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PTSD Symptoms Predict Outcome in Trauma-Informed Treatment of Intimate Partner Aggression

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Objective: This study sought to extend findings from a randomized controlled trial of the *Strength at Home Men's Program (SAH-M*) for intimate partner aggression (IPA) in military veterans by examining the impact of pretreatment posttraumatic stress disorder (PTSD) symptoms on treatment efficacy, and by examining new data on postintervention follow-up for individuals who received *SAH-M* after completing the *enhanced treatment as usual (ETAU*) wait-list control condition. ***Method:*** Using data from 125 male veterans who attended the *SAH-M* program immediately after an intake assessment or after waiting 6-month in the *ETAU* condition, this study used generalized linear modeling to examine predictors of physical and psychological IPA over a 9-month period of time. ***Results:*** PTSD symptoms at intake significantly predicted both physical and psychological IPA use, even after accounting for the effects of treatment condition, time, and number of sessions attended. PTSD had a strong association with both physical and psychological IPA. An interaction between PTSD and *SAH-M* was observed for psychological IPA but not physical IPA, and the magnitude of the effect was not clinically significant. There was a significant effect of *SAH-M* in reducing IPA in the full sample, including previously unanalyzed outcome data from the *ETAU* condition. ***Conclusion:*** The study results suggest that while *SAH-M* does not need to be modified to address the interaction between PTSD and treatment, outcomes could be enhanced through additional direct treatment of PTSD symptoms. Results extend prior analyses by demonstrating the effectiveness of *SAH-M* in reducing use of IPA in both the treatment and *ETAU* conditions.

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What is the public health significance of this article?
Among those with higher PTSD symptoms, results from the *SAH-M* treatment may be enhanced through the addition of treatment for PTSD. Findings also underscore the need for all IPA treatment programs to incorporate assessment and treatment planning for PTSD into their programming. Results further support the overall efficacy of *SAH-M* in reducing partner aggression in military samples.

Keywords: posttraumatic stress disorder, veterans, partner violence, aggression

Intimate partner aggression (IPA) is a serious public health issue, conveying significant risks for negative physical and mental health outcomes and threatening the social and economic stability of those who have experienced it (Marshall, Panuzio, & Taft, 2005). High rates of posttraumatic stress disorder (PTSD) symptoms are a strong risk factor for IPA (Okuda et al., 2015), particularly in military and veteran populations (Taft, Watkins, Stafford, Street, & Monson, 2011). We therefore examined whether PTSD symptoms predict response to a trauma-informed group intervention that has been recently shown to reduce IPA use among veterans, the *Strength at Home Men's program* (*SAH-M;* Taft, Macdonald, Creech, Monson, & Murphy, 2016).

Although efforts to introduce effective treatments for IPA use are not new, until recently, no IPA treatment has shown efficacy in reducing aggression in a military sample within a randomized clinical trial. In fact, IPA treatment programs have generally been shown to be ineffective, evidencing low rates of reduction in IPA recidivism (Babcock, Green, & Robie, 2004; Dunford, 2000; Stover, Meadows, & Kaufman, 2009). The most widely disseminated programs (e.g., Pence & Paymar, 1993) and state IPA practice guidelines (Stuart, Temple, & Moore, 2007) have been criticized because they often do not adequately take into account the influence of trauma exposure and mental health symptoms on IPA (Dutton & Corvo, 2007).

In contrast, the content of *SAH-M* derives from a trauma-informed social information processing model of IPA in military populations which posits that trauma and PTSD symptoms may contribute to biases and deficits in the processing of social information that elevate IPA risk (Taft, Creech, & Kachadourian, 2013; Taft, Murphy, & Creech, 2016; Taft, Walling, Howard, & Monson, 2010). As described in greater detail elsewhere (Taft, Macdonald, et al., 2013, 2016), *SAH-M* is a 12-week, cognitive–behavioral and trauma-informed group treatment for male veterans who have been physically aggressive toward an intimate partner in the past year. Findings from a randomized controlled trial recently indicated that *SAH-M* resulted in greater reductions in the use of physical and psychological IPA (as reported by both veterans and their partners) in comparison to an *enhanced treatment as usual* (ETAU) condition (Taft, Macdonald, et al., 2016).

Consistent with the social information processing model of IPA, compared to nonviolent men, men who use IPA attribute more negative and hostile intentions to female partners, show an emotional bias toward anger, select less-socially competent responses to relationship challenges, and have more positive expectations for use of aggression (Holtzworth-Munroe, 1992; Murphy, Norwood, & Poole, 2014). Our trauma-informed social information processing model extends this work to implicate trauma, and trauma-related problems such as PTSD, as drivers of social information processing deficits (Taft et al., 2015). Prior exposure to trauma may make it more likely that ambiguous situations are interpreted as threatening, and aggressive responses may stem at least in part from negatively biased perceptions of social situations (Chemtob, Novaco, Hamada, Gross, & Smith, 1997). Evidence suggests that social information processing mediates the association between PTSD symptoms and IPA in both civilian and veteran samples (Lamotte, Taft, Weatherill, & Eckhardt, 2017; Taft, Schumm, Marshall, Panuzio, & Holtzworth-Munroe, 2008).

Although PTSD symptoms can be directly reduced through trauma-specific treatments such as Prolonged Exposure (PE; Foa & Rothbaum, 1998) and Cognitive Processing Therapy (CPT; Resick, Monson, & Chard, 2016), these treatments do not necessarily address the specific social information processing biases that increase risk for IPA, cover specific skills that assist in recognizing and correcting such biases within intimate relationships, or address motivational issues and core themes that may be common in trauma-exposed men who engage in violent behavior. While the question of treating the PTSD directly to end IPA remains an open one requiring further study, since PTSD increases IPA risk, there is clear value in examining the extent to which PTSD symptoms may influence response to the *SAH-M* treatment.

Although results from analyses of the primary outcomes in our prior trial supported the efficacy of *SAH-M* in reducing use of IPA (Taft, Macdonald, et al., 2016), further examination of data related to treatment response may assist in efforts to optimize the effectiveness of this intervention. First, *SAH-M* is a trauma-informed treatment, but not a treatment for PTSD. Therefore, it is important to examine the influence of pretreatment PTSD symptoms on response to treatment to determine whether the treatment program could be further optimized to address the influence of PTSD symptoms on IPA. For example, participants with higher levels of PTSD symptoms may have trouble acquiring skills due to difficulties sustaining attention or problems processing emotional content in group. Alternatively, these individuals may acquire the skills addressed in *SAH-M*, but have trouble transferring new behaviors to relationship situations due to continued hyperarousal reactions and activation of trauma-related themes (e.g., mistrust).

Second, the prior analyses of *SAH-M* outcomes focused only on comparisons between the active treatment group and the *ETAU* control condition across three measurement periods (Taft, Macdonald, et al., 2016). As those in the *ETAU* condition received *SAH-M* after a 6-month waiting period (everyone in the trial ultimately received the active treatment), an examination of the influence of *SAH-M* on IPA in the full sample, including outcome

data from the *ETAU* condition, extends findings from the analysis of primary outcomes previously published.

The current study first examined whether pretreatment PTSD symptoms had a main effect in predicting IPA. It was hypothesized that higher levels of pretreatment PTSD symptoms would be associated with increased physical and psychological IPA. This would suggest that PTSD continues to influence IPA, even after receiving a trauma-informed treatment for IPA use. Next an interaction was tested to compare the effect of pretreatment PTSD on physical and psychological IPA between the baseline period and the treatment period. It was hypothesized that pretreatment PTSD would limit treatment effectiveness as evidenced by smaller posttreatment reductions in physical and psychological IPA. This would occur if PTSD symptoms were interfering with treatment. It was also hypothesized that treatment would reduce IPA in the full sample which included *ETAU* participants, who served as the control group in the original clinical trial and received *SAH-M* after a 6-month delay.

Method

Participants and Procedures

Participants were 125 male veterans drawn from a study evaluating the efficacy of *SAH-M* (Taft, Macdonald, et al., 2016). Although there were 135 veterans in the parent trial, this study excludes those participants with incomplete data at the baseline session for all variables ($n = 3$), or who reported no contact with their partner during the study period ($n = 7$). Veterans were recruited from two major metropolitan areas in the northeastern United States by clinician-referrals, self-referrals, and court-referrals. Study procedures were approved by the Institutional Review Boards at each site. Regardless of relationship status, participants were included in the study if there was a self-, collateral- or court-report of at least one act of male-to-female physical IPA over the previous 6 months or severe physical IPA over the past 12 months, or an ongoing legal problem related to IPA. Participants were excluded if they evidenced current substance dependence not in remission, current uncontrolled bipolar or psychotic disorder, or severe cognitive impairment. Experience of trauma was not required for inclusion; however, all participants reported at least one trauma on the Traumatic Life Events Questionnaire (TLEQ; Kubany et al., 2000). Traumatic events rated as most distressing were: exposure to military combat (45.9%), unexpected death of a loved one (9.0%), childhood physical abuse (6.1%), witnessing family violence as a child (6.1%), and car accident (5.7%); all other events were endorsed as most distressing by fewer than 5.0% of the sample.

Additional demographic characteristics and military service history of the sample are provided in Table 1. Regarding military service history, 28.5% of the sample was currently on Active Duty or in the National Guard or Reserves and 72.1% reported a junior-enlisted rank. Fifty-eight percent of the sample had a previous deployment to the U.S. conflicts in and around Iraq and Afghanistan. The average years of education in the sample was 12.99 ($SD = 1.99$).

As described in greater detail in Taft, Macdonald, et al., 2016, after a brief phone screen for eligibility, participants completed an intake assessment session at which they provided written informed consent and then completed an assessment to determine their eligibility for the parent study. Randomization to study condition was conducted in blocks of 4–5 participants using a random number generator to receive either *SAH-M* immediately, or *SAH-M* after a 6 month period of *ETAU*. Participants completed a total of four assessments at 3-month intervals for a 9-month period of time: intake (0-month), 3-month, 6-month and 9-month. The *SAH-M* condition received the treatment between the intake and the 3-month assessments. The *ETAU* condition received the treatment between the 6-month and 9-month assessments. Veterans were paid 50 dollars for completing each assessment.

Table 1
Demographic and Military Service History

Demographics and military history of study sample ($N = 125$)	*M/N*	*SD/%*
Race[1]		
White	96	76.8
Black or African American	15	12.0
Asian	1	.8
Hispanic	2	1.6
Other	7	5.60
Relationship status		
Married	45	37.5
Separated or Divorced	28	23.4
Dating or Engaged	31	24.8
Single	16	13.3
Employed full or part time	51	41.8
Court involved	71	56.8
Military branch		
Air force	7	5.6
Army	62	49.6
Marines	23	18.4
Navy	15	12.0

[1] race/ethnicity, marital status, missing for 4 participants; Branch of service not reported for 18.

Collateral information on IPA use was provided by 118 female partners (82.2%) who provided verbal informed consent for telephone interviews. Six female partners declined to be in the study, and 18 were unable to be reached. Partners were contacted even if the veteran reported that the relationship had dissolved. Female partners' verbal consent was obtained via telephone prior to completing assessments and partners were assessed at time points corresponding with their partner's assessments. Prior research demonstrates high levels of consistency between telephone administrations and in-person administration of the IPA measure used (Lawrence, Heyman, & O'Leary, 1995). Assessments were completed by research assistants or project coordinators who were not the treating clinician for each case. Prior to all assessments, partners were asked if they were in a safe and private place to answer questions. If not, a call-back time was scheduled. Additional safety procedures included the provision of information regarding available emergency resources including crisis hotlines, emergency room/urgent care center numbers, and shelter services. Partners were also asked about their safety and offered safety planning information. Doctoral-level clinical psychologists were available for consultation. Following the assessment, partners who expressed interest in clinical services were provided with referrals. Partners were paid 50 dollars for completing each assessment.

Measures

PTSD symptoms. PTSD symptoms were assessed by trained master's and doctoral-level assessors using the Clinician-Administered PTSD Scale (CAPS; Blake et al., 1995). The CAPS is a widely used semistructured clinician interview that assesses PTSD diagnostic status and symptom severity consistent with Diagnostic and Statistical Manual – 4th edition (*DSM–IV*; American Psychiatric Association, 2000) criteria. For each of the 17 *DSM–IV* symptoms of PTSD, interviewers rated the frequency and severity of the symptom in the past month based on participant responses to semistructured interview questions. The CAPS was scored by summing frequency and severity ratings for each item into one summary score. This score was used as a continuous variable in analyses. All participants in the present study were administered the full CAPS interview; 84.0% (n = 105) met both *DSM–IV* Criterion A1 (exposure to traumatic event) and A2 (experience of fear, helplessness or horror), however, in anticipation that A2 would be removed from *DSM–5* (American Psychiatric Association, 2013) due to its lack of specificity (Friedman, 2013), participants were not required to meet criterion A2 to be administered the CAPS.

The CAPS has demonstrated strong psychometric properties, including excellent reliability, and excellent convergent and discriminant validity (Weathers, Keane, & Davidson, 2001). All CAPS assessments were conducted by assessors who were masked to participants' treatment condition and audio recorded. A random sample of 10% of each site's administrations was evaluated by an independent doctoral-level clinical psychologist for reliability. In the current study, an intraclass correlation (ICC; Shrout & Fleiss, 1979) between the assessors' and independent assessment reliability monitor's CAPS ratings was excellent (ICC = .995), and diagnostic concordance on the CAPS was excellent (κ = .851; Fleiss, 1981).

Intimate partner aggression. Use of physical and psychological IPA was measured using the 12-item Physical Assault and the 8-item Psychological Aggression subscales of the *Revised Conflict Tactics Scales* (CTS2; Straus, Hamby, Boney-McCoy, & Sugarman, 1996). At four time-points, male participants and their female partners reported the frequency with which the male participant had engaged in IPA behaviors in the past 3 months on a scale ranging from 0 (*never*) to 6 (*more than 20 times*). Participant-reported and partner-reported items were compared and the larger of the two individual item responses were used in the calculation of CTS2 scores (Taft, O'Farrell, et al., 2010).

Following the recommendations of Straus and colleagues, prevalence scores for physical aggression were then calculated (Straus et al., 1996). Prevalence scores indicate whether one or more acts on the scale occurred in the past three months; a score of one indicates one or more types of physical aggression occurred, whereas a score of zero indicates no physical aggression occurred. Psychological aggression was calculated as a frequency score, which was more appropriate due to the greater overall incidence of psychological aggression in the sample (LaMotte, Taft, Weatherill, Scott, & Eckhardt, 2014). Items were recoded to represent the estimated frequency of the behavior, with mid points used for responses containing a range of scores (e.g., "3 to 5 times" received a score of 4; Straus et al., 1996), and reports of more than 20 times recoded as 25. Mean scores for physical and psychological IPA over time are presented in Table 2.

Intervention

SAH-M is a 12-session trauma-informed, cognitive–behavioral group treatment designed specifically to help military populations reduce and end their use of IPA (Taft, Macdonald, et al., 2016; Taft, Murphy, et al., 2016). It consists of 12 120-min group sessions organized into four treatment phases: (a) psychoeducation on IPA and common reactions to trauma; (b) conflict management skills; (c) coping strategies and negative thought patterns; and (d) communication skills. Participants are asked to complete practice assignments at home.

Components of the treatment that target social information processing deficits include psychoeducation on "survival mode" thinking and alternative thoughts, self-monitoring of thoughts, feelings, and physical reactions, and learning and practicing "Time Outs" to diffuse difficult relationship situations and allow time to recognize and correct social information processing biases (Taft, Murphy, et al., 2016). Other trauma-informed elements of the treatment program include conducting sessions in a safe space, prioritizing the development of rapport and trust, working on enhancing motivational readiness for change, and removing stigmatizing labels such as "batterer," "perpetrator," or "victim." The program content seeks to educate clients on the influence of trauma and PTSD symptoms on intimate relationship problems. Consistent throughout the *SAH-M* program is a trauma-informed

Table 2
IPA Means and Standard Deviations Over Time

Condition	Time			
	Intake	3 Month	6 Month	9 Month
SAH-M Group	Baseline	Treatment	Treatment	Treatment
Physical aggression	.79 (.41)	.25 (.44)	.20 (.40)	.23 (.43)
Psychological aggression	51.51 (41.08)	24.43 (31.51)	28.57 (36.37)	17.12 (27.19)
ETAU Group	Baseline	Baseline	Baseline	Treatment
Physical aggression	.69 (.47)	.45 (.50)	.28 (.45)	.26 (.44)
Psychological aggression	47.27 (40.68)	37.94 (42.71)	28.54 (31.52)	26.76 (33.22)

Note. IPA = intimate partner aggression; *SHA-M = Strength at Home Men's Program*; *ETAU = enhanced treatment as usual*. The "Treatment" variable refers to data on use of IPA that was collected regarding the 12-week treatment period and the follow-up period. Means are presented for each time period with standard deviations in parentheses.

philosophy that clinicians can recognize the devastating impacts of trauma on clients (Harris & Fallot, 2001) while also the holding the client accountable and responsible for their abusive behavior (Taft, Murphy, et al., 2016). Trauma-informed care such as *SAH-M* is different than trauma-specific care, which specifically seeks to treat the symptoms and sequelae of trauma exposure such as PTSD (Harris & Fallot, 2001).

As described in additional detail in Taft, Macdonald, et al. (2016), individuals randomized to the *ETAU* condition received referrals to mental health treatment (within and outside VA), resources (for connecting with other IPA services in the community), assessment and monitoring of IPA, and a check-in call between assessments. After a 6-month period of time, individuals in this condition received the *SAH-M* intervention. A series of chi-square tests for independence were performed to determine if the *ETAU* condition reported greater engagement in treatment while waiting for and receiving the *SAH-M* intervention. Results revealed no statistically significant differences between men randomized to *SAH-M* or *ETAU* on engagement in individual, IPA, couples, substance abuse, inpatient psychiatric, or other treatment services at the 3-month, 6-month or 9-month assessments (all p's $> .05$).

Analyses

Analyses were conducted on the 125 participants who had complete data for all independent variables and reported contact with their intimate partner during the study period. Table 2 shows how IPA decreases over the study period for both the *SAH-M* and *ETAU* conditions. Analyses determine how IPA was influenced by (a) time; the overall trend of IPA over time for both the *SAH-M* and *ETAU* conditions; (b) treatment; the effect of treatment in both the *SAH-M* and *ETAU* conditions, compared to baseline measurements; (c) condition; any remaining differences between the *SAH-M* and *ETAU* conditions. A significant time effect indicates how much IPA changes in each 3-month period, across both the *SAH-M* and *ETAU* conditions. A significant treatment effect indicates the magnitude of the difference in IPA between the baseline periods and the treatment periods. A significant condition effect would indicate that the delayed application of *SAH-M* resulted in different outcomes than the immediate application of *SAH-M*. No remaining differences between conditions were expected because assignment was randomized. Analyses also controlled for the number of sessions attended.

Generalized linear modeling (SAS Version 9.2, PROC GLIMMIX, method = RSPL) was used to analyze repeated measures of physical and psychological IPA. Physical IPA was recoded as a dichotomous variable due to the low frequency of counts greater than 1; psychological IPA remained a count variable. Physical IPA was modeled using a binomial distribution with a logit link, and transformed to odds ratios using exp(b). Psychological IPA was modeled using a Poisson distribution with a log link, with a log(time) offset and transformed to rates using exp(b). Models included a random intercept to estimate individual differences in baseline IPA level (i.e., repeated measurements clustered within-person). Models also included variables for treatment, baseline PTSD symptoms (standardized with $M = 0$ and variance = 1), an *ETAU* cohort variable, and the number of sessions attended. Models included the interaction between PTSD and treatment. Interactions were probed by calculating simple slopes and the difference between the simple slopes using SAS Proc PLM. Interactions were graphed using Microsoft Excel (http://www.jeremydawson.co.uk/slopes.htm).

Results

PTSD Symptoms

The mean CAPS score for participants in the sample was 51.83 ($N = 125$, $SD = 29.35$) and 55.2% of the sample met criteria for a diagnosis of PTSD based on a total CAPS score greater than 45 and meeting all criteria for a *DSM–IV* diagnosis of PTSD (Weathers, Ruscio, & Keane, 1999). Although the proportion of the sample meeting diagnostic threshold for PTSD was higher in the *ETAU* (58.0%) than the *SAH-M group (42.0%), a chi square test indicated there was no between-groups difference in the proportion of the sample meeting the threshold for a diagnosis of PTSD* ($\chi^2 = 2.83$, $p = .09$). An independent samples t test, however, indicated PTSD symptoms were higher in the *ETAU* group ($M = 57.08$, $SD = 27.28$) than in the *SAH-M* group ($M = 46.30$, $SD = 27.28$), $t(123) = -2.08$, $p = .04$.

Physical Aggression

A random intercept model was estimated to calculate the effect of the intervention on physical IPA. Results are presented in Table 3. The intercept is the odds of experiencing physical IPA in a 3-month period. The intervention had a strong effect; physical IPA was 56% less likely for patients who have received the treatment, after accounting for the effect of time and the covariates. Results indicate a strong effect of time; physical IPA was 45% less likely for every 3-month period following enrollment in the study. Further, there was no significant difference between treatment conditions, indicating that the delayed application of *SAH-M* to the *ETAU* control group was not less effective than the initial application of *SAH-M* to the experimental group. PTSD had a strong effect. An increase of one standard deviation in PTSD symptoms was associated with 60% increased risk of physical IPA. There was no significant interaction between PTSD symptoms and the receipt of treatment. A wide confidence interval indicates that the effect of treatment for physical IPA is not precise; there is a large proportion of unexplained error in the treatment estimate. This may indicate the presence of an unmeasured moderator variable, a condition under which treatment is more or less effective.

Psychological Aggression

A random intercept model was estimated to calculate the effect of the intervention on psychological IPA. Results are presented in Table 4. The intercept is the average number of events in a 3-month period. The intervention had a modest effect on psychological IPA; number of psychological IPA incidents for the veterans receiving treatment was 19% lower than for veterans who had not yet received treatment. There was a strong effect of time, with the number of psychological IPA incidents decreasing, on average, by 50% every 3-month period. Again, there was no significant difference between study conditions, indicating that the delayed intervention was not significantly different than the immediate

Table 3
Odds Ratio Estimates for Treatment Effects and Covariates of Physical IPA Incidence

Variable	Model 1			Model 2		
	Estimate	95% confidence interval	*p*-value	Estimate	95% confidence interval	*p*-value
Intercept	4.55	(2.04, 10.18)	<.01	4.60	(2.05, 10.28)	<.01
Treatment	.44	(.20, .97)	<.05	.44	(.29, .65)	<.05
Time	.55	(.40, .74)	<.01	.54	(.46, .64)	<.01
ETAU Group	1.75	(.85, 3.59)	.13	1.74	(1.20, 2.51)	.13
PTSD	1.60[a]	(1.20, 2.15)	<.01	1.50[a]	(1.25, 1.81)	<.01
# Sessions	.94	(.88, .99)	<.05	.94	(.88, .99)	<.05
Interaction				1.16	(.72, 1.86)	.55

Note. IPA = intimate partner aggression; *ETAU* = *enhanced treatment as usual*; PTSD = posttraumatic stress disorder. Model 1 tests the main effects. Model 2 adds the interaction term. Estimates are odds ratios. Intercept is the baseline odds of physical IPA in the three-month period.
[a] Clinician-Administered PTSD Scale (CAPS) score was standardized with a $M = 0$, standard deviation = 1 to aid interpretation.

intervention. PTSD had a moderate effect. An increase of one standard deviation in PTSD symptoms is associated with a 36% increase in psychological IPA incidents. A significant interaction was observed between PTSD symptoms and receipt of treatment. During the baseline period, the odds ratio for PTSD was 1.32 with a 95% confidence interval (1.07, 1.62). During the treatment period, the odds ratio for PTSD was 1.44 with a 95% confidence interval (1.17, 1.77). The difference between these two simple slopes can be represented by an odds ratio of 1.09 with a 95% confidence interval (1.05, 1.13). This indicates that PTSD has a modest impact on the effectiveness of the *SAH-M* treatment, by decreasing the treatment effect for psychological IPA between 5% and 13% for a one standard deviation increase in PTSD symptoms. Figure 1 shows that this effect of PTSD on treatment effectiveness is small.

Discussion

The present study extends findings from a randomized controlled trial supporting the efficacy of *SAH-M* in reducing physical and psychological IPA (Taft, Macdonald, et al., 2016). As expected, results indicated there was a significant effect of treatment on reducing IPA in the full sample, including previously unanalyzed outcome data from the *ETAU* control condition. The hypothesized main effect of PTSD symptoms on physical and psychological IPA was supported. PTSD symptoms had a strong association with both physical and psychological IPA after accounting for the effects of time, treatment, study condition, and the number of sessions attended. The hypothesis that PTSD interferes with treatment effectiveness was not strongly supported. The interaction was only observed for psychological IPA, not physical IPA. While it may be the case that the large proportion of unexplained error variance in the treatment estimate obscured interaction results from physical IPA, the clinical significance of the interaction for psychological IPA was minimal.

The study results therefore suggest that while there was no interaction between PTSD symptoms and treatment, treatment outcomes may be strengthened through additional direct treatment of PTSD symptoms. Further research is needed to determine the optimal timing and format of such intervention, for example whether PTSD treatment should be delivered before, concurrently with, or after, IPA intervention. Given that many *SAH-M* participants were court-ordered to receive IPA services (and may have

Table 4
Odds Ratio Estimates for Treatment Effects and Covariates of Psychological IPA Frequency

Variable	Model 1			Model 2		
	Estimate	95% confidence interval	*p*-value	Estimate	95% confidence interval	*p*-value
Intercept	59.92	(41.83, 85.84)	<.01	60.12	(41.96, 86.14)	<.01
Treatment	.81	(.76, .86)	<.01	.80	(.77, .83)	<.01
Time	.50	(.49, .51)	<.01	.50	(.44, .56)	<.01
ETAU Group	1.01	(.67, 1.45)	.97	1.02	(.82, 1.25)	.94
PTSD	1.36[a]	(1.11, 1.67)	<.01	1.32a	(1.19, 1.46)	<.01
# Sessions	.98	(.94, 1.03)	.50	.99	(.94, 1.03)	.51
Interaction				1.09	(1.07, 1.11)	<.01

Note. IPA = intimate partner aggression; *ETAU* = *enhanced treatment as usual*; PTSD = posttraumatic stress disorder. Model 1 tests the main effects. Model 2 adds the interaction term. Estimates are odds ratios. Intercept is the baseline rate of psychological IPA in the three-month period.
[a] Clinician-Administered PTSD Scale (CAPS) score was standardized with a $M = 0$, standard deviation = 1 to aid interpretation.

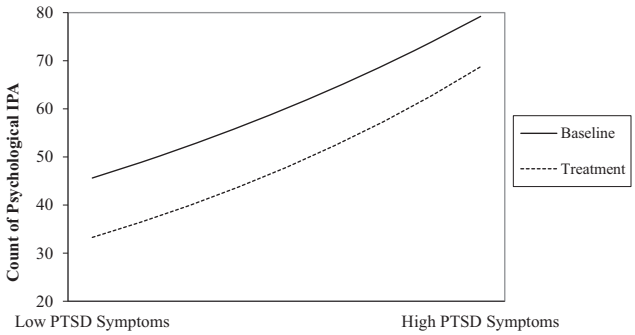

Figure 1. Interaction of posttraumatic stress disorder (PTSD) and treatment on psychological intimate partner aggression (IPA) counts.

had little or no prior engagement with mental health services), efforts to engage them immediately into PTSD treatment before addressing IPA and related safety issues may be counterproductive.

Another option is to adapt the *SAH-M* treatment to directly address the relationship between PTSD symptoms and IPA through the addition of new content and added sessions. However, such adaptations may present challenges for participants who have few traditional symptoms of PTSD. Alternatively, it may be feasible to develop a modular treatment component to directly address PTSD symptoms within *SAH-M*, specifically for those with significant PTSD symptoms. Finally, *SAH-M* may be combined with posttreatment strategies, such as motivational interviewing, as a cost-effective method of transferring gains made in *SAH-M* treatment into enhanced readiness for PTSD treatment. Indeed, one focus of the final session of *SAH-M* is to review treatment progress and examine the need to move from a trauma-informed treatment approach to a trauma-focused approach. Future research is needed to determine how to best facilitate such transitions for those with elevated symptoms of PTSD.

An important question raised by these findings is the extent to which early treatment for PTSD may serve to reduce IPA risk and thus prevent the need for treatments such as *SAH-M*. Along these lines, it may be important to consider the extent to which IPA may cease if PTSD is effectively treated. Prior work examining the influence of behavioral marital therapy (BMT) on IPA among couples in which the male partner was also abusing alcohol offers an example; those individuals whose alcohol use had remitted after BMT no longer had elevated IPA use in comparison to matched controls, while those who had relapsed remained at elevated levels of IPA (O'Farrell & Murphy, 1995). Future research is needed to determine whether remission of PTSD symptoms is similarly associated with cessation of IPA. However, recent work has shown that approximately 50% of individuals still had PTSD after receiving high quality evidence-based treatment (e.g., Eftekhari et al., 2013; Resick et al., 2017). In addition, findings from a study of CPT suggested that improvements in the avoidance symptoms of PTSD were associated with declines in extended family adjustment (Monson et al., 2012), suggesting that attention to PTSD alone, without concurrent improvement in relationship skills, may not be sufficient. Thus findings from the current study suggest that the combination of *SAH-M* with evidence-based treatment for PTSD may be most effective in reducing IPA in those with high levels of PTSD symptoms.

The current findings also underscore the need to include formal assessment and treatment planning for PTSD as a standard part of intake procedures prior to IPA treatment. Available data from both community-based and veteran samples highlight high rates of trauma exposures among individuals who engage in IPA (Maguire et al., 2015; Semiatin, Torres, LaMotte, Portnoy, & Murphy, 2017). Given that most individuals who are court-ordered to IPA treatment will receive that treatment within a program that is not trauma-informed and does not include such assessment, a vast number of individuals may go through such programs with untreated PTSD. In our current work to implement *SAH-M* at Veterans Affairs hospitals nationwide, we recommend referral for PTSD treatment when the veteran exceeds empirical cut-offs for probable PTSD diagnosis on a screening instrument. Across the system of IPA treatment programs nationwide, implementation of assessment and treatment for PTSD as part of the standard of care is likely needed if we are to reduce rates of IPA.

Current study findings extend the work of Taft, Macdonald, et al. (2016) by providing a more robust estimation of efficacy by also including treatment outcome data from the *ETAU* group, and accounting for the effect of time, which was strong for both physical and psychological IPA. The strong effect of time is likely related to monitoring of IPA by the justice system in those who were justice involved, but may also be attributable to a Hawthorne effect, in which participating in assessments and other study related procedures influenced IPA (McCambridge, Witton & Elbourne, 2014). An important limitation of these data is that there was less time to observe IPA after treatment in the *ETAU* condition and therefore results for this group could be vulnerable to concerns regarding reporting bias. Despite this limitation, results support the effectiveness of the *SAH-M* intervention in reducing IPA use among veterans and service members.

Another limitation is that the sample was comprised primarily of Caucasian and heterosexual veterans, which may limit generalizability of the findings to more diverse samples of veterans. In addition, since the study enrolled only veterans or active duty service members, generalization to the general population is limited. In addition, this study did not examine the influence of *SAH-M* on the use of aggression by both partners. Results also indicated there was a baseline difference in PTSD symptoms between the *SAH-M* and the *ETAU* control group, however, concerns regarding bias of results are mitigated given that treatment condition was controlled for in statistical models. Strengths of the study are the randomized design, use of masked assessors, gold-standard clinical interview for PTSD symptoms, inclusion of partner report of IPA to mitigate any underreporting, and multiple time points of assessments to allow longitudinal analysis.

Despite great attention paid to the public health problem of IPA and its various impacts, until recently there has been little evidence from randomized clinical trials to suggest the efficacy of any treatment program in reducing use of IPA. Widely used intervention models and many state guidelines for IPA interventions ignore or downplay the influence of trauma despite the wealth of scientific evidence indicating that trauma and PTSD symptoms convey significant risk for IPA. Results from the current study are promising in that they support the effectiveness of the *SAH-M* program in reducing IPA in veterans and service members. Findings also

point to how we may improve this efficacious trauma-informed intervention, and perhaps other IPA interventions, by incorporating evidence-based treatment for PTSD. Results also underscore the need for all IPA programs to include assessment of trauma and PTSD.

References

American Psychiatric Association. (2000). Diagnostic and statistical manual of mental disorders: *DSM–IV*. (4th ed., text rev.). Washington, DC: Author.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.

Babcock, J. C., Green, C. E., & Robie, C. (2004). Does batterers' treatment work? A meta-analytic review of domestic violence treatment. *Clinical Psychology Review, 23,* 1023–1053. http://dx.doi.org/10.1016/j.cpr.2002.07.001

Blake, D. D., Weathers, F. W., Nagy, L. M., Kaloupek, D. G., Gusman, F. D., Charney, D. S., & Keane, T. M. (1995). The development of a Clinician-Administered PTSD Scale. *Journal of Traumatic Stress, 8,* 75–90. http://dx.doi.org/10.1002/jts.2490080106

Chemtob, C. M., Novaco, R. W., Hamada, R. S., Gross, D. M., & Smith, G. (1997). Anger regulation deficits in combat-related posttraumatic stress disorder. *Journal of Traumatic Stress, 10,* 17–36. http://dx.doi.org/10.1002/jts.2490100104

Dunford, F. W. (2000). The San Diego Navy experiment: An assessment of interventions for men who assault their wives. *Journal of Consulting and Clinical Psychology, 68,* 468–476. http://dx.doi.org/10.1037/0022-006X.68.3.468

Dutton, D. G., & Corvo, K. (2007). The Duluth model: A data-impervious paradigm and a failed Strategy. *Aggression and Violent Behavior, 12,* 658–667. http://dx.doi.org/10.1016/j.avb.2007.03.002

Eftekhari, A., Ruzek, J. I., Crowley, J. J., Rosen, C. S., Greenbaum, M. A., & Karlin, B. E. (2013). Effectiveness of national implementation of prolonged exposure therapy in Veterans Affairs care. *Journal of the American Medical Association Psychiatry, 70,* 949–955. http://dx.doi.org/10.1001/jamapsychiatry.2013.36

Fleiss, J. L. (1981). Balanced incomplete block designs for inter-rater reliability studies. *Applied Psychological Measurement, 5,* 105–112. http://dx.doi.org/10.1177/014662168100500115

Foa, E. B., & Rothbaum, B. O. (1998). *Treating the trauma of rape*. New York, NY: Guilford Press.

Friedman, M. J. (2013). Finalizing PTSD in *DSM–5*: Getting here from there and where to go next. *Journal of Traumatic Stress, 26,* 548–556. http://dx.doi.org/10.1002/jts.21840

Harris, M., & Fallot, R. D. (2001). Envisioning a trauma-informed service system: A vital paradigm shift. *New Directions for Mental Health Services, 2001,* 3–22. http://dx.doi.org/10.1002/yd.23320018903

Holtzworth-Munroe, A. (1992). Social skill deficits in maritally violent men: Interpreting the data using a social information processing model. *Clinical Psychology Review, 12,* 605–617. http://dx.doi.org/10.1016/0272-7358(92)90134-T

Kubany, E. S., Leisen, M. B., Kaplan, A. S., Watson, S. B., Haynes, S. N., Owens, J. A., & Burns, K. (2000). Development and preliminary validation of a brief broad-spectrum measure of trauma exposure: The Traumatic Life Events Questionnaire. *Psychological Assessment, 12,* 210–224. http://dx.doi.org/10.1037/1040-3590.12.2.210

LaMotte, A. D., Taft, C. T., Weatherill, R. P., & Eckhardt, C. I. (2017). Social skills deficits as a mediator between PTSD symptoms and intimate partner aggression in returning veterans. *Journal of Family Psychology, 31,* 105–110. http://dx.doi.org/10.1037/fam0000215

LaMotte, A. D., Taft, C. T., Weatherill, R. P., Scott, J. P., & Eckhardt, C. I. (2014). Examining intimate partner aggression assessment among returning veterans and their partners. *Psychological Assessment, 26,* 8–15. http://dx.doi.org/10.1037/a0034579

Lawrence, E., Heyman, R. E., & O'Leary, K. D. (1995). Correspondence between telephone and written assessments of physical violence in marriage. *Behavior Therapy, 26,* 671–680. http://dx.doi.org/10.1016/S0005-7894(05)80038-3

Maguire, E., Macdonald, A., Krill, S., Holowka, D. W., Marx, B. P., Woodward, H., . . . Taft, C. T. (2015). Examining trauma and posttraumatic stress disorder symptoms in court-mandated intimate partner violence perpetrators. *Psychological Trauma: Theory, Research, Practice and Policy, 7,* 473–478. http://dx.doi.org/10.1037/a0039253

Marshall, A. D., Panuzio, J., & Taft, C. T. (2005). Intimate partner violence among military veterans and active duty servicemen. *Clinical Psychology Review, 25,* 862–876. http://dx.doi.org/10.1016/j.cpr.2005.05.009

McCambridge, J., Witton, J., & Elbourne, D. R. (2014). Systematic review of the Hawthorne effect: New concepts are needed to study research participation effects. *Journal of Clinical Epidemiology, 67,* 267–277. http://dx.doi.org/10.1016/j.jclinepi.2013.08.015

Monson, C. M., Macdonald, A., Vorstenbosch, V., Shnaider, P., Goldstein, E. S., Ferrier-Auerbach, A. G., & Mocciola, K. E. (2012). Changes in social adjustment with cognitive processing therapy: Effects of treatment and association with PTSD symptom change. *Journal of Traumatic Stress, 25,* 519–526. http://dx.doi.org/10.1002/jts.21735

Murphy, C. M., Norwood, A. E., & Poole, G. M. (2014). Intimate partner violence: A biopsychosocial, social information processing perspective. In C. R. Agnew & S. C. South (Eds.), *Interpersonal relationships and health: social and clinical psychological mechanisms* (pp. 156–178). New York, NY: Oxford University Press. http://dx.doi.org/10.1093/acprof:oso/9780199936632.003.0008

O'Farrell, T. J., & Murphy, C. M. (1995). Marital violence before and after alcoholism treatment. *Journal of Consulting and Clinical Psychology, 63,* 256–262. http://dx.doi.org/10.1037/0022-006X.63.2.256

Okuda, M., Olfson, M., Wang, S., Rubio, J. M., Xu, Y., & Blanco, C. (2015). Correlates of intimate partner violence perpetration: Results from a National Epidemiologic Survey. *Journal of Traumatic Stress, 28,* 49–56. http://dx.doi.org/10.1002/jts.21986

Pence, E., & Paymar, M. (1993). *Education groups for men who batter: The Duluth model*. New York, NY: Springer.

Resick, P. A., Monson, C. M., & Chard, K. M. (2016). *Cognitive processing therapy for PTSD: A comprehensive manual*. New York, NY: Guilford Press Publications.

Resick, P. A., Wachen, J. S., Dondanville, K. A., Pruiksma, K. E., Yarvis, J. S., Peterson, A. L., . . . the and the STRONG STAR Consortium. (2017). Effect of group vs individual Cognitive Processing Therapy in active-duty military seeking treatment for Posttraumatic Stress Disorder: A randomized clinical trial. *Journal of the American Medical Association Psychiatry, 74,* 28–36. http://dx.doi.org/10.1001/jamapsychiatry.2016.2729

Semiatin, J. N., Torres, S., LaMotte, A. D., Portnoy, G. A., & Murphy, C. M. (2017). Trauma exposure, PTSD symptoms, and presenting clinical problems among male perpetrators of intimate partner violence. *Psychology of Violence, 7,* 91–100. http://dx.doi.org/10.1037/vio0000041

Shrout, P. E., & Fleiss, J. L. (1979). Intraclass correlations: Uses in assessing rater reliability. *Psychological Bulletin, 86,* 420–428. http://dx.doi.org/10.1037/0033-2909.86.2.420

Stover, C. S., Meadows, A. L., & Kaufman, J. (2009). Interventions for intimate partner violence: Review and implications for evidence-based practice. *Professional Psychology: Research and Practice, 40,* 223–233. http://dx.doi.org/10.1037/a0012718

Straus, M. A., Hamby, S. L., Boney-McCoy, S., & Sugarman, D. B. (1996). The revised Conflict Tactics Scales (CTS2): Development and preliminary psychometric data. *Journal of Family Issues, 17,* 283–316. http://dx.doi.org/10.1177/019251396017003001

Stuart, G. L., Temple, J. R., & Moore, T. M. (2007). Improving batterer intervention programs through theory-based research. *Journal of the American Medical Association, 298,* 560–562. http://dx.doi.org/10.1001/jama.298.5.560

Taft, C. T., Creech, S. K., & Kachadourian, L. (2013). Assessment and treatment of posttraumatic anger and aggression: A review. *Journal of Research Rehabilitation and Development, 49,* 777–788. http://dx.doi.org/10.1682/JRRD.2011.09.0156

Taft, C. T., Macdonald, A., Creech, S. K., Monson, C. M., & Murphy, C. M. (2016). A randomized control clinical trial of the strength at home men's program for partner violence in military veterans. *The Journal of Clinical Psychiatry, 77,* 1168–1175. http://dx.doi.org/10.4088/JCP.15m10020

Taft, C. T., Macdonald, A., Monson, C. M., Walling, S. M., Resick, P. A., & Murphy, C. M. (2013). "Strength at home" group intervention for military populations engaging in intimate partner violence: Pilot findings. *Journal of Family Violence, 28,* 225–231. http://dx.doi.org/10.1007/s10896-013-9496-y

Taft, C. T., Murphy, C. M., & Creech, S. K. (2016). *Trauma-informed treatment and prevention of intimate partner violence*. Washington, DC: American Psychological Association. http://dx.doi.org/10.1037/14918-000

Taft, C. T., O'Farrell, T. J., Doron-LaMarca, S., Panuzio, J., Suvak, M. K., Gagnon, D. R., & Murphy, C. M. (2010). Longitudinal risk factors for intimate partner violence among men in treatment for alcohol use disorders. *Journal of Consulting and Clinical Psychology, 78,* 924–935. http://dx.doi.org/10.1037/a0021093

Taft, C. T., Schumm, J. A., Marshall, A. D., Panuzio, J., & Holtzworth-Munroe, A. (2008). Family-of-origin maltreatment, posttraumatic stress disorder symptoms, social information processing deficits, and relationship abuse perpetration. *Journal of Abnormal Psychology, 117,* 637–646. http://dx.doi.org/10.1037/0021-843X.117.3.637

Taft, C. T., Walling, S. M., Howard, J. M., & Monson, C. (2010). Trauma, PTSD, and partner violence in military families. In S. M. Wadsworth & D. S. Riggs (Eds.), *Risk and resilience in U.S. military families* (pp. 195–212). Berlin, Germany: Springer Science and Business Media.

Taft, C. T., Watkins, L. E., Stafford, J., Street, A. E., & Monson, C. M. (2011). Posttraumatic stress disorder and intimate relationship problems: A meta-analysis. *Journal of Consulting and Clinical Psychology, 79,* 22–33. http://dx.doi.org/10.1037/a0022196

Taft, C. T., Weatherill, R. P., Scott, J. P., Thomas, S. A., Kang, H. K., & Eckhardt, C. I. (2015). Social information processing in anger expression and partner violence in returning U.S. veterans. *Journal of Traumatic Stress, 28,* 314–321. http://dx.doi.org/10.1002/jts.22017

Weathers, F. W., Keane, T. M., & Davidson, J. R. (2001). Clinician-administered PTSD Scale: A review of the first ten years of research. *Depression and Anxiety, 13,* 132–156. http://dx.doi.org/10.1002/da.1029

Weathers, F. W., Ruscio, A. M., & Keane, T. M. (1999). Psychometric properties of nine scoring rules for the Clinician-Administrated Posttraumatic Stress Disorder Scale. *Psychological Assessment, 11,* 124–133. http://dx.doi.org/10.1037/1040-3590.11.2.124

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