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A randomized controlled trial testing Couple HOPES: An online, self-help couples' intervention for posttraumatic stress disorder

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from providing trainings for this treatment and related interventions. Dr. Monson owns equity in Nellie Health, an online mental healthcare company. Drs. Fitzpatrick and Wagner also provide for-profit trainings for the treatment of posttraumatic stress disorder and related conditions.
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Abstract

Objective: This manuscript presents a randomized waitlist controlled trial testing Couple HOPES, a coach-guided, online intervention for couples wherein one member had posttraumatic stress disorder (PTSD) symptoms. Aims involved examining whether Couple HOPES resulted in greater improvements in PTSD symptoms, relationship satisfaction, and secondary outcomes compared to a waitlist, whether outcomes were maintained over a three-month follow-up, and whether outcomes differed if PTSD was COVID-related.

Method: Sixty-seven couples were recruited, where one partner met criteria for likely PTSD and was either a Military Member, Veteran, First Responder, healthcare worker, and/or whose PTSD symptoms were related to COVID. Couples were randomized to receive Couple HOPES immediately or after eight weeks. Outcomes were measured at the beginning, middle, and end of Couple HOPES/the waiting period, and one and three-months after Couple HOPES. Measures of PTSD and relationship satisfaction were also completed during each of seven modules.

Results: Intent-to-treat analyses showed greater improvements in self- and informant-reported PTSD in those receiving Couple HOPES relative to waiting, with large and medium effect sizes, respectively. Partners without PTSD symptoms reported greater improvements in relationship satisfaction in Couple HOPES compared to the waitlist with a small effect size, but people with PTSD symptoms did not. Uncontrolled follow-up showed reversion of gains in some outcomes. Whether PTSD was COVID-related did not significantly moderate outcomes.

Conclusions: Findings support the efficacy of this low-cost, scalable intervention for improving PTSD, regardless of the means through which it was acquired (COVID-related or not). Further testing with larger sample sizes is needed.

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Keywords: Posttraumatic stress disorder; military; COVID-19; randomized controlled trial; digital mental health intervention; self-help intervention

Public Health Significance: Couple HOPES (a brief, online, coach-guided couple intervention for PTSD) resulted in greater improvements in PTSD symptoms, compared with waiting, in a sample of Military Members, Veterans, First Responders, healthcare workers, and those with COVID-related PTSD symptoms. Romantic partners also showed greater improvements in relationship satisfaction after receiving Couple HOPES, and outcomes did not significantly differ if symptoms were COVID-related. These findings suggest that Couple HOPES may be a low cost, accessible, and low burden means of reducing PTSD for those with a range of trauma histories.

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Posttraumatic stress disorder (PTSD) is a chronic debilitating disorder that develops in response to exposure to a traumatic event (APA, 2022), and is linked to numerous adverse mental health outcomes, including impairments across a range of functioning domains (Jellestad et al., 2021). Military Members, Veterans, and First Responders (MMVFR) are particularly vulnerable to PTSD, perhaps due to frequent occupational exposure to traumatic events (Walker et al., 2016), and MMVFR with PTSD exhibit poorer overall responses to treatment compared to civilians (e.g., Straud et al., 2019). PTSD is also associated with elevated levels of impaired intimate relationship functioning, relationship aggression, and conflict, with MMVFR populations being particularly impacted (e.g., Taft et al., 2011). In turn, impaired intimate relationship functioning is associated with PTSD development and exacerbation, and worse PTSD treatment outcomes (e.g., Wagner et al., 2016). Improving intimate relationship functioning may therefore be essential to promote optimal PTSD recovery, particularly in MMVFR, who also tend to prefer that their families are involved in their treatment (Rando & Thompson-Hollands, 2022).

Conjoint PTSD interventions

Linkages between PTSD and relationship functioning led to the development of dyadic interventions to target both PTSD symptoms and relationship functioning. One such intervention is Cognitive-Behavioral Conjoint Therapy (CBCT) for PTSD (Monson & Fredman, 2012), a 15-session therapy delivered simultaneously to people with PTSD and their intimate partners. In a systematic review of 14 studies evaluating CBCT, 66% of patients no longer met PTSD status following treatment (Liebman et al., 2020). Although results were mixed regarding changes in relationship satisfaction, those with lower baseline satisfaction may be particularly likely to

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improve in satisfaction (Shnaider et al., 2015). These findings suggest CBCT results in improvements to PTSD comparable to first line PTSD interventions, with possible added benefits of improved relationships. However, CBCT and other evidence-based psychotherapies for PTSD are difficult to access due to myriad barriers including geography, cost, and stigma (Kazdin & Blase, 2011). Moreover, conjoint interventions such as CBCT may face additional access issues as several jurisdictions require specific credentialing in couple therapy practices to administer it.

Couple HOPES

In response to such access barriers, our team developed Couple HOPES (Helping Overcome PTSD and Enhance Satisfaction; www.couplehopes.com; Monson et al., 2021), an online, coach-guided couple intervention adapted from CBCT (Monson & Fredman 2012). Couple HOPES involves seven interactive modules derived from CBCT, access to a paraprofessional coach, and out-of-module practice assignments. In a case series of 10 couples (Fitzpatrick et al., 2021) and uncontrolled trial of 17 couples (Monson et al., 2022) wherein one member was an MMVFR with elevated PTSD symptoms (referred to as the PTSD+ partner), Couple HOPES resulted in significant medium to large (g = .80 and .72, respectively) pre- to post-intervention improvement in self-reported PTSD symptoms and small to medium (g = .68 and .34, respectively) improvement in relationship satisfaction for the partner without PTSD (PTSD- partners). Neither study found significant improvement in informant-reported PTSD symptoms or PTSD+ partners' relationship satisfaction. The uncontrolled trial also found improvements in partner symptom accommodation (i.e., behaviors that seek to mitigate or manage the PTSD+ partners' symptoms; Fredman et al., 2014) and the PTSD+ partner's argumentativeness and depression. Improvements in self-reported PTSD symptoms, argumentativeness, and partner symptom accommodation, but not partner relationship satisfaction or PTSD+ partner's depression, held over 1-month follow-up.

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A subsequent analysis of both samples for tertiary outcomes also revealed significant and sustained improvements in partner reports of conflict, anxiety, perceived health, and quality of life (Crenshaw et al., 2022). Finally, a recent study in the VA piloted a more intensive version of Couple HOPES, given higher chronicity and severity among veteran populations, by combining it with 30-minute telemental health sessions following each module (Morland et al., 2024). In 15 US veterans and their intimate partners, the study found significant small improvement in veterans' PTSD symptoms (self- and partner-report, *g*s = .38 and .40, respectively) and in both partners' relationship satisfaction (*g*s = .26 and .30). These findings suggest Couple HOPES has promise for improving PTSD and related outcomes, although long term improvement is unclear.

Although these results are encouraging, it is unclear whether improvements are related to the intervention, the passage of time, or repeated assessment, and whether gains are maintained past one month. Given the lack of an established comparable program, and consistent with stage models of behavioral health intervention (e.g., Onken et al., 2014), the next stage is to conduct a waitlist controlled trial prior to more resource-intensive designs using an active control. Other studies of digital couple interventions found significant small improvements in relationship functioning in a waitlist group (Doss et al., 2016), so this design is expected to account for natural remission and regression to the mean. The initial aim of this study was therefore to test the efficacy of Couple HOPES relative to waitlist for MMVFR with elevated PTSD symptoms, and whether outcomes could be maintained over a three-month follow-up period.

COVID-19, PTSD, and Couple HOPES

After embarking upon this initiative, the COVID-19 pandemic unexpectedly began, imposing unignorable consequences on the mental health and well-being of community members and their ability to access PTSD interventions. A recent meta-analysis of 63 studies from 24

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countries found a high prevalence of PTSD (17.5%) in those who directly or indirectly experienced COVID-19 (Yunitri et al., 2022), and 15.5% of COVID-19 patients and 17.2% of health professionals met probable PTSD diagnostic thresholds (Yunitri et al., 2022). COVID-related stressors (e.g., financial stress, health, isolation) are also associated with worsened intimate relationship functioning (e.g., Gottlieb and Schmitt, 2023; Pietromonaco & Overall, 2022). People who experience COVID-related PTSD may therefore experience unique vulnerabilities to the disorder because of deteriorated relationship functioning, and vice versa, raising the possibility that those with COVID-related PTSD may especially benefit from conjoint PTSD interventions. Finally, the pandemic context of social distancing, overburdened providers, and long waitlists for care (Butler, 2020; Canadian Institute for Health Information, 2021) highlighted the need for remote-delivered, low-burden interventions. In response, our team expanded the trial to also include healthcare workers and those with COVID-related PTSD. We hypothesized that Couple HOPES would be more efficacious in improving primary and secondary outcomes compared to the waitlist control condition. As an exploratory secondary aim, we examined whether results varied based on whether PTSD symptoms were COVID-related.

Method

Participants

All study procedures were approved by Research Ethics Boards at Toronto Metropolitan University and York University. This trial was pre-registered (identifiers NCT04231578 and NCT04763681) and was overseen by a data safety monitoring officer. Sixty-seven intimate couples were recruited via social media advertisements and community outreach.[1] Inclusion

[1] An initial trial focused on couples wherein one member was an MMVFR had a target sample size of 70 couples, based on power analyses with an estimated between-group effect size of $g = .60$ for relationship satisfaction (Doss et al., 2016). Subsequent funding was received to expand the trial to additionally include individuals with COVID-related-PTSD regardless of MMVFR membership, targeting an additional 70 couples.

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criteria involved:

1) One member of the couple was exposed to any trauma defined by PTSD Criterion A in the Diagnostic and Statistical Manual of Mental Disorders (5th ed., TR; APA, 2022);
2) The above individual endorsed elevated PTSD symptoms (i.e., a score of 33 or higher on the Posttraumatic Stress Disorder Checklist-5 (PCL-5; Weathers et al., 2013);
3) The above individual was either a Canadian MMVFR, Canadian or American healthcare worker, or Canadian or American experiencing a Criterion A traumatic event "related to COVID-19" (e.g., life-threatening complications related to COVID-19, witnessing actual or potential death due to COVID-19). PTSD symptoms did not have to relate to occupation
4) Couple had high speed internet access, both partners were willing to have coaching sessions audio recorded, and partners committed to watching modules together as a couple.

As Couple HOPES is a novel, remotely-delivered intervention, caution was warranted to ensure it was implemented within safe and appropriate relational contexts. Couples were therefore excluded if either partner endorsed elevated suicide risk (i.e., endorsing a past-year suicide attempt or reporting elevated past-week suicidal ideation), severe past-year intimate partner violence (i.e., was hit, kicked, punched, forced into sexual activities, or otherwise hurt by their partner), or feeling physically unsafe in the relationship (Hamby, 2016; Soeken et al., 1998). They were also excluded if both partners met inclusion criteria 1 and 2. See Table 1 for demographic information.

Measures

Screening. Prospective participants completed a brief questionnaire package including the PCL-5 (Weathers et al., 2013) to assess eligibility. The PCL-5 is a 20-item self-report measure that assesses core PTSD symptoms in accordance with the DSM-5-TR criteria (APA, 2022). A cut score of 33 was used to indicate probable PTSD (Weathers et al., 2013).

Primary outcome (PTSD). The PTSD+ participant completed the PCL-5 to assess their own PTSD symptoms. The partner completed an informant-report version of the PCL-5, consistent with prior dyadic studies (e.g., Monson et al., 2012; 2022), to assess perception of the PTSD+ participant's symptoms. Internal consistency of the PCL-5 in this study, partitioned into within-person and between-person variance (Geldhof et al., 2014), was high (Self-report, $\omega_{Within(W)} = .926$,

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$\omega_{Between\ (B)}$ = .961; Informant-report, $\omega_{Within(W)}$ = .931, $\omega_{Between\ (B)}$ = .963).

Primary outcome (relationship satisfaction). The four-item Likert scale Couples Satisfaction Inventory-4 (CSI-4; Funk & Rogge, 2007), assessed both partners' relationship satisfaction. Higher scores indicate greater satisfaction. Internal consistency in this study was high (PTSD+ partner, ω_W = .789, ω_B = .989, partner, ω_W = .865, ω_B = .989).

Secondary outcomes. Both partners completed measures of conflict (*Ineffective Arguing Inventory;* Kurdek, 1994; ω_W = .798, ω_B = .978); depression (*Patient Health Questionnaire-9;* Kroenke et al., 2001; ω_W = .791, ω_B = .891); anxiety (*Generalized Anxiety Disorder-7;* Spitzer et al., 2006; ω_W = .874, ω_B = .904); problematic alcohol and substance use (self-report *Addiction Severity Index;* McLellan et al., 1980; alcohol, ω_W = .699, ω_B = .864; drug, ω_W = .181, ω_B = .857, where low within-person reliability for drug use is likely due to low endorsement and, therefore, variability); perceived health, quality of life, and work functioning (single items from the World Health Organization; WHOQOL Group, 1998). The present manuscript focuses on secondary outcomes for the PTSD+ partner only.[2] Moreover, PTSD+ participants completed a measure of trauma-related guilt (*Trauma-Related Guilt Inventory;* Kubany et al., 1996; ω_W = .953, ω_B = .960), and partners completed a measure of PTSD symptom accommodation (*Significant Others' Responses to Trauma Scale;* Fredman et al,. 2014; ω_W = .874, ω_B = .953). Finally, both partners reported satisfaction with the intervention at post-intervention (*Client Satisfaction Questionnaire-8;* Attkisson & Zwick, 1982; ω_W = .953, ω_B = .960).[3]

Intervention

[2] PTSD and relationship satisfaction are primary outcomes target in CBCT and the PTSD+ partner's other mental health symptoms are secondary targets. Partner mental health outcomes are considered tertiary and outside the scope of the current investigation, and will be reported elsewhere. This division is consistent with past phases testing Couple HOPES (e.g., Monson et al., 2022).

[3] Preregistration also included a secondary outcome measure focused on anger, which was excluded because an invalid measure of anger was erroneously administered.

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Couple HOPES content was delivered via video in seven interactive modules through its website or mobile application (iOS/Android). Modules include Introduction (rationale, trauma impact question), Safety Building (time-out skill), Listening (communication skills), Approaching (reducing avoidance), Feeling (sharing feelings), Thinking (sharing thoughts), and Moving Forward (review and planning for the future). Psychoeducation was woven throughout each module. Couples were asked to complete each module together. For each module, couples were first asked to complete self- or informant-reported measures of PTSD symptoms (PCL-5) and self-reported measures of relationship satisfaction (CSI-4). Participants could see their and their partner's past and current scores on these measures to view progress. Couples were then presented with a series of videos presenting each module's content alongside interactive within-module exercises (e.g., write a trauma-impact statement, begin creating an avoidance list). They were then asked to complete relevant out-of-module practice assignments (e.g., practice time-out skill, create avoidance list, and conduct "approach" exercises). Couples were recommended to complete at least one module per week but permitted to work at a faster pace, and subsequent modules unlocked automatically. Monson et al. (2021) provide a fulsome description of Couple HOPES.

Couples were also asked to complete four 15-20-minute scheduled videoconference calls with a coach, plus one optional "as-needed" call to address problems such as program adherence, or symptom exacerbation. The first call was scheduled upon beginning the program, and subsequent calls were scheduled to align with anticipated completion of modules 3, 5, and 7. Coaching calls started with a review of symptoms and potential reasons for change or lack of change. If planned modules and assignments were completed, coaches then provided behavioral reinforcement (e.g., praise) and elicited questions. When not completed, coaches discussed barriers and engaged in troubleshooting. Calls focused on engagement with the program and content

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questions, not on specific relationship issues unless necessary to troubleshoot engagement. The final call summarized program content, potential gains, and areas for future development. Coaches were also available to couples through secure messaging on the Couple HOPES website.

Coaching training and fidelity. Coaches were members of the investigative team, postdoctoral fellows, graduate students, and research personnel, all of whom had at least an undergraduate degree. Coach training included approximately 8 hours of training specific to the program, including review of the theoretical rationale, Couple HOPES specific content, and strategies to address process challenges during coaching calls (e.g., lack of between-session practice). Each coach had access to a test account to familiarize themselves with the content and platform. Lastly, a clinical psychologist and Couple HOPES developer conducted an oral exam of clinical skills (including suicidal and interpersonal violence risk management) and reviewed a mock coaching call of each coach. Coaches followed a formalized, unpublished coaching manual.

Coaching calls were audio-recorded. Coaching fidelity was monitored through weekly to biweekly group meetings held with coaches and a coaching supervisor. These meetings included discussion of cases and review of coaching call recordings. A fidelity checklist assessed adherence and competence in delivering key Couple HOPES coaching content and non-unique elements (e.g., empathy) and checked for proscribed items. An arm's-length member of the investigative team randomly selected 10% of these recordings for fidelity using this checklist.

Procedure

Recruitment ran from January 15, 2021 to January 14, 2023. Couples were recruited through online advertisements, word of mouth, and liaising with professional networks. They signed up through the Couple HOPES website and were then sent eligibility screening surveys. Eligible couples were then provided with online consent forms and, if informed consent was

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provided, prompted to complete an online baseline assessment. After completion of the baseline assessment, couples were randomized using a 1:1, stratified approach to either Couple HOPES or the waitlist condition. In light of research suggesting MMVFR have attenuated responses to PTSD interventions (e.g., Straud et al., 2019), stratification was based on whether PTSD+ participants were MMVFR or not. Randomization was conducted using Study Randomizer (www.studyrandomizer.com) programmed by an independent statistician.

Couples randomized to Couple HOPES were granted instant access to the Couple HOPES platform and received initial contact from their coach. The waitlist group was scheduled to commence the intervention following an eight-week waiting period. The Couple HOPES group completed outcome assessments at baseline, mid-intervention, post-intervention, and at a one- and three-month follow-up. The waitlist control group completed outcome assessments at baseline (before randomization), three weeks into the waiting period, eight weeks into the waiting period (i.e., immediately before beginning intervention), mid-intervention, post-intervention, and at a one- and three-month follow-up. Couples had a seven-day window to complete their assessments. Partners were instructed to complete assessments individually. At the start of each module, both partners also independently completed brief assessments of PTSD symptoms (PCL-5) and relationship satisfaction (CSI-4). All other assessment responses were completed privately and not visible to their partner. If one member of the couple withdrew from the intervention, the couple was discontinued from the intervention but remained eligible for assessments. After the eight-week mark, couples lost access to coaching support but retained access to the platform for 12 months. Participants received gift card compensation of $7.50 CAD for each major assessment completed.

Analytic Plan

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All available data were included in statistical models consistent with intent-to-treat principles. Change was tested using multilevel growth models using restricted maximum likelihood and a Kenward–Roger correction (McNeish & Stapleton, 2016) using the R 4.2.2 (R Core Team, 2022) package lme4 (Bates et al., 2015). Multilevel models account for statistical dependency of partners and repeated measures and use all available data even in the presence of missing data. Self- and informant-reported PTSD symptoms were modeled separately, for three reasons: self-reported symptoms and perception of another's symptoms are somewhat distinct constructs, prior trials showed distinct intercepts and slopes for these outcomes, and this approach is consistent with past phases testing Couple HOPES (results of sensitivity analyses that include both responses in the same model were highly similar and are reported in supplemental material). For relationship satisfaction, a two-level model with time points and individuals both nested within couples in a crossed structure was used, and models included an interaction between the partner variable and other terms to provide separate estimates for each partner. Secondary outcomes focus on PTSD+ participants, so two-level models with time points nested within individuals were used.

All models included covariates for subgroup (0 = had a COVID-related trauma, 1 = did not) and, as required for accurate standard error estimation (Kahan & Morris, 2012), membership of the stratification variable (0 = MMVFR, 1 = non-MMVFR). We additionally tested whether subgroup moderated treatment outcomes. Consistent with past studies, models for PTSD symptom and relationship satisfaction used all available assessment points from both the major assessments and the platform. Models for other outcomes were assessed only at major assessment points.

There were four sets of analyses. 1) The primary test of the efficacy of Couple HOPES was the between-condition difference in outcome change over the initial eight weeks. Each outcome was regressed onto condition, time (0 = baseline, 1 = postintervention or end of waitlist), and

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condition*time, with random intercepts and slopes for time. 2) To compliment the primary test of efficacy, which aggregates results across individuals, we also evaluated the clinical significance of the intervention for primary outcomes using Jacobson & Truax's (1991) Reliable Change Index (RCI) to categorize each participant as either reliably improved, reliable deteriorated, or neither. To compute the RCI, we used omegas as the estimate of reliability and baseline standard deviation from the present sample, which is appropriate at the given sample size (Crenshaw & Monson, 2024). Total pre-post change for each individual was compared with the RCI to determine the participant's classification, and chi-squares tested between-group differences in classification.

3) Additionally, we tested whether the waitlist group improved after enrolling in the program, in which the estimand was the within-condition change in outcomes over the eight-week intervention period following the waitlist ("waitlist group uncontrolled analysis"). Each outcome was regressed onto time, with random intercepts and slopes for time. 4) Finally, we combined the intervention and waitlist groups to test change over the 3-month follow-up following the intervention period (i.e., starting at 8 weeks for the intervention group, or starting after the 8-week waitlist and subsequent 8-week intervention for the waitlist group; "follow-up analyses"). A piecewise model estimated separate slopes for intervention and follow-up. Analysis focused on change over follow-up and net change from baseline to 3-month follow-up. We tested between-condition differences by testing the interaction between condition and both time variables.

Likelihood ratio tests comparing linear and quadratic effects of time were all nonsignificant ($ps > .05$), suggesting a linear effect of time was appropriate. Within- and between-group standardized effect sizes represent model-estimated change (or between-condition differences in model-estimated change) divided by the standard deviation of the outcome variable at baseline (Feingold, 2009). The possibility of bias due to missing data in the comparison with waitlist was

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tested using covariate-dependent dropout analysis and pattern mixture models (Graham, 2009). Those in Couple HOPES (vs waitlist), who were not MMVFR, with COVID-related trauma, who were younger, and those who did not identify as White/Caucasian/European Origin were more likely to have missing data. However, missing data analyses did not show any evidence suggesting results were biased by missing data. See supplemental material for details of missing data analyses.

Transparency and Openness. Aggregated data sufficient to reproduce the analyses and full annotated data analysis code can be found at https://osf.io/exfzw/. Those interested may contact the senior author for a copy of the coaching manual. Ongoing discussions with the funder and university about who owns the intellectual property rights to the intervention, including the coaching manual, prevent publicly posting at this time.

Results

Descriptive Results

Figure 1 shows the flow of participants through the study. A total of 1241 couples signed up for Couple HOPES and were offered the screening survey and 294 couples had both members complete it, 227 of whom were excluded. Therefore, 67 (27 of whom had COVID-related PTSD) were eligible and randomized to Couple HOPES (n = 30 couples) or the waitlist (n = 37 couples).

In the intervention group, couples completed a mean of 5.3 modules (*SD* = 2.6, range = 0-7), and 17 (66%) completed the intervention. In the waitlist group, couples completed a mean of 4.3 modules (*SD* = 3.0, range = 0-7) during the intervention, and 15 (41%) completed it. Across conditions, the modal couple completed all 7 modules (32 couples), followed by 0 modules (12 couples) and 6 modules (7 couples). In the intervention group, PTSD+ partners sent an average of 4.7 messages to the coach during the program (*SD* = 5.9, range = 0-25), and partners sent an average of 3.7 (*SD* = 4.7, range = 0-17). In the waitlist group, PTSD+ partners sent an average of

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3.2 messages (*SD* = 4.4, range = 0-17) and partners sent an average of 3.3 (*SD* = 4.4, range = 0-16). Couples completed a mean of 2.93 coaching sessions in the intervention group (*SD* = 1.78) and 2.27 sessions in the waitlist group (*SD* = 1.84). Participants were generally satisfied with the program: In the intervention group, mean satisfaction on the *Client Satisfaction Questionnaire* was 3.32 (*SD* = 0.45; 1-4 scale) for the PTSD+ participant and 3.38 (*SD* = 0.55) for partners. In the waitlist group, mean intervention satisfaction was 3.14 (*SD* = 0.89) for the PTSD+ participant and 3.09 (*SD* = 0.67) for partners. No adverse events occurred.

Fidelity

A total of 17 recordings of coaching calls were reviewed for fidelity. Mean fidelity scores for adherence (i.e., presence of required content) to Couple HOPES coaching elements was .96 (SD = .11; possible range = 0-1; observed range = .6-1), and mean fidelity scores for competence in delivery of coaching elements was 2.78 (SD = .28; possible range = 0-3; observed range = 2.1-3). Mean fidelity scores for essential, non-unique elements was 2.90 (SD = .20; possible range = 0-3; observed range = 2.25-3). No proscribed elements were detected.

Comparison with waitlist control (primary test of efficacy)

Table 2 displays estimated marginal means and mean within-group change after the initial 8 weeks (i.e., at post-intervention or end of the waitlist period). In the Couple HOPES condition, there was significant within-group improvement in self- and informant-reported PTSD symptoms, partner's relationship satisfaction, symptom accommodation, and the PTSD+ participant's conflict, depression, and anxiety, but not other outcomes. The waitlist group did not show significant within-group change for any outcome.

Table 3 and Figure 2 display results for the primary test of efficacy: the between-group difference in change between Couple HOPES and waitlist at 8 weeks. There were significant

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between-group differences for 3 of 4 primary outcomes. Couple HOPES showed significantly greater improvement than waitlist for both self- and informant-reported PTSD symptoms, and for partner relationship satisfaction. The PTSD+ participant's relationship satisfaction did not significantly differ. For secondary outcomes, Couple HOPES showed significantly greater improvement than waitlist for symptom accommodation and anxiety, but not other outcomes.

Clinical significance for primary outcomes

Table 4 shows clinical significance results for PTSD symptoms and relationship satisfaction over the initial 8-week study period for both the intervention and waitlist groups. Since this analysis assesses change at an individual level, participants with missing data at post-intervention could not be categorized. For each category, we therefore report two percentages: the percentage of those with sufficient data to categorize and, for a conservative estimate (which assumes those with missing data did not change), the percentage of the full sample.

For self-reported PTSD symptoms, Couple HOPES resulted in significantly more participants (13; 43% of full sample, 76% of those with sufficient data to categorize) categorized as reliably improved (vs other categories) than waitlist (8; 22%, 30%, respectively). Other categories did not significantly differ across condition. For informant-reported PTSD symptoms, Couple HOPES resulted in significantly fewer participants (0; 0%, 0%, respectively) categorized as reliably worsened (vs other categories) than waitlist (7; 19%, 25%, respectively). Other categories did not significantly differ across condition. For the PTSD+ participant's relationship satisfaction, Couple HOPES resulted in significantly fewer participants (6; 20%, 35% respectively) categorized as unchanged (vs other categories) compared with the waitlist (20; 54%, 71%, respectively). Other categories did not significantly differ across condition. For the partner's relationship satisfaction, no categories significantly differed across condition.

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Waitlist group uncontrolled analysis

Supplement Table 1 (S1) shows within-group change for the waitlist group during the intervention period. The waitlist group showed significant improvement in self-reported PTSD symptoms during the intervention (B = -8.40, d = -0.57, p = .001), but not other outcomes.

Follow-up analysis

Table 5 shows estimates of change over the intervention and follow-up phases for both conditions. For all outcomes, participants in the intervention and waitlist groups did not significantly differ in the amount of change during the time they were in the intervention or over follow-up. Consequently, these groups were combined in follow-up analyses for parsimony, with a covariate representing condition. Couples in the waitlist condition were offered the program when intervention couples were expected to complete the program; therefore, the follow-up period does not provide a control group comparison and thus causal conclusions cannot be made.

For primary outcomes, both self- and informant-reported PTSD symptoms worsened over follow-up. Contrasts of marginal means show that self-reported PTSD symptoms nonetheless had significant net improvement from pre-intervention to 3-month follow-up (B = -8.22, p = .004), whereas informant-reported PTSD did not show net change at 3-months (B = -2.50, p = .785). For relationship satisfaction, the PTSD+ partner did not significantly change during follow-up or from pre-intervention to 3-month follow-up (B = 0.40, p = .998). In contrast, partners showed worsening over follow-up, although net change from pre-intervention to 3-month follow-up was not significant (B = -0.65, p = .944). For secondary outcomes, PTSD+ participant's report of conflict worsened over the follow-up, although net change by 3-month follow-up was not significant (B = -1.11, p = .929). Other secondary outcomes showed no evidence of change over follow-up (ps > .05). Taken together, analysis of follow-up indicates a (partial) loss of gains over follow-up.

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Moderating effect of COVID-related PTSD

Across 42 analyses (14 outcomes * 3 sets of analyses, excluding clinical significance due to sample size constraints), COVID group status moderated just one result: the waitlist group uncontrolled trial results for alcohol use significantly differed by COVID group status ($p = .033$), though neither group individually showed evidence of change in either direction ($ps > .05$). These results suggest that, on the whole, participants do not experience different outcomes in Couple HOPES according to whether or not they experienced COVID-related PTSD.

Discussion

This study was the first randomized controlled trial testing the efficacy of Couple HOPES. Initiated as a waitlist-controlled trial in MMVFR with elevated PTSD symptoms, COVID-19 resulted in an expanded trial that included healthcare workers and those with COVID-related PTSD. We hypothesized that Couple HOPES would be more efficacious in improving PTSD symptoms, relationship satisfaction, and a range of secondary outcomes. We also examined whether gains were maintained over three-month follow-up, and tested whether the presence of COVID-related PTSD moderated results.

Impact of Couple HOPES on PTSD

In support of hypotheses, Couple HOPES resulted in greater improvements in both self- and informant-reported PTSD symptoms, compared to waitlist. Additionally, relative to waitlist, more individuals in Couple HOPES exhibited clinically-significant improvement in self-reported PTSD, and fewer people (none) reported clinically-significant worsening in informant-reported PTSD. These findings are generally consistent with previous tests of Couple HOPES (Fitzpatrick et al., 2021; Monson et al., 2022) which showed moderate to large improvements in self-reported PTSD. Ultimately, these findings support the efficacy of Couple HOPES in improving its central

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target, and further bolster confidence in the capacity of relatively "light-touch", low-cost interventions to exert such effects.

Of note, and inconsistent with results of the present study, informant-reported PTSD symptoms from partners did not significantly improve in past uncontrolled trials (Fitzpatrick et al., 2021; Monson et al., 2022). Partners' ability to observe and report changes in their PTSD+ partners' symptoms may be more attenuated than that of PTSD+ participants. Consequently, prior tests of Couple HOPES may have lacked the statistical power to observe these effects compared to this larger trial. However, it is also notable that clinical significance testing found that fewer participants *worsened* in Couple HOPES, relative to the waitlist. Between-group comparisons may therefore not only be driven by informant-reported PTSD improving in Couple HOPES, but also by partners being more likely to report a worsening of PTSD when they are not receiving intervention. Repeated assessment may heighten partners' awareness of PTSD symptoms without providing intervention options, resulting in the appearance of worsening over time. However, while some individuals in the waitlist condition may have shown deterioration, analyses did not show overall worsening in informant-rated PTSD in the waitlist.

Finally, net gains in self-reported PTSD were observed at three-month follow-up, although they were attenuated relative to at post-intervention. This result indicates that gains from Couple HOPES are generally maintained but weakened over time. Couple HOPES is a relatively brief, low burden intervention. As it does not involve clinicians who work to promote skill generalization and maintenance, it is perhaps unsurprising that some gains are therefore not maintained. Although maintenance of net gains is encouraging, future research should evaluate whether additional "booster" coaching sessions could enhance the maintenance of gains.

Impact of Couple HOPES on Relationship Satisfaction

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Consistent with some earlier tests of Couple HOPES (Fitzpatrick et al., 2021), partners receiving Couple HOPES reported greater improvements in relationship satisfaction relative to those on the waitlist. However, these gains were not sustained at the three-month follow-up phase. Thus, while partners may initially experience relational benefits from Couple HOPES, they may be lost over time. Also consistent with the case series and uncontrolled trial of Couple HOPES (Fitzpatrick et al., 2021; Monson et al., 2022), PTSD+ participants receiving Couple HOPES did not exhibit greater changes in relationship satisfaction compared to those on the waitlist.

Similar to Couple HOPES, a systematic review of CBCT for PTSD shows mixed effects on relationship satisfaction (Liebman et al., 2022), with more consistent improvements in partners' versus PTSD+ participants' relationship satisfaction. It is important to note that couples in Couple HOPES and CBCT trials are not recruited on the basis of relationship distress, and present with a range of relationship satisfaction. Indeed, in the present study, 44% and 41% of PTSD+ participants and their partners, respectively, had baseline relationship satisfaction scores in the satisfied range. It is therefore possible that relationship satisfaction outcomes face ceiling effects, and that possible benefits of Couple HOPES on relationship satisfaction, like with CBCT, may only be visible for those who begin with considerable relational distress (Shnaider et al., 2015). Follow-up moderator testing is needed to probe this possibility.

Finally, Couple HOPES resulted in fewer PTSD+ participants categorized as 'unchanged' in clinical significance testing relative to the waitlist, but no differences in the number classified as improved or worsened. However, this finding should be interpreted with caution. Only a subset of the full sample could be analyzed in clinical significance testing, and therefore these results cannot be directly compared to findings from the primary statistical significance tests. There was more available data for clinical significance testing in the waitlist condition than the Couple

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HOPES condition, and it is possible that these findings reflect such an imbalance. Statistical power needed to detect changes on other classifications, such as improving or worsening, may have also been limited. Future tests with larger sample sizes should seek to replicate these effects.

Impact of Couple HOPES on Secondary Outcomes

Between group comparisons revealed additional benefits of Couple HOPES relative to waitlist. Specifically, PTSD+ participants' anxiety and partners' accommodation of PTSD symptoms improved to a greater extent in Couple HOPES, and their gains were maintained over the follow-up. These results are unsurprising as Couple HOPES draws heavily on well-established exposure-based interventions (Kaczkurkin & Foa, 2015), and accommodation of PTSD symptoms (especially avoidance of trauma-related cues and reminders) is directly targeted in Couple HOPES. Conversely, there were no differences between conditions in changes in PTSD+ participants' depression, conflict, alcohol or drug use, perceived health, work functioning, or quality of life. These variables are not directly targeted by Couple HOPES to the same extent, which may explain why changes were not observed relative to the waitlist. Additionally, many participants did not report difficulties in these domains at baseline, limiting the intervention's potential impact.

Moderation of COVID-related PTSD

Finally, none of the study findings were moderated by COVID-related PTSD, suggesting that the efficacy of Couple HOPES (or lack thereof, depending on the outcome) also extends to those who experience PTSD related to or exacerbated by a global pandemic. Type of trauma does not always moderate PTSD treatment outcomes (e.g., Jaycox et al., 1998), and our findings similarly suggest that the principles of treating PTSD are consistent across trauma types.

Limitations and Future Directions

These study findings must be contextualized within their limitations. Despite extensive

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recruitment efforts by the research team, and although close to the original target sample size of 70 couples, the sample size is approximately half of the revised target sample size. The study was therefore not sufficiently powered to detect effects below $d = .62$ or moderator effects, so it is possible some outcomes with smaller population-level improvement went undetected. Such recruitment issues also raise critical questions regarding the desirability of coach-guided, online, conjoint interventions such as Couple HOPES. Indeed, although we received many initial sign-ups, considerably fewer people completed screening surveys. Additionally, drop-out rates from Couple HOPES (34% in the intervention group) were high, although not considerably higher than dropout rates observed in other PTSD interventions, which range from 12% to 45% (e.g., Litz et al., 2019; Monson et al., 2012; Morland et al., 2022). It is possible that the same features that make interventions such as Couple HOPES broadly accessible also make them easy to disengage from and drop out of. Greater attention is needed to ways to make such interventions more desirable and engaging, and future researchers are encouraged to examine this (Fitzpatrick et al., 2024). Additionally, a limitation related to the virtual nature of the intervention is that, although participants were instructed to complete assessments individually, we were unable to verify whether they did so in each other's presence. This may have introduced response bias, such as social desirability bias, particularly for the primary outcome measures of PTSD symptoms and relationship satisfaction, which were completed immediately before each module.

Moreover, our sample is overwhelmingly heterosexual, cisgender, and white, and investigations of the efficacy of Couple HOPES in LGBTQ2+, trans and non-binary, and racialized individuals is needed. Recruitment was also limited to MMVFR, healthcare workers, and those with COVID-related PTSD, so results may not generalize to other populations. It also remains unclear how Couple HOPES performs relative to other active interventions, and future studies to

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these ends are needed. Additionally, recent research recommends a cutoff of 28 on the PCL-5 for likely PTSD (Marx et al., 2022), so future research and clinical application of Couple HOPES should seek to include individuals with a lower PCL-5 score. Finally, future research should consider the eligibility requirement that participants at least maintain their treatment regimen (or not seek further intervention) during the active intervention phase.

Clinical Implications and Conclusions

Despite these limitations, this study offers several clinical implications. First, findings suggest that Couple HOPES may be a scalable, cost-effective, and accessible means of reducing PTSD. Globally, the need for PTSD interventions is pressing, but access to evidence-based care is limited. Scalable alternatives to psychotherapy that do not rely on specialist clinicians, such as Couple HOPES, are needed to meet the demand for services and alleviate strained healthcare systems. As the efficacy of Couple HOPES was not moderated by COVID-related PTSD, findings also suggest that this may be a scalable, cost-effective, and accessible means of treating PTSD in the settings of global catastrophes such as pandemics. Given these findings, more work investigating ways in which Couple HOPES may be integrated into models of care (e.g., Morland et al., 2024) is needed. However, given its high drop-out rates, clinicians, policy makers, and service providers should consider ways to bolster motivation for and engagement in programs like Couple HOPES. Taken together, this trial raises new questions about whom Couple HOPES could benefit, how to engage people in it, and where it fits in a spectrum of care. Alongside these questions, it offers exciting potential for broadening PTSD intervention to all who need it.

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Use of data in previous publications: A previous manuscript, using only baseline data, examined associations between partner accommodation and other variables (Xiang et al., 2024). These data have otherwise not been used in a publication elsewhere.

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Table 1
Sample demographics by partner and by study condition.

		Couple HOPES (*n*=30)		Waitlist (*n*=37)	
Study Variable	**Total**	**PTSD+**	**Partner**	**PTSD+**	**Partner**
Relationship status, *n* individuals*					
Married	89 (67%)	21 (70%)	21 (70%)	25 (68%)	22 (61%)
Divorced	1 (1%)	0 (0%)	0 (0%)	1 (3%)	0 (0%)
Remarried	2 (2%)	0 (0%)	0 (0%)	0 (0%)	2 (6%)
Cohabitating, not married	13 (10%)	1 (3%)	1 (3%)	6 (16%)	5 (14%)
Cohabitating over one year	17 (13%)	4 (13%)	5 (17%)	4 (11%)	4 (11%)
Separated	3 (2%)	1 (3%)	1 (3%)	0 (0%)	1 (3%)
Dating	8 (6%)	3 (10%)	2 (7%)	1 (3%)	2 (6%)
Age *M* (*SD*)	43.6 (10.4)	42.7 (1.7)	43.1 (1.6)	43.8 (1.8)	44.4 (2.0)
Engaged in other mental health therapy or medication, *n* yes	66 (50%)	21 (70%)	9 (31%)	27 (73%)	9 (25%)
Women, *n* individuals	65 (49%)	15 (50%)	15 (50%)	15 (41%)	20 (56%)
Men, *n* individuals	68 (51%)	15 (50%)	15 (50%)	22 (59%)	16 (44%)
Same-gender, *n* couples	2 (3%)	0		2	
Mixed-gender, *n* couples	65 (97%)	30		35	
Relationship length *M* (*SD*)	12.3 (9.0)	13.2 (9.4)		11.6 (8.8)	
Race/ethnicity, *n individuals*					
Aboriginal/First Nation/Indigenous/Métis/Inuit	2 (2%)	2 (7%)	0 (0%)	0 (0%)	0 (0%)
Chinese/Chinese Canadian	4 (3%)	1 (3%)	1 (3%)	1 (3%)	1 (3%)
Hispanic/Latinx/ Hispanic Canadian/ Latinx Canadian	1 (1%)	0 (0%)	1 (3%)	0 (0%)	0 (0%)
White/ Caucasian/European	122 (92%)	26 (87%)	27 (90%)	35 (95%)	34 (94%)
Other Asian/ Asian Canadian	1 (1%)	0 (0%)	0 (0%)	1 (3%)	0 (0%)
Mexican/ Mexican Canadian *n*	1 (1%)	0 (0%)	0 (0%)	0 (0%)	1 (3%)
Biracial/Multiracial *n*	2 (2%)	1 (3%)	1 (3%)	0 (0%)	0 (0%)

Note. PTSD = posttraumatic stress disorder.
*Discrepancies in marital status reports across PTSD+ participants and partners are due to inconsistent reporting across members of a couple.

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Table 2

Estimated marginal means, change scores within condition, and within-condition effect sizes of outcomes by condition at posttreatment or end of waitlist period

Outcome	Condition	Baseline	Mid-intervention	Post-intervention	Mean change (95% CI)	Standardized mean change (95% CI)
PTSD (self)	Waitlist	40.2 (35.7, 44.7)	39.8 (35.2, 44.5)	39.4 (32.6, 46.2)	-0.83 (-7.30, 5.63)	-0.06 (-0.49, 0.38)
	CH	50.7 (46.1, 55.4)	44.0 (39.0, 49.0)	35.5 (27.9, 43.1)	-15.20* (-22.27, -8.14)	-1.03 (-1.50, -0.55)
PTSD (informant)	Waitlist	30.5 (25.1, 35.8)	30.4 (25.7, 35.1)	30.3 (24.0, 36.6)	-0.20 (-7.12, 6.73)	-0.01 (-0.41, 0.39)
	CH	37.2 (31.7, 42.7)	32.4 (27.4, 37.4)	26.4 (19.5, 33.3)	-10.77* (-18.05, -3.48)	-0.62 (-1.04, -0.20)
Relationship Satisfaction (PTSD+)	Waitlist	12.2 (10.5, 13.9)	12.2 (10.6, 13.8)	12.2 (10.4, 14.0)	-0.01 (-1.29, 1.27)	0.00 (-0.25, 0.24)
	CH	12.1 (10.4, 13.9)	12.4 (10.7, 14.1)	12.8 (10.8, 14.7)	0.66 (-0.56, 1.88)	0.13 (-0.11, 0.36)
Relationship Satisfaction (partner)	Waitlist	12.7 (11.0, 14.3)	12.4 (10.8, 14.1)	12.1 (10.3, 14.0)	-0.54 (-1.79, 0.72)	-0.10 (-0.34, 0.14)
	CH	10.8 (9.0, 12.5)	11.4 (9.7, 13.2)	12.3 (10.4, 14.2)	1.55* (0.35, 2.74)	0.30 (0.07, 0.53)
Accommo-dation	Waitlist	16.9 (13.2, 20.7)	18.0 (14.3, 21.7)	19.1 (14.7, 23.5)	2.16 (-1.39, 5.72)	0.19 (-0.12, 0.51)
	CH	21.0 (16.9, 25.1)	18.1 (14.1, 22.2)	15.3 (10.2, 20.4)	-5.66* (-9.94, -1.38)	-0.51 (-0.89, -0.12)
Conflict	Waitlist	23.2 (20.3, 26.0)	22.9 (20.3, 25.6)	22.7 (19.9, 25.4)	-0.50 (-2.13, 1.12)	-0.06 (-0.25, 0.13)
	CH	22.2 (19.1, 25.3)	21.1 (18.2, 24.1)	20.1 (17.0, 23.2)	-2.15* (-4.19, -0.12)	-0.26 (-0.50, -0.01)
Depression	Waitlist	13.1 (11.4, 14.9)	12.8 (11.0, 14.6)	12.4 (10.2, 14.7)	-0.71 (-2.48, 1.06)	-0.13 (-0.44, 0.19)
	CH	15.8 (13.8, 17.7)	14.1 (12.0, 16.1)	12.4 (9.7, 15.1)	-3.40* (-5.65, -1.14)	-0.60 (-1.01, -0.20)
Anxiety	Waitlist	12.2 (10.5, 13.8)	11.8 (10.4, 13.3)	11.5 (9.7, 13.4)	-0.62 (-2.61, 1.37)	-0.13 (-0.54, 0.28)
	CH	14.9 (13.1, 16.7)	12.8 (11.2, 14.4)	10.7 (8.4, 13.0)	-4.20* (-6.66, -1.74)	-0.87 (-1.37, -0.36)
Guilt	Waitlist	55.7 (47.1, 64.3)	56.3 (48.2, 64.4)	56.8 (48.0, 65.7)	1.14 (-5.04, 7.32)	0.04 (-0.20, 0.29)
	CH	60.1 (50.9, 69.4)	57.0 (48.0, 65.9)	53.8 (43.6, 63.9)	-6.38 (-14.03, 1.28)	-0.25 (-0.55, 0.05)
Alcohol	Waitlist	0.10 (0.05, 0.14)	0.10 (0.06, 0.14)	0.11 (0.06, 0.15)	0.01 (-0.03, 0.05)	0.06 (-0.26, 0.38)
	CH	0.09 (0.04, 0.14)	0.09 (0.04, 0.13)	0.08 (0.02, 0.14)	-0.01 (-0.06, 0.05)	-0.05 (-0.44, 0.35)
Drug	Waitlist	0.02 (0.01, 0.03)	0.01 (0.00, 0.02)	0.01 (0.00, 0.02)	-0.01 (-0.02, 0.00)	-0.24 (-0.52, 0.04)
	CH	0.02 (0.00, 0.03)	0.01 (0.00, 0.02)	0.01 (0.00, 0.02)	-0.01 (-0.02, 0.00)	-0.21 (-0.56, 0.13)
Perceived Health	Waitlist	2.28 (1.94, 2.61)	2.30 (2.01, 2.58)	2.31 (1.98, 2.65)	0.04 (-0.32, 0.40)	0.04 (-0.31, 0.38)
	CH	1.80 (1.43, 2.17)	2.00 (1.68, 2.32)	2.21 (1.79, 2.62)	0.41 (-0.04, 0.85)	0.39 (-0.04, 0.81)
Work functioning	Waitlist	2.52 (2.13, 2.92)	2.53 (2.18, 2.88)	2.54 (2.15, 2.93)	0.02 (-0.34, 0.37)	0.01 (-0.28, 0.30)
	CH	2.29 (1.85, 2.72)	2.27 (1.88, 2.66)	2.25 (1.79, 2.71)	-0.03 (-0.47, 0.40)	-0.03 (-0.39, 0.33)
Quality of life	Waitlist	2.40 (2.07, 2.74)	2.55 (2.27, 2.83)	2.70 (2.38, 3.02)	0.30 (-0.06, 0.65)	0.30 (-0.06, 0.66)
	CH	2.41 (2.04, 2.77)	2.37 (2.06, 2.68)	2.33 (1.94, 2.72)	-0.07 (-0.51, 0.36)	-0.07 (-0.51, 0.37)

Note. CH = Couple HOPES.

* $p < .05$

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Table 3

Between-group difference in mean change and standardized mean differences for outcomes at posttreatment or end of waitlist period

Outcome	Change difference, Mean (95% CI)	Standardized change difference, Mean (95% CI)
PTSD (self)	-14.4* (-23.6, -5.0)	-1.0 (-1.6, -0.3)
PTSD (informant)	-10.6* (-20.4, -0.8)	-0.61 (-1.18, -0.05)
Relationship Satisfaction (PTSD+)	0.67 (-1.10, 2.43)	0.13 (-0.21, 0.47)
Relationship Satisfaction (partner)	2.08* (0.35, 3.81)	0.40 (0.07, 0.73)
Accommodation	-7.8* (-13.2, -2.4)	-0.70 (-1.18, -0.21)
Conflict	-1.7 (-4.2, 0.9)	-0.20 (-0.50, 0.11)
Depression	-2.7 (-5.5, 0.1)	-0.48 (-0.97, 0.02)
Anxiety	-3.6* (-6.6, -0.5)	-0.74 (-1.37, -0.11)
Guilt	-7.5 (-17.0, 2.0)	-0.30 (-0.67, 0.08)
Alcohol	-0.01 (-0.08, 0.05)	-0.11 (-0.60, 0.39)
Drug	0.00 (-0.01, 0.02)	0.03 (-0.40, 0.46)
Perceived Health	0.37 (-0.20, 0.92)	0.35 (-0.19, 0.88)
Work functioning	-0.05 (-0.60, 0.49)	-0.04 (-0.50, 0.40)
Quality of life	-0.37 (-0.91, 0.17)	-0.37 (-0.92, 0.17)

Note. Change difference represents mean change in Couple HOPES minus mean change in the waitlist group. PTSD = posttraumatic stress disorder.

* $p < .05$

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Table 4

Clinical significance results for the intervention and waitlist groups for PTSD symptoms and relationship satisfaction

		Improved	Unchanged	Worsened
PTSD symptoms	Couple HOPES	13	3	1
	Waitlist	8	13	6
	χ^2	7.39*	2.98	1.04
PTSD – informant report	Couple HOPES	11	9	0
	Waitlist	12	9	7
	χ^2	0.29	0.37	4.02*
Relationship satisfaction (PTSD+ partner)	Couple HOPES	8	6	3
	Waitlist	5	20	3
	χ^2	3.08	4.28*	0.04
Relationship satisfaction (partner)	Couple HOPES	5	12	3
	Waitlist	4	20	6
	χ^2	0.46	0.03	0.01

Note. Chi-square tests represent between-group differences in membership to each category compared with membership in one of the other two categories. PTSD = posttraumatic stress disorder.

* $p < .05$

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Table 5

Within-group change over intervention phase and follow-up combined across both conditions

Outcome	Pre-post change	Post-to-end of follow-up change	Standardized pre-post change	Standardized post-to-end of follow-up change
PTSD (self)	-12.89* (-16.88, -8.81)	4.67* (1.49, 7.85)	-0.87 (-1.14, -0.59)	0.31 (0.10, 0.53)
PTSD (informant)	-9.02* (-13.85, -4.24)	6.52* (3.04, 9.99)	-0.52 (-0.80, -0.25)	0.38 (0.18, 0.58)
Relationship Satisfaction (PTSD+)	0.79 (-0.19, 1.76)	-0.39 (-1.42, 0.65)	0.15 (-0.04, 0.34)	-0.07 (-0.27, 0.12)
Relationship Satisfaction (partner)	0.84 (-0.12, 1.79)	-1.49* (-2.42, -0.55)	0.16 (-0.02, 0.34)	-0.29 (-0.47, -0.11)
Accommodation	-4.86* (-8.11, -1.55)	0.63 (-1.75, 2.97)	-0.43 (-0.72, -0.14)	0.06 (-0.16, 0.27)
Conflict	-2.44* (-4.00, -0.89)	1.33* (0.00, 2.66)	-0.29 (-0.48, -0.11)	0.16 (-0.00, 0.32)
Depression	-2.22* (-3.79, -0.65)	-0.23 (-2.12, 1.65)	-0.39 (-0.67, -0.12)	-0.04 (-0.38, 0.29)
Anxiety	-2.18* (-3.65, -0.75)	-0.42 (-2.18, 1.33)	-0.45 (-0.75, -0.15)	-0.09 (-0.45, 0.27)
Guilt	-7.01* (-13.58, -0.52)	-1.69 (-7.33, 3.97)	-0.28 (-0.53, -0.02)	-0.07 (-0.29, 0.16)
Alcohol	0.00 (-0.02, 0.03)	-0.01 (-0.04, 0.02)	0.02 (-0.16, 0.21)	-0.09 (-0.31, 0.12)
Drug	0.00 (-0.01, 0.01)	-0.00 (-0.01, 0.00)	0.01 (-0.16, 0.16)	-0.13 (-0.30, 0.05)
Perceived Health	0.06 (-0.25, 0.38)	-0.25 (-0.69, 0.19)	0.06 (-0.24, 0.36)	-0.24 (-0.66, 0.18)
Work functioning	0.17 (-0.14, 0.49)	0.13 (-0.24, 0.51)	0.14 (-0.11, 0.40)	0.11 (-0.20, 0.42)
Quality of life	0.10 (-0.16, 0.38)	0.01 (-0.31, 0.33)	0.11 (-0.16, 0.38)	0.01 (-0.31, 0.33)

Note. Pre-post change represents average model-estimated total change from pre-intervention to post-intervention. Post-to-end of follow-up change represents average model-estimated total change from post-intervention through the 3-month follow-up. PTSD = posttraumatic stress disorder.

* $p < .05$.

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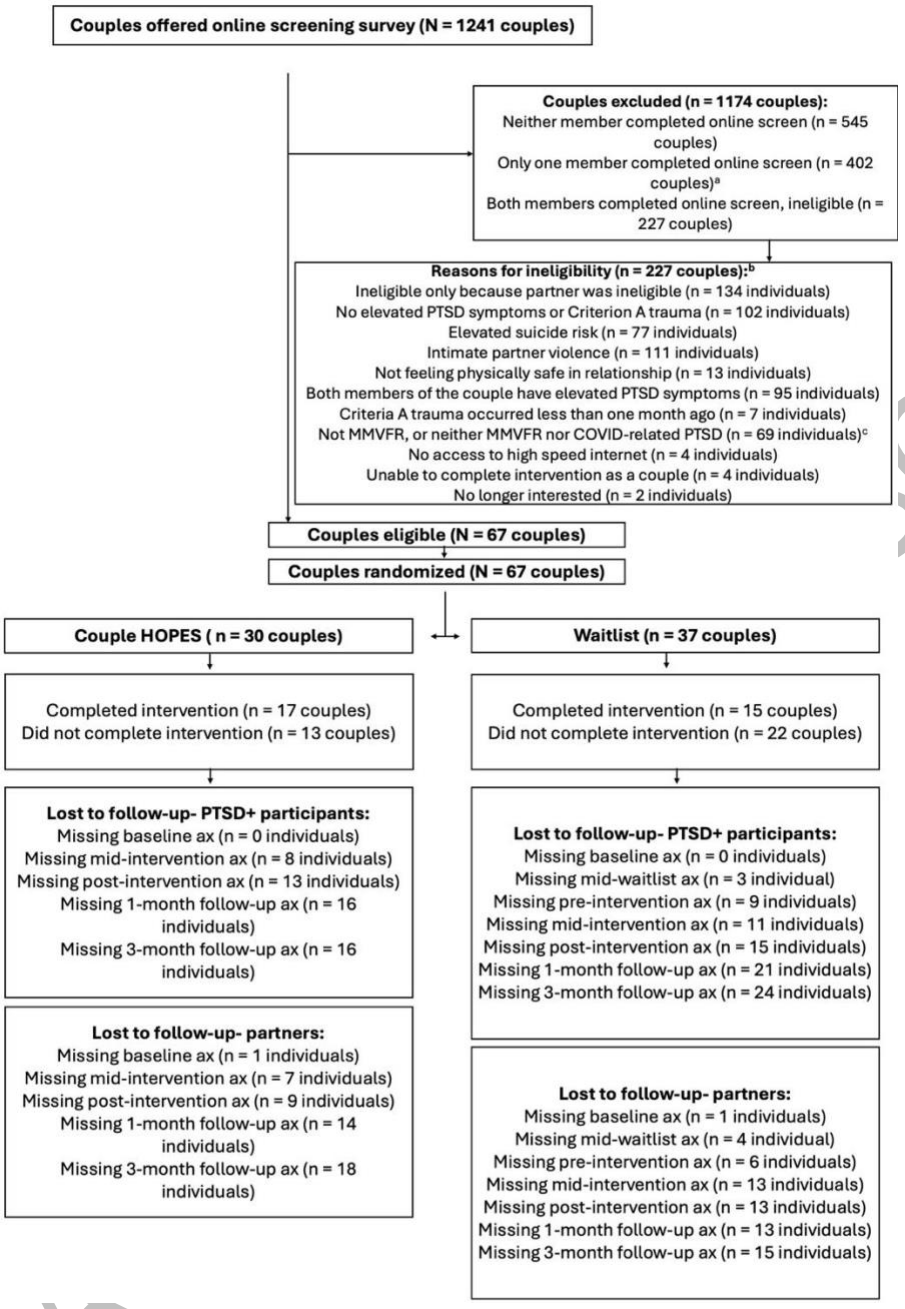
Figure 1

CONSORT diagram illustrating flow of participants through the study



[a]For brevity, only reasons for ineligibility for couples who both completed the screen are reported here

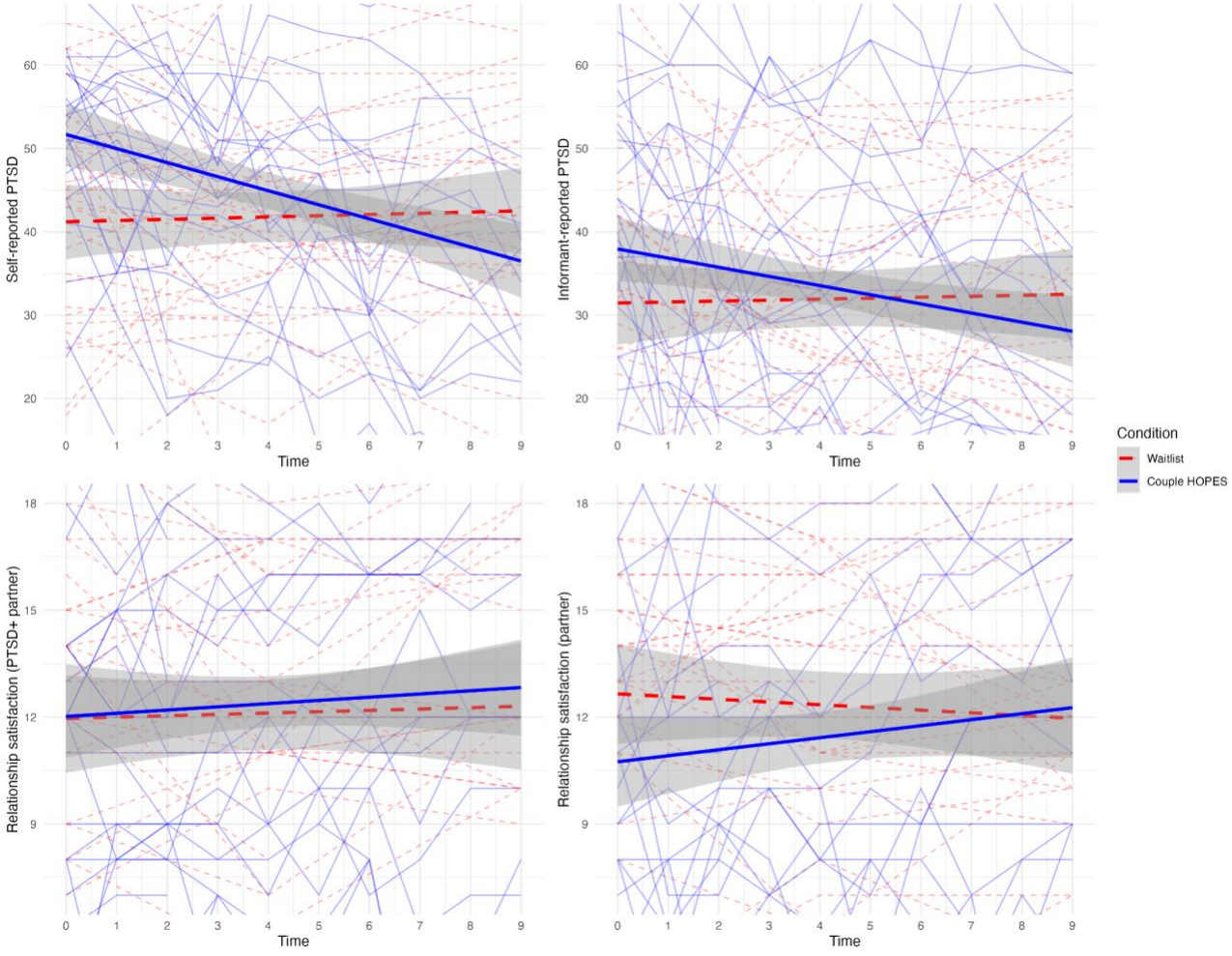
[b]All reasons for exclusion reported; couples may exhibit multiple exclusion criteria

[c] MMVFR recruitment began before COVID-related PTSD recruitment. This category includes people initially excluded because they were not MMVFR (prior to the beginning of the COVID-related PTSD trial extension), and people later excluded because they were neither MMVFR nor had COVID-related PTSD (after beginning the COVID-related PTSD trial extension).

Note. MMVFR = Military Member, Veteran, First Responder; PTSD = posttraumatic stress disorder; ax = assessment

Figure 2

Change in primary outcomes over time during the initial 8 weeks: Couple HOPES vs waitlist



Note. Solid lines represent average linear trendlines for each condition, bands represent 95% confidence intervals of the trendlines, and individual lines are spaghetti plots representing change over time for each individual.

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