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Temporal Associations Between Posttraumatic Stress Symptoms and Depression in Response to Online Expressive Writing Interventions in a Hispanic Sample

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Running Head: Cross-lagged model

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Abstract

Some expressive writing (EW) interventions targeting posttraumatic stress symptoms (PTSS) may reduce both PTSS and comorbid depression symptoms. The temporal associations between PTSS and depression symptom levels in response to EW interventions are unknown. This study examined the directionality of PTSS and depression symptom levels from baseline to 1-week, 1-month, and 3-month follow-ups of two online EW interventions in a Hispanic sample with diverse trauma experiences. Participants (n = 70) completed either emotion-focused or fact-focused writing for three consecutive days online. A manifest autoregressive model with cross-lagged effects and treatment condition was analyzed. All but one first-order autoregressive paths were statistically significant, with later PTSS and depression scores significantly predicted by those scores at preceding time points. The cross-lagged effects findings suggest that earlier PTSS levels influenced later depression levels, but earlier depression did not influence later PTSS, demonstrating a unidirectional temporal association. Severe PTSS may hinder EW treatment gains in depression. Superior outcomes for emotion-focused writing relative to fact-focused writing were also found.

Keywords: cross-lagged, expressive writing, traumatic stress symptoms, depression, Hispanics

Temporal associations between posttraumatic stress symptoms and depression in response to online expressive writing interventions in a Hispanic sample

Traumatic life events can trigger a cascade of negative outcomes, including posttraumatic stress disorder (PTSD), posttraumatic stress symptoms (PTSS), and depression. Given high comorbidity between PTSD/PTSS and depression (e.g., Adams et al., 2019; Eddinger et al., 2019; Horesh et al., 2015; Shah et al., 2012), it is important to understand their temporal relationship and how it is impacted by simple cost-effective interventions, such as expressive writing (EW), for treating trauma consequences.

Three temporal pathways have been considered (e.g., Jacobson & Newman, 2017; Schindel-Allon et al., 2010) to explain the high comorbidity between PTSD/PTSS and depression: 1) PTSD/PTSS and depression occurring simultaneously, 2) PTSD/PTSS influencing the severity of depression, and 3) depression impacting the severity of PTSD/PTSS. The first pathway suggests that PTSD/PTSS and depression may be bidirectional risk factors for one another or both caused or exacerbated by other common risk factors. The second pathway may suggest that the maladaptive cognitions and behaviors of PTSD/PTSS (e.g., negative thoughts, avoidance of trauma reminders) cause or exacerbate depression, perhaps by leading to withdrawal from pleasurable experiences or positive interpersonal interactions. The third pathway may be explained by the emergence or increase of depressive symptoms, such as negative affect and a negative self-concept, in response to a traumatic life event, which then causes or exacerbates PTSD/PTSS. These temporal associations can provide important information about initial symptom onset and symptom changes during and after treatment. Examining these temporal pathways with cross-lagged analysis will be important for understanding the development and maintenance of PTSD/PTSS and depression in the absence

of treatment, but it is at least as important to understand how they interact over time in response to an intervention such as expressive writing.

Expressive writing (EW) interventions, originally developed by Pennebaker and Beall (1986), can be an effective treatment for PTSD and PTSS (e.g., Frattaroli, 2006; Sloan et al., 2015). There is some evidence that EW targeting PTSD/PTSS may also reduce comorbid depression in victims of trauma (Hirai et al., 2012; Meston et al., 2013; Sloan et al., 2005; Sloan et al., 2007; van Emmerik et al., 2008), which provides some support for the model of PTSD/PTSS as a causal factor of comorbid depression. However, such findings are not universal, with one study reporting commensurate outcomes between an EW and neutral writing intervention in PTSD symptom reductions and no significant reduction in depression (Sloan et al., 2011), which might suggest more independence between PTSD/PTSS and depression. The relationship between PTSS and depression in response to interventions may be complex and dependent on the intervention and the level of symptom reduction. For example, it may be the case that only EW interventions that strongly improve PTSS/PTSD symptoms are effective for treating comorbid depression. The studies to date, that document decreases of PTSS/PTSD and depression at EW treatment time points, provide an important first step. Examining longitudinal temporal associations between the severity of PTSS and that of depression with EW interventions is the next step and will provide a fuller understanding of whether and how PTSS and depression comorbidity influence the immediate and longitudinal efficacy of EW interventions. This information is needed for planning precise EW interventions for PTSS/PTSD sufferers with depressive symptoms (e.g., determining whether to target PTSS/PTSD first, PTSS/PTSD only, PTSS/PTSD and depression simultaneously).

To our knowledge, no research has directly examined longitudinal temporal associations

between levels of PTSS and those of depression in response to EW. Temporal associations findings with other exposure-based treatments and with assessment-only studies without treatment may provide guidance, but such studies did not investigate associations following treatment and their results do not form a cohesive pattern. For example, over 10 exposure-based sessions targeting civilians, Brown et al. (2018) found a bidirectional association, with PTSD symptoms at one treatment session predicting depression at the next treatment session and depression symptoms also predicting next session PTSD symptom levels. By contrast, in a cognitive processing treatment for veterans, Schumm et al. (2018) reported a unidirectional association, with changes in depression predicting changes in PTSD from baseline to mid treatment, but changes in PTSD symptoms failing to predict changes in depression symptoms. In the literature overall, seemingly contradictory results are common in longitudinal assessments of PTSS and depression, with some finding a bidirectional association (e.g., Horesh et al., 2015; Lenferink et al., 2019; Schindel-Allon et al., 2010), others a unidirectional association with PTSS predicting depression only (Schweininger et al., 2015), and still others a unidirectional association with depression predicting PTSS only (Schindel-Allon et al., 2010). These inconsistent results from related areas make it difficult to confidently predict potential longitudinal temporal associations between the severity of PTSS and that of depression in response to EW interventions, and still more uncertain in an understudied population such as a Hispanic sample.

Examination of a Hispanic sample as part of the temporal association debate is particularly important as the Hispanic population is approximately 18% currently and estimated to reach 27.5% of the US population by 2060 (U.S. Census Bureau, 2019). Further, PTSS and depression are serious problems in the Hispanic community. Hispanic adults have been found to

experience similar or greater PTSD/PTSS than non-Hispanic White adults (e.g., Alcántara et al., 2013; Roberts et al., 2011). In addition, although depression was most prevalent in non-Hispanic White Americans, the prevalence of depression in Latinx/Hispanic Americans was higher than in Asian or African American samples (e.g., Hasin et al., 2018; Lipson et al., 2018; Liu et al., 2019; McLaughlin et al., 2018). Limited but promising evidence for the efficacy of online EW interventions for Hispanic trauma sufferers (Hirai et al., 2012; Hirai et al., 2020) justifies the current examination of temporal associations between levels of PTSS and levels of depression in response to online EW interventions in a Hispanic sample. Hispanic individuals are underserved for their mental health issues (Cardemil et al., 2007; Eisenberg et al., 2007; Hirai et al., 2015; Shea et al., 2019) and the flexible, accessible, low-cost nature of EW treatments make them a prime candidate to address this. Understanding symptom changes in response to EW interventions in Hispanic individuals is a crucial step in attempts to improve treatment access and utilization for this cultural group.

The current study is the first to examine temporal relationships between PTSS and depression symptom levels from baseline to 1-week, 1-month, and 3-month follow-ups of two online EW interventions in a Hispanic sample. The study explored whether the severity of PTSS at an assessment point would predict the severity of depression at the next assessment point or whether the converse relationship (depression severity at a time point predicting PTSS severity at the next time point) would be found.

Method

Author Positionality

There are four authors for the current study. The first author is an Asian female scholar with expertise in PTSD and Anxiety Disorders in minority individuals including Hispanic

Americans and 12 years at an institution enrolling over 90% Hispanic students. She led the initial study design process, data collection, and data analysis. The second author is a Turkish male scholar with expertise in methodology and statistics and co-led the initial study design process and played the lead role in data analysis. The third author is a White U.S.-born female scholar with expertise in PTSD, Mood and Anxiety Disorders and has worked with Hispanic Americans in multiple contexts, including at a Hispanic-Serving Institution for 16 years. The fourth author is a White U.S.-born male scholar with expertise in PTSD, Mood and Anxiety Disorders. Both third and fourth authors contributed to refining the design. All authors worked as a team and contributed to interpreting findings and developing the implications of the study. All authors had regular discussions to ensure the study was guided by their collective expertise and cultural knowledge. This was a collaborative team project that ensured the study was sensitive and appropriate to the context in which it was conducted.

Participants

The present study used data collected for an expressive writing study that investigated the efficacy of two writing prompts, an emotion-focused prompt and a fact-focused prompt, on posttraumatic stress (Hirai et al., 2020). The study started with 99 Hispanic undergraduate student participants (50 in the emotion-focused group and 49 in the fact-focused group) who had self-reported a traumatic life event and posttraumatic stress symptoms associated with the trauma at the time of recruitment. These inclusion criteria were posted on the online sign-up system. In the emotion-focused group, 11 dropped out before the 1-week follow-up, no one additional dropped out before the 1-month follow-up, and 4 dropped out before the 3-month follow-up. In the fact-focused group, 8 dropped out before the 1-week follow-up, 4 dropped out before the 1-month follow-up, and 2 dropped out before the 3- month follow-up. Thus, of the

initial 99, 70 participants completed the three writing sessions and three follow-up assessment sessions and the current data were from these 70 participants. There were 61 females and 9 males. The average age of participants was 20 (*SD* = 2.5). Participants were recruited from the subject pool of a Psychology department at a state university in Texas. At baseline, 40 participants reported symptom levels on the PTSD Checklist–DSM-5 version (Weathers et al., 2013) equal to or exceeding the cutoff score of 33 for a probable PTSD diagnosis. More details about the recruitment procedure, participants, study design, and writing tasks are reported elsewhere (Hirai et al., 2020).

Measures

The Demographic Information Questionnaire asked participants to report demographic information including age, sex, ethnicity, and ancestral descent.

Participants were asked to select a traumatic event to target from a list including adult physical assault, adult sexual assault, natural disaster (e.g., hurricane, tornado), accident (e.g., automobile), childhood physical abuse, childhood sexual abuse, and interpersonal stress (e.g., stalking, emotional abuse, violence in the family).

The PTSD Checklist–DSM-5 version (PCL-5; Weathers et al., 2013) is a 20-item self-report questionnaire that assesses PTSD symptom severity, corresponding to DSM-5 criteria. Participants answered the PCL-5 items in response to the event selected from the event list. The respondent rates each item based on a 5-point Likert scale where 0 is “not at all” and 4 is “extremely.” A total score, obtained by summing the 20 item scores, can be used to establish a probable PTSD diagnosis (Blevins et al., 2015). Specifically, scores between 31 and 33 may suggest a probable PTSD diagnosis (Weathers et al., 2013). A strong reliability estimate for the total scale (alpha = .94) has been reported (Blevins et al., 2015). For the current sample

Cronbach's alphas for the total scale were .91 at baseline, .93 at 1-week follow-up, .95 at 1-month follow-up, and .93 at 3-month follow-up. The PCL-5 and prior PCL versions have been used in past online expressive writing studies (Frankfurt et al., 2019; Krupnick et al., 2017; Sayer et al., 2015; Possemoto et al., 2010; Woud et al., 2019).

The Depression, Anxiety, and Stress Scale 21 (DASS21; Lovibond & Lovibond, 1995) is a 21-item scale consisting of 7-item depression, anxiety, and stress subscales. To examine temporal associations between PTSS and depression, the current study used scores on the DASS depression subscale. Symptoms are rated on a 4-point Likert scale ranging from 0 (did not apply to me at all) to 3 (applied to me very much, or most of the time). A depression subscale score was calculated by summing the seven items of the subscale. To examine depression severity categories, we recalculated those for the DASS42 (Lovibond & Lovibond, 1995). Since the current measure, the DASS21, has half the items of the DASS42, the severity score ranges from the DASS42 were divided in half and the current study considered depression subscale scores of 4 or lower normal, 5 to 6 mild, 7 to 10 moderate, and above 11 severe. Cronbach's alpha coefficients for the DASS21 subscales have ranged from .72 to .97 (Antony et al., 1998). The alpha coefficients for the depression subscale for the present sample were .88 at baseline, .90 at 1-week follow-up, .92 at 1-month follow-up, and .90 at 3-month follow-up. The DASS has been used in past online expressive writing studies (Baikie et al., 2012; Hirai et al., 2012; Nguyen-Feng et al., 2015).

Writing Task Conditions

The current study employed an emotion-focused writing task and a fact-focused writing task (described in detail in Hirai et al., 2012, 2020), that were adapted from Pennebaker's original expressive writing (EW) instructions (Pennebaker & Beall, 1986). All writing tasks were

completed online. Participants in the emotion-focused intervention wrote about emotions and feelings about a traumatic event as well as facts about the traumatic experience. Participants in the fact-focused group focused only on facts about their traumatic event. Participants in both groups were asked to write about the single traumatic event they selected from the event list in all writing tasks.

Procedure

The study was approved by the institutional review board of the university. Participants were recruited via an online sign-up system hosted by the psychology department, with a study description emphasizing traumatic life experience and current associated symptoms. The study consisted of a face-to-face consenting session and six online sessions. In the face-to-face consenting session, those who orally endorsed a traumatic event and current trauma-related symptoms and signed the consent form were randomly assigned to either the emotion-focused or the fact-focused group. They received a copy of an instruction sheet listing dates for six online remote sessions: three writing sessions scheduled for three consecutive days and three follow-up assessment sessions scheduled for 1 week, 1 month, and 3 months after the third writing session. For each session, an email with a link to the EW site was sent to prompt participants to complete the designated session.

On the first day prior to the first writing task, participants completed the demographic questionnaire and the symptom scales online (baseline). At the 1-week, 1-month, and 3-month follow-up assessments, participants completed the symptom scales online. Participants received research credit as compensation.

Data Analysis Plan

A manifest autoregressive model with covariate and cross-lagged effects was analyzed on

the total data (n = 70) using Mplus 7.0 (Muthén & Muthén, 1998-2012). The longitudinal data set consisted of PTSS and depression scores for baseline and three follow-up assessments (1-week, 1-month, and 3-month follow-up) for two intervention conditions (emotion-focused and fact-focused). First, a manifest autoregressive model (first-order model) with an experimental variable but without the cross-lagged effects was tested using maximum likelihood estimation. Next, starting from the baseline assessments, the second-order (baseline to 1-month, 1-week to 3-month) and third order (baseline to 3-month) autoregressive paths were added to examine the remote temporal associations within PTSS and within depression. Next, starting from the previous model, cross-lagged paths were added to examine temporal associations between PTSS and depression. All models allowed the residuals at the same assessment occasion to be correlated in order to account for the shared occasion-specific effects between the two constructs.

Results

Completers vs. dropouts

A series of t-tests and chi-square tests revealed no significant differences between completers (n=70) and dropouts (n=29) for age (p = .33), gender (p = .32), PTSS scores (p = .74) or depressive symptom scores (p = .46) at baseline.

Writing Tasks

A manipulation check was performed. All current participants completed all three writing exercises and all wrote about a traumatic event throughout the exercises. Content of each written account (3 written accounts x 70 participants = 210 in total) was analyzed by the Linguistic Inquiry and Word Count (LIWC; Pennebaker et al., 2007) software and by two master level psychology graduate students trained by the first author, independently. The average total word counts produced by the emotion-focused group were 487 in the first writing session, 415 in the

second writing session, and 387 in the third session, and in the fact-focused group were 459 in the first writing session, 361 in the second writing session, and 333 in the third writing session. The content analysis found that the emotion-focused group produced significantly higher percentages of negative emotion words concerning their traumatic experiences than the fact-focused group at each time (p's < .01). Detailed results of the content analysis are described in Hirai et al. (2020).

To estimate durations of writing sessions, the time stamps recorded at the beginning and end of the second and third writing sessions were used. Because the first writing session included a relatively large assessment battery, durations for the first writing session were not estimated. The average durations for the second writing session were 24 min in the emotion-focused group and 28 min in the fact-focused group, and for the third writing session were 22 min in the emotion-focused group and 26 min in the fact-focused group. Two t-tests revealed no group differences in writing durations for the second session (p = .24) or the third session (p = .29).

Cross-Lagged Model

Means and standard deviations of PTSS and depression for the four assessment points are presented in Table 1. Model fit was examined based on the cutoff scores suggested by Hu and Bentler (1999) for determining acceptable fit: >.95 for Comparative Fit Index (CFI), <.06 for Root Mean Square Error of Approximation (RMSEA), and <.08 for Standardized Root Mean Square Residual (SRMR). The first autoregressive model fit the data poorly, $\chi^2(18) = 65.76$, p < .001; CFI = 0.856, RMSEA = 0.195, 95% CI [0.145, 0.246], SRMR = 0.129. The second model, adding second and third-order autoregressive paths to the first model, had a model fit that was slightly improved, yet it remained poor: $\chi^2(12) = 44.42$, p < .001; CFI = 0.902, RMSEA = 0.196, 95% CI [0.137, 0.260], SRMR = 0.095. The third cross-lagged model fit the data

adequately: $\chi^2(6) = 20.43$, $p < .002$; CFI = 0.957, RMSEA = 0.185, 95% CI [0.101, 0.277], SRMR = 0.041. The large values of the RMSEA were likely due to the small degree of freedom and low sample size (Kenny et al., 2014) and given the simplicity of the final model with a small number of variables, this did not reward RMSEA. Results indicated that the cross-lagged model best fit the data. The path coefficients of the final cross-lagged autoregressive model are presented in Table 2. A diagram of the cross-lagged model using standardized path coefficients is shown in Figure 1.

A stringent analysis examining unstandardized path coefficients revealed that all of the first-order autoregressive paths were statistically significant (all *p*'s <.01), except the effect of depression at 1-month follow-up on depression at 3-month follow-up (*p* =.09). None of the second and third-order paths within PTSS were significant. The paths from baseline to 1-month follow-up and to 3-month follow-up within depression were significant (*p's* <.05). For the cross-lagged unstandardized path coefficients, the effect of severity of PTSS at baseline on the severity of depression at 1-week follow-up was significant ($p < .01$) and the effect of severity of PTSS at 1-month follow-up on the severity of depression at 3-month follow-up was nearly significant (*p* =.051). No other cross-lagged effects were significant. Correlations between PTSS and depression were .49 at 1-week follow-up, .42 at 1-month follow-up, and .51 at 3-month follow-up, which were all significant (*p's* <.01). The intervention variable (emotion-focused = 1, fact-focused = 0) was significantly negatively associated with PTSS and depression at the three follow-up assessment points. The emotion-focused group had significantly lower PTSS and depression scores at the three follow-up assessment points than the fact-focused group. These symptom changes by group are illustrated in Figure 2.

Discussion

The current study was the first to examine temporal associations between PTSS and depression symptom severity in response to two EW interventions for Hispanic individuals. An autoregressive cross-lagged model fit the data.

This study provides important evidence about the temporal associations of PTSS and depression symptoms in response to EW. The first-order autoregressive paths indicated that earlier PTSS levels predicted later PTSS levels and earlier depression levels predicted later depression levels. A significant portion of individual differences remained stable for both PTSS and depression, suggesting that participants experienced somewhat similar temporal patterns of symptom changes from one assessment point to the next. Participants with the greatest initial levels of PTSS generally failed to reach symptom levels as low as those who started off with relatively milder PTSS, continuing to report relatively higher (although nonetheless reduced in response to EW) PTSS levels at the follow-up points. Similarly, individuals who reported the greatest initial levels of depression generally continued to report relatively higher depression levels than those with initially milder depression, yet on average decreased depression levels in response to EW at 1-week follow-up were found.

The current findings support a unidirectional model in which earlier PTSS severity tended to predict later depression severity, but earlier depression level did not predict later PTSS level. Our cross-lagged analysis found two unidirectional temporal associations: higher PTSS scores at baseline predicted higher depression scores at 1-week follow-up and greater severity of PTSS at 1-month predicted greater severity of depression at 3-month follow-up. These results provide some evidence to support the pathway model of an emergence/exacerbation of PTSS/PTSD causing/exacerbating comorbid depression. As the current study was the first EW

study to examine the complex interplay between PTSS and depression symptom levels at multiple time points, the scientific literature provides very little context for interpreting the current findings. The two past intervention studies that examined temporal associations between PTSD and depression symptom levels in response to other non-EW interventions reported different results from the current study: a bidirectional pattern in response to an exposure-based intervention (Brown et al., 2018) or a unidirectional pattern in which changes in depression preceded changes in PTSD symptoms in response to a cognitive processing treatment (Schumm et al., 2018). These few available studies had important differences between intervention and population when compared with the current research and these are likely responsible for the different outcomes. The studies varied in: kinds of treatment (e.g., EW vs. exposure treatment vs. cognitive processing treatment), administration method (e.g., self-administered online vs. therapist-directed), duration of interventions (e.g., 3 days vs. several weeks), target symptom levels (subclinical to clinical levels of PTSS vs. symptoms reported by individuals with diagnosed PTSD), and population (e.g., Hispanic young adults vs. American veterans). Some of these differences may lead to unique temporal sequences of improvements in PTSD/PTSS and depression. There is also a possibility that the current unidirectional pattern may be unique to Hispanic trauma victims, while a bidirectional or the opposite unidirectional pattern (earlier depression severity influencing later PTSS) may occur in non-Hispanic trauma victims.

It should be noted that the average baseline depression scores for the emotion-focused and fact-focused groups in the current study varied widely (44.2% fell in the normal range, 11.5% in the mild depression range, 14.3% in the moderate range, and 30% in the severe range), as would be expected in a relatively high-functioning sample. The depression scores for the emotion-focused group at 1-week follow-up dropped to the normal range and remained in that

range over the 1-month and 3-month follow-up periods, while the depression scores for the fact-focused group remained in the mild to moderate ranges across the three follow-up periods. The relatively low to mild depression severity within these restricted ranges may have contributed to the lack of cross-lagged effects from depression to PTSS.

The current study found that the disturbance correlations between PTSS and depression at the three follow-up assessment points were moderate ($.42 < r\text{'s} < .51$, $p\text{'s} < .01$). These correlation coefficients indicate that shared variance in PTSS and depression at the same assessment occasions existed after controlling for intervention effects, autoregressive effects, and cross-lagged effects. These occasion-specific effects are common in autoregressive and other longitudinal studies (Geiser, 2013). Along with the unidirectional temporal associations between PTSS and depression, the moderate correlations between the two constructs suggest that PTSS and depression were synchronized in response to the EW interventions but were distinct, which is consistent with past findings (e.g., Horesh et al., 2015).

The current results of associations between PTSS and depression scores over time may have several important clinical implications. First, the first-order autoregressive results suggest that initial PTSS and depression levels might impact the effect of EW interventions. In the current sample, Hispanic individuals with severe PTSS and depressive symptoms at baseline did not reach the levels of symptoms individuals with lower baseline symptom levels reached. Yet, many of those with higher symptom levels nonetheless showed improvements. Importantly, of the 40 participants with initial PTSS scores above the clinical cut-off for a probable PTSD diagnosis, 20 participants scored below the cut-off at 1-week follow-up and 30 participants scored below the cut-off at 3-month follow-up, suggesting EW's benefits for those with relatively severe PTSS. Clinicians may wish to use EW as an initial intervention and monitor its

impact particularly closely among those with more severe symptoms. Second, the current cross-lagged analysis results may suggest that depressive symptoms should be targeted explicitly in addition to EW targeting PTSS among those with high baseline PTSS. As noted above, in the current Hispanic sample, initial levels of PTSS negatively influenced the effects of EW on depression scores at 1-week follow-up (whereas the converse was not the case and initial levels of depression did not influence the effects of EW on PTSS). These findings, particularly if replicated, suggest the potential importance of treating depression in addition to EW targeting PTSS for those who have relatively severe PTSS symptoms with comorbid depression. Yet it is not clear how extremely severe depression symptoms would have affected these outcomes, as this study examined comorbid depression in a fairly high-functioning sample with mild to moderate depression.

The current findings of differential effects by intervention condition support the assertion that emotion-focused writing prompts produce effects superior to those of fact-focused writing prompts. The significant negative path coefficients of the intervention variable to PTSS and depression at the three assessment points revealed significantly lower PTSS and depression scores for the emotion-focused relative to the fact-focused group at 1-week, 1-month and 3-month follow-up points, suggesting the enduring value of emotion-focused writing for treating trauma-related symptoms (Figure 2). These results are consistent with some previous findings on EW outcomes obtained from samples with a wide range of symptom levels varying from subclinical PTSS to diagnosed PTSD (Hirai et al., 2012; Meston et al., 2013; Sloan et al., 2005; van Emmerik et al., 2008). Nonetheless, participants in both of the current EW conditions reported some symptom improvements and these results add evidence to support the assertion that EW interventions that have positive impacts for PTSS/PTSD can also produce positive

outcomes in comorbid depression in a Hispanic sample. Future research should examine adjustments to the EW intervention protocol. For example, the current study found an upward trajectory of depression scores, particularly for the fact-focused group and somewhat for the emotion-focused group (Figure 2). Implementing booster writing exercises around 1 month after the initial EW intervention might improve PTSS levels, which might then help maintain treatment gains in depression down the road.

The results of the current study should be considered in light of the strengths and limitations of the present study. The current findings were from an educated and fairly high-functioning Hispanic student sample, consisting of individuals whose levels of PTSS varied from subclinical to clinical levels and depression symptoms varied from mild to moderate severity. Therefore, there was the benefit of examining individuals with a range of PTSS and depression symptom levels, but the current findings may not be fully generalizable to Hispanic individuals with extremely severe PTSS and depression. Future research should extend this examination to include clinically diagnosed treatment-seeking individuals from a range of ethnic and racial background. However, the current results suggest the potential efficacy of EW interventions as a treatment tool for high-functioning Hispanic individuals. This is particularly important given the demonstrated treatment and access gap for this group and that Hispanic populations are underrepresented in research. Thus, this data offers an important contribution to an improved understanding of Hispanic mental health. The inclusion of participants with a probable PTSD diagnosis is also a strength of the study, although clinician administered interviews were not used. Future research should confirm diagnostic status with clinical interviews and examine prior and current treatment activity other than the EW exercises, which might also influence PTSS and depression scores.

The current study was the first to examine temporal associations between the severity of PTSS and depression in response to two EW interventions for Hispanic individuals, an often overlooked and undertreated cultural group. The identified unidirectional association between PTSS and depression underscores the possibility that severe PTSS may hinder EW treatment gains in depression. The lack of temporal influence of depression on PTSS may suggest that among high-functioning Hispanic individuals with mild to moderate depression severity, PTSS treatment with EW will not be compromised by the presence of some comorbid depressive symptoms. Overall, the demonstrated decreases in PTSS and depression symptoms add exciting support for the potential usefulness of this simple three-day writing intervention

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Table 1. *Means and Standard Deviations of Posttraumatic Stress Symptoms and Depression*

	Emotion-focused (*n* = 35)		Fact-focused (*n* = 35)	
Scale	*M*	*SD*	*M*	*SD*
PCL PTSS baseline	40.6	17.66	35.0	15.42
PCL PTSS 1 week	22.2	18.07	25.7	14.81
PCL PTSS 1 month	12.1	13.97	22.2	16.03
PCL PTSS 3 month	9.9	9.52	23.3	14.89
DASS Depression baseline	6.5	5.60	7.9	6.20
DASS Depression 1 week	4.5	5.10	6.5	5.70
DASS Depression 1 month	2.5	3.64	6.4	6.16
DASS Depression 3 month	3.0	3.43	7.7	6.02

Note: PCL-5= PTSD Checklist – DSM-5 version; DASS = Depression Anxiety and Stress Scale.

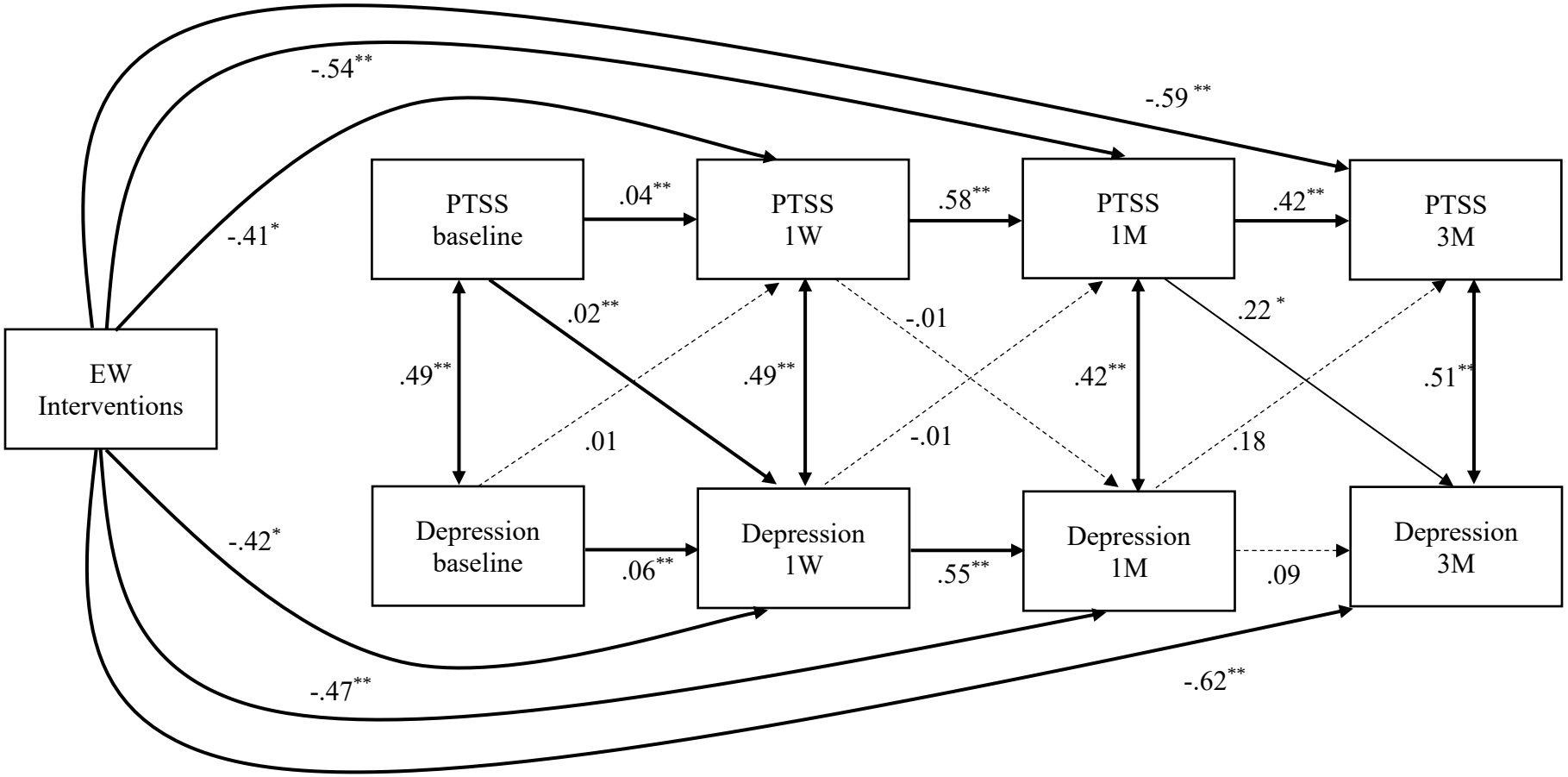
Table 2. *Path Coefficients of the Final Cross-Lagged Autoregressive Model*

	Unstandardized				Partially Standardized	
Path	Coefficient	*SE*	*t*	*P*	Coefficient	*p*
The Effects of Expressive Writing						
EW → PTSS 1W	-6.716	2.953	-2.274	.023	-0.410	.020
EW → PTSS 1M	-8.421	2.951	-2.854	.004	-0.538	.003
EW → PTSS 3M	-8.259	2.722	-3.034	.002	-0.590	.002
EW → Depression 1W	-2.266	0.988	-2.293	.022	-0.418	.019
EW → Depression 1M	-2.572	0.843	-3.053	.002	-0.471	.002
EW → Depression 3M	-3.334	1.035	-3.222	.001	-0.620	.001
First-order autoregressive effects						
PTSS Baseline → PTSS 1W	0.639	0.101	6.304	<.001	0.039	<.001
PTSS 1W → PTSS 1M	0.558	0.129	4.314	<.001	0.584	<.001
PTSS 1M → PTSS 3M	0.375	0.100	3.745	<.001	0.419	<.001
Depression Baseline → Depression 1W	0.342	0.095	3.597	<.001	0.063	<.001
Depression 1W → Depression 1M	0.551	0.119	4.638	<.001	0.547	<.001
Depression 1M → Depression 3M	0.086	0.140	0.615	.538	0.087	.537
Higher-order autoregressive effects						
PTSS Baseline → PTSS 1M	0.031	0.109	0.282	.778	0.002	.778
PTSS Baseline → PTSS 3M	0.082	0.089	0.921	.357	0.006	.359
PTSS 1W → PTSS 3M	-0.003	0.097	-0.026	.979	-0.003	.979
Depression Baseline → Depression 1M	0.208	0.086	2.412	.016	0.038	.013
Depression Baseline → Depression 3M	0.431	0.096	4.484	<.001	0.080	<.001
Depression 1W → Depression 3M	-0.162	0.127	-1.277	.202	-0.163	.198
Cross-lagged effects						
PTSS Baseline → Depression 1W	0.128	0.034	3.775	<.001	0.024	<.001
PTSS 1W → Depression 1M	-0.003	0.035	-0.079	.937	-0.008	.937
PTSS 1M → Depression 3M	0.075	0.039	1.954	.051	0.219	.046
Depression Baseline → PTSS 1W	0.227	0.284	0.800	.424	0.014	.423
Depression 1W → PTSS 1M	-0.017	0.361	-0.047	.963	-0.006	.963
Depression 1M → PTSS 3M	0.448	0.282	1.589	.112	0.175	.108
R-Square						
PTSS 1W	0.477**					
PTSS 1M	0.464**					
PTSS 3M	0.535**					
Depression 1W	0.466**					
Depression 1M	0.599**					
Depression 3M	0.465**					

Note: PTSS = Posttraumatic Stress symptoms; EW = expressive writing intervention variable; M=Month; W = Week; $^{**}p < .01$.

Note: The intervention variable (EW) was coded as the emotion-focused group = 1 and the fact-focused group = 0; Standardization was performed only for the PTSS and depression variables.

Figure 1. *Diagram of the Final Model*



Note: Partially standardized path coefficients are displayed.
Note: Residuals and second and third-order autoregressive effects are not shown in the diagram to reduce clutter.
Note: The intervention variable (EW) was coded as the emotion-focused group = 1 and the fact-focused group = 0.

Figure 2. *PTSS and Depression Symptom Levels by Writing Task Condition*