 participants with IDs such as 134, 258, 250, 350). The co-PI randomly selected half of the fake participant IDs to be assigned to one group and another half to be assigned to the

other group. The co-PI then gave the list back to the lab coordinator who paired the fake participant IDs with the real participant IDs. The lab coordinator then randomly assigned each group to a condition. This procedure was repeated for each semester. The co-PI did not see any real participant IDs until all data collection was completed and the co-PI did not know which participant IDs or numbers corresponded to which treatment group until all analyses were finished.

Blinding. While randomization is one important step in minimizing bias, randomization alone does not solve all issues of bias. Another important factor to consider is blinding, which refers to "the concealment of group allocation from one or more individuals involved in a…randomized controlled trial." (Karanicolas, Farrokhyar, & Bhandari, 2010, p. 345) If a member of the research team (who is also aware of the hypotheses) knows which participants are assigned to which groups, it can lead to bias throughout the process. For example, a researcher may treat an individual in one treatment group (in this case, the MBST intervention) differently as compared to a participant in another group (the psychoeducational intervention) and this might influence the participants to behave in a way that is in line with the researcher's hypotheses during assessments. Bias can also be introduced later on in the research process during data analysis. If a researcher knows which group is hypothesized to perform better, the researcher may selectively report results of statistical tests. Therefore, it is critical to blind the researchers throughout as much of the process as possible.

To reduce bias, a few steps were taken (some of which were already mentioned above). First, the co-principal investigator did not see any participant names/emails throughout the data collection process. All participants completed assessments online using their email addresses. A separate researcher (lab coordinator) downloaded the data and assigned participant IDs to the

participants based on their email addresses. The lab coordinator then deleted the email addresses from the data files before the co-principal investigator ever had a chance to look at them. The co-principal investigator then randomized participants' fake IDs using excel (see process described above). Following that, the co-principal investigator gave the lab coordinator the list of fake participant IDs who have been assigned to equal groups. The lab coordinator then paired the fake IDs with the real IDs and randomly assign groups to treatment conditions. The values of corresponding conditions were not be shown to the co-principal investigator until all data has been collected and all analyses have been conducted. Additionally, the lab coordinator sent and responded to all participant emails as to keep the co-principal investigator blind during this process as well (since IDs were matched to email addresses). The same process for deleting email addresses and assigning participant IDs was conducted at follow-up.

During the actual intervention, the co-principal investigator was not allowed to handle any intervention materials, as to keep her blinded from IDs. However, as the co-principal investigator was part of the actual intervention it must be acknowledged that she was not fully blinded throughout this process.

During data analysis, precautions were made to keep the co-principal investigator blind as well. As stated above, all analyses were determined a-priori. Therefore, the co-principal investigator could not selectively test and/or report analyses but reported as stated in the document. As previously mentioned, when running analyses with the dummy coded variables the co-principal investigator did not know which number corresponded to which treatment group. The value of the groups was not revealed to her until all analyses were conducted.