

# Social Interaction Within a Trauma-Exposed Population During the Early Phase of COVID-19

---

Candice Hayden<sup>1</sup>, Yvette Z. Szabo<sup>2,3,4</sup>, Austen R. Anderson<sup>2,3</sup>,  
Sheila B. Frankfurt<sup>2,3,5</sup>, and Adam P. McGuire<sup>1\*,2,3</sup>

<sup>1</sup>Department of Psychology and Counseling, The University of Texas at Tyler, Tyler, TX, USA

<sup>2</sup>VISN 17 Center of Excellence for Research on Returning War Veterans, Waco, TX, USA

<sup>3</sup>Central Texas Veterans Health Care System, Temple, TX, USA

<sup>4</sup>Department of Health, Human Performance, and Recreation, Baylor University, Waco, TX, USA

<sup>5</sup>Department of Psychiatry and Behavioral Sciences, Texas A&M University, College of Medicine, Temple, TX, USA

## ABSTRACT

The novel coronavirus (COVID-19) has led to significant stressors and shifts in social life, yet social interactions experienced by people with trauma exposure during the COVID pandemic is largely unknown. This study assessed frequency of interactions, social support given and received, and prosocial behavior using online survey methods ( $N=1049$ ). We examined differences in experiences across three groups: no trauma exposure, trauma-exposed with low PTSD symptoms, and trauma-exposed with high PTSD symptoms. We also explored correlations between social interactions and PTSD symptom clusters. Results indicated significant differences across groups and the high PTSD group reported stronger associations between social interaction variables and symptom clusters, on average.

## KEYWORDS

COVID-19; social interaction; trauma; PTSD; social support; prosocial behavior; mental health; pandemic

\*Corresponding Author: Adam P. McGuire, PhD; The University of Texas at Tyler, Department of Psychology and Counseling, 3900 University Blvd, HPR 237, Tyler, TX 75799; Telephone: 903-566-6268; Email: amguire@uttyler.edu

## CITATION

Hayden C. L., Szabo, Y. Z., Anderson, A. R., Frankfurt, S. B., & McGuire, A. P. (2021). Social interaction within a trauma-exposed population during the early phase of COVID-19. *Journal of Trauma and Loss* (in production).

---

## Acknowledgment

This material is the result of work with resources and the use of facilities at the University of Texas at Tyler and was supported by the VISN 17 Center of Excellence for Research on Returning War Veterans, the Central Texas Veterans Health Care System, and the Office of

Hayden et al., 2021 (Postprint)

Academic Affiliations, Advanced Fellowship Program in Mental Illness Research and Treatment. The views expressed herein are those of the authors and do not necessarily reflect the official policy or position of the Department of Veterans Affairs or the United States Government.

### **Funding**

Adam McGuire is partially supported by a Small Projects in Rehabilitation Research Award I21-RX003035, Sheila Frankfurt is supported by Career Development Award IK1-RX002427, and Yvette Szabo is supported by Career Development Award IK1-RX003122 from the United States Department of Veterans Affairs, Rehabilitation Research and Development Service.

---

The novel coronavirus (COVID-19) outbreak has become one of the largest and deadliest pandemics in modern time. In response to this threat, isolation and social distancing practices were strongly suggested within the United States (U.S.) by late February and early March 2020. By late March, 26 states had issued stay-at-home orders, which included social distancing measures and limiting face-to-face contact with people outside of one's home (Kates et al., 2020) because there is a greater risk of contracting the COVID-19 virus through shared respiratory droplets (e.g. coughing, sneezing). Consequently, most peoples' social life changed dramatically and many faced social isolation. Although these guidelines reduce the spread of the COVID-19 virus and physically protects people, it may also negatively impact psychological health and wellbeing. In past pandemics (e.g., Severity Acute Respiratory [SARS] and Middle East Respiratory Syndrome [MERS]) where a form of social distancing or quarantine was enforced, isolation was associated with symptoms of psychological distress (Hawryluck et al., 2004; Jeong et al., 2016). Specifically, during the SARS pandemic, individuals who were isolated in quarantine experienced an increase in both depressive (Liu et al., 2012) and posttraumatic stress symptoms (Wu et al., 2009). However, the experiences of social interaction during a large-scale crisis with strict physical distancing measures are largely unknown, particularly for those with preexisting trauma histories and symptoms of posttraumatic stress disorder (PTSD). Hence, social engagement in individuals with varying levels of trauma and PTSD symptoms, within the context of COVID-19, requires further investigation.

People who have previously experienced traumatic life events, such as a life-threatening event or serious injury (American Psychological Association [APA], 2013), may be at greater risk for negative outcomes associated with COVID-19-related social distancing and prevention measures. The stress sensitivity hypothesis posits people who were previously exposed to stressful events are more vulnerable to future stressors (McFarlane, 2010; Smid et al., 2013). Thus, people with previous trauma exposure may fare worse in a large-scale crisis than people without trauma exposure. Additionally, previous studies suggest this population is predisposed to experience social dysfunction in the first place. For example, people with a history of trauma exposure report lower levels of social support compared to those with no trauma history (Monson et al., 2015). Further, there is some evidence that the number of trauma exposures has a negative linear relationship with face-to-face contacts (Kohli et al., 2015). Trauma exposure may also bring a sense of stigma due to the nature of the trauma, leading individuals to avoid social contact and potential judgment of others (Charuvastra & Cloitre, 2008).

Beyond trauma exposure, the extent and nature of social interactions are also impacted by the presence of PTSD symptoms. For example, social dysfunction is strongly and positively associated with PTSD (Schnurr et al., 2009). Additionally, individuals with PTSD report more difficulties in maintaining friendships, joining in community activities, and interacting with strangers (Veling et al., 2013). Several studies have also found the inverse relationship such that higher levels of social support (i.e., a form of social interaction) are associated with lower PTSD symptom severity (Brewin et al., 2000, McGuire et al., 2018, Ozer et al., 2003). Although the general association between PTSD and social dysfunction is known, few studies have investigated the links between crisis-induced social distancing, subsequent experiences of social interaction, and PTSD. In the context of the COVID-19 pandemic, the association between PTSD symptoms and social interaction may be affected by restricted social interactions and the increased likelihood of unexpected social isolation.

Another potentially important factor for understanding the impact of PTSD on social interactions during COVID-19 could be differences in PTSD symptom clusters: reexperiencing or intrusion, avoidance, negative cognitions and mood, and arousal symptoms (APA, 2013). Previous studies indicate the association between PTSD symptoms and indicators of social functioning can differ across clusters. For example, in a sample of women who experienced abuse, emotional numbing, but not reexperiencing, hyperarousal, and avoidance symptoms predicted a loss in perceived social support six months later (Johnson et al., 2007). In another study, Solomon and Mikulincer (2007) found that avoidance was predictive of negative social interactions at two and three years after a combat stress reaction for military personnel. Conversely, in a sample of veterans, more days of social contact prior to residential treatment predicted lower avoidance and numbing symptoms four months after treatment discharge (Sippel et al., 2019). Additional research is needed to better understand how these specific PTSD symptom clusters might relate to social interactions during COVID-19.

Social support has been examined within disaster or crisis-related research and in the context of assessing protective factors for those with trauma history and PTSD symptoms; therefore, social support could be a relevant form of social interaction for people with trauma exposure in the context of social distancing and the COVID-19 crisis, which could also have implications regarding who is benefiting from this protective factor. Another form of social interaction that deserves special attention in the context of this pandemic is prosocial behavior—engaging in volunteerism or an altruistic act that benefits others (e.g., purchasing groceries for your neighbor). Disasters can elicit increased levels of volunteerism (e.g., emergency first aid and search and rescue; Perry & Lindell, 2003) and prosocial behavior has been associated with a wide range of psychological benefits (Klein, 2016; Nelson et al., 2016). Thus, prosocial behavior is important to consider because it could carry additional benefit or buffer the impact of other contemporaneous social distancing.

There are several gaps in our understanding to this point. To date, selected studies have investigated the severity and prevalence of PTSD symptoms in trauma-exposed populations following the onset of COVID-19 (Liu et al., 2020; Sun et al., 2020); however, it is largely unknown how a trauma-exposed population with varying levels of PTSD symptoms engages in social interaction during this pandemic, and how their social interaction might differ from those with no trauma history during times of distress. Furthermore, it is unclear how PTSD symptom severity may impact or relate to various forms of social interaction that could ultimately serve as protective factors from long-term psychological consequences. For instance, it would be important to understand how people with high versus low symptom severity are engaging in

potentially important social interactions (e.g., giving and receiving social support), and how distinct symptom clusters may differentially relate to social behaviors. Being able to describe these experiences and identify potential differences would allow us to better understand the risks associated with this unique crisis and social context.

### **Current Study**

Understanding how individuals with varying levels of trauma exposure and PTSD symptoms socially interact during the COVID-19 pandemic can expand our knowledge of how these individuals react during future pandemics. Therefore, the purpose of our study is to examine social interactions during the early phase of COVID-19 among people with varying levels of trauma exposure and PTSD symptoms. We assessed social interactions within the past week by measuring the frequency of face-to-face and virtual interactions, self-reported social support received, social support given, and the number of days engaged in prosocial behavior for COVID-19-related causes. In this descriptive study, we had three exploratory aims: 1) identify differences in the frequency of social interaction between people with trauma exposure versus no trauma exposure; 2) examine potential differences in the frequency of social interactions between people with low versus high levels of PTSD symptoms; 3) examine how the frequency of types of social interactions are related to PTSD symptom clusters among low and high levels of symptoms.

## **Method**

### **Participants and Procedures**

In mid-March, we were preparing an online survey study aimed to validate a newly developed questionnaire when the COVID-19 crisis emerged. We leveraged data collection by adding COVID-19-related questions to the existing survey in an attempt to examine social life during this unique, early phase of the crisis. All data was collected on March 29 and March 30. A large, nationwide study that has been collecting COVID-19 data throughout the course of the pandemic suggests that psychological distress in the U.S was at its highest to date during the period of March 28-30 (University of Southern California Dornsife, 2020).

Participants were recruited through Amazon Mechanical Turk (MTurk)—an online platform that allows researchers to recruit participants to complete tasks referred to as Human Intelligence Tasks (HITs). MTurk-specific eligibility requirements included 1) participants must reside in the United States; 2) the number of MTurk HITs previously completed and approved must be greater than 100; and, 3) participants were required to have at least a 95% approval rating for their previous HITs. These qualifications were designed to recruit participants who successfully completed substantial MTurk tasks in the past and to exclude people with a history of rejected payments due to inconsistent responses or poor effort. This study was advertised as “a survey about personal experiences” that was estimated to take approximately 10-15 minutes, resulting in a \$1.50 payment. The average time for completion across the final sample was 13 minutes, which resulted in an hourly rate of over \$6.00 per hour, on average. This rate is above the median hourly wage for tasks performed on MTurk, which has been estimated at approximately \$2.00 per hour (Hara et al., 2018).

A total of 1,304 participants were recruited to participate in this study. Participants provided informed consent at the beginning of the survey, followed by a battery of self-report questionnaires. The survey included two attention screeners that assessed whether participants carefully read instructions and responded appropriately. Participants who failed both attention screeners were rejected payment and excluded from the study. To further screen for poor responding, we also excluded participants who reported inappropriate answers to count questions

about how many days the participant engaged in specific behaviors during the past week (e.g., in the past *seven* days, I volunteered on *ten* days). A total of 255 participants were excluded from this analysis: 66 did not provide consent or complete the study (i.e., did not submit their responses), 43 failed two attention screeners, 142 provided inappropriate responses to count questions, three participants were excluded for significant missing data, and one participant was excluded for being under the age of 18. Following all screening procedures, the final sample size was 1,049 (56.1% Male; 78.0% White;  $M_{age} = 38.46$ ,  $SD_{age} = 11.88$ ). All procedures were approved by the local Institutional Review Board.

## Measures

### *Social Interactions*

We assessed social interaction by measuring social support given and received, as well as frequency of face-to-face, virtual, and prosocial interactions. To measure social support, we created four items to assess instrumental support received, emotional support received, instrumental support given, and emotional support given--consistent with distinct social support factors identified in previous studies (Shakespeare-Finch & Obst, 2011). Participants were asked to rate how often they gave or received instrumental or emotional support in the past week using a 6-point scale ranging from 0 (*never*) to 5 (*frequently*). Sum scores were created for total social support received ( $\alpha = .62$ ) and total social support given ( $\alpha = .66$ ) by adding the instrumental and emotional support items for support received and support given, respectively. We used count questions to assess the frequency of three types of social interactions including face-to-face contact, virtual contact, and prosocial behavior. Participants were asked to respond to the following questions in reference to the past week: "How many days did you..." 1) "have one or more face-to-face interactions with another person who does not live with you?"; 2) "have one or more virtual interactions (phone, messaging, video) with another person who does not live with you?"; 3) "volunteer your time or money to a cause related to COVID-19?"

### *Trauma History and Posttraumatic Stress Disorder*

To screen for trauma history, we administered the first item of the Primary Care PTSD Screen for DSM-5 (PC-PTSD-5), which asks whether you have ever experienced an event that was frightening, horrible, or traumatic, with examples (e.g. a serious accident or fire, a physical or sexual assault or abuse). Those who answered "yes" to the screening question proceeded to complete The PTSD Checklist for DSM-5 (PCL-5; Weathers et al., 2013), which assessed the presence and severity of PTSD symptoms in relation to their worst traumatic event. The measure includes 20 self-report items rated on a 0 (*not at all*) to 4 (*extremely*) scale. A total score was obtained by summing each of the item scores, with higher scores indicating greater symptom severity. The PCL-5 has demonstrated validity and reliability in past work (Blevins et al., 2015) and good reliability in this study ( $\alpha = .98$ ). To assess worry regarding COVID-19, we included a single item asking participants to rate their level of concern about the virus. The item was rated on a 5-point scale ranging from 0 (*not at all*) to 4 (*extremely*).

### *Analytic Strategy*

First, we compared different types of social interaction between participants who endorsed a history of experiencing traumatic events ( $n = 404$ ) and those with no trauma exposure ( $n = 645$ ) using independent samples *t*-tests. Next, we completed follow-up analyses by comparing social interactions between three groups: 1) no trauma exposure ( $n = 645$ ), 2) trauma exposure with low PTSD symptoms ( $n = 284$ ), 3) trauma exposure with high PTSD symptoms ( $n = 120$ ). Low and high symptom groups were determined with a PCL-5 cutoff score of 32 (Bovin

et al., 2016). Comparisons between the three groups were conducted using one-way ANOVAs for each social interaction variable. Six pairwise contrasts were also conducted to assess for significant differences between groups within each social interaction variable. Last, we examined the correlations between PTSD symptom clusters and social interactions across both low and high symptom groups. Pearson correlations were used for COVID-19 worry and social support variables and Spearman correlations were used for the three count variables of social interaction because those variables were ordinal and skewed. All analyses were completed using R (R Core Team, 2017). We used the collection of packages called tidyverse (Wickham, 2019) to process the data and produce figures. The base stats package was used to calculate *t*-tests (*t.test*) and one-way ANOVAs (*lm*; *anova*). Cohen's *d* was calculated with the psych package (Revelle, 2020) and we interpreted  $d < 0.20$  as no difference, and *d*'s of 0.20, 0.50, and 0.80 as small, moderate, and large differences, respectively.

## Results

### Group Comparisons

Comparisons between trauma-exposed and non-trauma-exposed groups revealed significant differences on multiple variables (see Table 1). Trauma-exposed individuals reported greater COVID-19 worry. They also reported a higher number of days of face-to-face contact and prosocial behavior over the past week. There were no differences in days of virtual social contact, but trauma-exposed individuals did report higher social support received and given over the past week. The significant differences were of small effect size, ranging from .19 to .29.

Table 1.

Descriptive statistics and group comparisons between (1) no trauma exposure and (2) trauma-exposed.

Variable	Range	No trauma exposure <i>n</i> = 645 (61.5%)	Trauma-exposed <i>n</i> = 404 (38.5%)	<i>t</i>	<i>p</i>	<i>d</i> (95% <i>CI</i> )
		Mean ( <i>SD</i> )	Mean ( <i>SD</i> )			
COVID-19 worry	0 - 4	2.41 (1.14)	2.65 (1.14)	-3.29	<.001	0.21 (0.08, 0.33)
Social interactions						
# Days with face-to-face contact	0 - 7	1.78 (1.95)	2.16 (2.04)	-3.03	.002	0.19 (0.07, 0.32)
# Days with virtual contact	0 - 7	4.17 (2.45)	4.39 (2.40)	-1.46	.144	0.09 (-0.03, 0.22)
# Days engaged in prosocial behavior	0 - 7	0.58 (1.34)	0.86 (1.64)	-2.91*	.004	0.19 (0.07, 0.32)
Social support						
Total social support given	0 - 10	4.86 (2.48)	5.59 (2.50)	-4.62	<.001	0.29 (0.17, 0.42)
Total social support received	0 - 10	4.01 (2.44)	4.51 (2.66)	-3.06*	.002	0.20 (0.07, 0.32)

Note. \*Welch's *t*-test used when Levene's test indicated unequal variances between groups. *p*-values below .05 are in boldface.

To account for the potential impact of PTSD symptoms in addition to trauma exposure, a second set of analyses were conducted to assess differences between participants with no trauma exposure, trauma-exposed with low PTSD symptoms, and trauma-exposed with high PTSD symptoms. One-way ANOVAs revealed significant differences across groups for all variables except for days of virtual social contact (see Table 2). Pairwise contrasts revealed that the high PTSD group had significantly greater COVID-19 worry than the low PTSD group and the no trauma exposure group. This same pattern was found with the high PTSD group reporting a greater number of days of prosocial behavior, higher social support received, and higher social support given relative to the other two groups. The high PTSD group also reported a greater number of days of face-to-face contact than the no trauma exposure group, but no difference in relation to the low PTSD group.

Table 2.

Descriptive statistics and group comparisons between (1) no trauma exposure, (2) trauma-exposed with low PTSD symptoms, and (3) trauma-exposed with high PTSD symptoms.

		(1) No trauma exposure	(2) Trauma-exposed, low PTSD symptoms (PCL < 32)	(3) Trauma-exposed, high PTSD symptoms (PCL > 31)			
		<i>n</i> = 645 (61.5%)	<i>n</i> = 284 (27.1%)	<i>n</i> = 120 (11.4%)			
Variable	Range	Mean ( <i>SD</i> )	Mean ( <i>SD</i> )	Mean ( <i>SD</i> )	<i>F</i>	<i>p</i>	Pairwise contrasts
COVID-19 worry	0 - 4	2.41 (1.14)	2.23 (1.11)	3.26 (0.97)	29.30*	<.001	3 > 1,2
Social interactions							
# Days with face-to-face contact	0 - 7	1.78 (1.95)	2.04 (1.99)	2.47 (2.11)	6.09	<.001	3 > 1
# Days with virtual contact	0 - 7	4.17 (2.45)	4.51 (2.46)	4.11 (2.23)	1.33	.264	
# Days engaged in prosocial behavior	0 - 7	0.58 (1.34)	0.39 (1.06)	1.98 (2.15)	22.03*	<.001	3 > 1,2
Social support							
Total social support given	0 - 10	4.86 (2.48)	5.26 (2.49)	6.38 (2.36)	18.34	<.001	3 > 1,2
Total social support received	0 - 10	4/01 (1.34)	3.97 (2.48)	5.79 (2.66)	17.79	<.001	3 > 1,2

Note. \*Welch's test used when Levene's test indicated unequal variances between groups. *p*-values below .05 are in boldface.

### Follow-Up Correlations

To examine correlations between the symptom clusters of PTSD and the study variables, Pearson and Spearman correlations were calculated for the low PTSD and high PTSD subgroups (See Table 3). Intrusion symptoms were significantly positively associated with COVID-19 worry, social support given, social support received, and days engaged in prosocial behavior. Avoidance symptoms were positively associated with COVID-19 worry and social support given in both groups, and prosocial behavior in the low PTSD group. Notably, avoidance was not associated with social support received in either group and was not associated with prosocial behavior in the high PTSD group. Negative cognitions/mood symptoms were positively associated with social support given, social support received, and prosocial behavior for the high PTSD group, whereas they were only associated with COVID-19 worry and prosocial behavior in the low PTSD group. Arousal/reactivity symptoms were not associated with any variables in the low PTSD group. This stands in contrast with the high PTSD group, where arousal/reactivity was significantly positively associated with COVID-19 worry, social support given and received, and prosocial behavior.

### Discussion

The present study reports on social interaction across a sample of adults with varying levels of trauma exposure and PTSD symptoms in a national, online study. Compared to those without trauma exposure, individuals with a history of trauma reported more COVID-19-related worry, more face to face contact and more days engaged in prosocial behavior. They also reported more social support given and received. PTSD symptom severity explains most, but not all, of these differences.

Table 3.

Correlations between social interaction variables and PTSD symptom clusters across high and low PTSD symptom samples.

Variables	PCL-Total	PCL-Intrusion	PCL-Avoid	PCL-Negative cognitions/mood	PCL-Arousal
<i>LOW PTSD SAMPLE (PCL &lt; 32; n = 284)</i>					
<u>Pearson Correlations</u>					
COVID worry	0.17**	0.16**	0.16**	0.14*	0.11
Social support given	0.13*	0.21***	0.15*	0.02	0.11
Social support received	0.09	0.15**	0.07	0.04	0.06
<u>Spearman Correlations</u>					
# Days with face-to-face contact	-0.04	0.00	-0.04	0.00	-0.05
# Days with virtual contact	-0.02	0.01	0.02	-0.01	-0.07
# Days engaged in prosocial behavior	0.12*	0.14*	0.12*	0.13*	0.11
<i>HIGH PTSD SAMPLE (PCL &gt; 31; n = 120)</i>					
<u>Pearson Correlations</u>					
COVID worry	0.30***	0.29**	0.29**	0.16	0.29**
Social support given	0.43***	0.38***	0.28**	0.27**	0.44***
Social support received	0.42***	0.36***	0.17	0.28**	0.47***
<u>Spearman Correlations</u>					
# Days with face-to-face contact	0.15	0.11	0.03	0.16	0.16
# Days with virtual contact	0.07	0.02	0.07	0.02	0.09
# Days engaged in prosocial behavior	0.40***	0.42***	0.11	0.27**	0.41***

Note. \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ 

Our first aim was to examine differences in social interaction between people with and without a history of trauma exposure. Compared to those without trauma exposure, individuals with a history of trauma reported more COVID-19-related worry, more face-to-face contact and more days engaged in prosocial behavior. They also reported more social support given and received. Higher COVID worry is consistent with the stress sensitivity model, where the impact of acute stressors could be more impactful for those with a history of traumatic events (Smid et al., 2013) and has been posited to be a potentially important consideration in COVID-19 (McFarlane, 2010). However, a positive association between a history of trauma exposure and seemingly desired characteristics such as prosocial behavior and social support is somewhat unexpected. One possible explanation for this relationship could be a vulnerability to increased risk taking behavior. Specifically, individuals with trauma may seek activities that evoke arousal in attempts to reduce depressive symptoms (Joseph et al., 1997). This behavior might coincide with increased face-to-face interaction regardless of the inherent future risk. This finding suggests that individuals with trauma could be more susceptible to violating health precautions during a pandemic and warrants further investigation in future research.

When stratified by level of PTSD symptoms, most differences in social interaction were observed between individuals with high levels of PTSD compared to those with low PTSD and to those with no history of trauma exposure. Consistent with our previous work focused on anxiety and depression (McGuire et al., under review), individuals with more severe PTSD symptoms report more worry, face-to-face contact, and social support given and received.



Despite an extensive literature which demonstrates associations between PTSD symptoms and social impairment, most of that research investigates aggregated assessments of symptoms and social interactions, rather than social interactions over a specific time-point (in this case, during the two weeks around the period of peak emotional distress in the COVID-19 pandemic). It is possible that the elevated distress during the pandemic drives a greater need for social support to mitigate distress associated with increased isolation. Also, there is some evidence that PTSD symptoms are associated with preoccupied attachment styles (among others), leading individuals to be overly dependent on others for approval or support (Woodhouse et al., 2015). Future research is needed to understand the quality of such social support, and its impact on future distress.

The third aim of the study examined relationships between social interactions and PTSD symptom clusters among high and low levels of symptoms. When looking across the trauma-exposed sample, the number of days engaged in prosocial behavior was positively associated with all the symptom clusters, while days of face-to-face or virtual contact were not. Positive associations between intrusion symptoms and COVID worry, prosocial behavior, social support given, and social support received were consistent across both groups, whereas the correlations differed by group for arousal/reactivity. Specifically, significant associations with arousal/reactivity symptoms were observed in high, but not low PTSD, suggesting arousal/reactivity may be one factor uniquely important for those with high levels of PTSD and should be examined in future research. Another group discrepancy was found for negative cognitions/mood such that higher symptoms were significantly associated with more social support given and received in the high PTSD group, but results were non-significant for the low PTSD group. One interpretation of this finding is that once the level of symptoms reach a certain threshold, perhaps they begin to be associated with social support provision and receipt, but under that threshold, individuals are able to function without as much support. Prosocial behavior was significantly associated with negative cognitions/mood for both groups, although the correlation was stronger for high PTSD. One possible explanation for this outcome may be that individuals engaged in prosocial behavior could have been more directly exposed to unsettling aspects of the COVID pandemic, which in-turn negatively affected their mood. This may have been particularly difficult for individuals with higher impairment. These analyses were exploratory but offer preliminary evidence that associations between social interactions and PTSD symptom clusters may differ by level of distress.

This study contributes to our understanding of how a history of trauma exposure may impact social interaction in the face of the national pandemic. However, our findings should be interpreted in the context of their limitations. First, because we leveraged an ongoing research study to examine social interactions in the early aftermath of COVID-19, we did not include questions about an individual's personal experience with COVID-19 or with social, occupational or other health related factors to minimize participant burden in an ongoing study. Future research should examine whether other relevant factors associated with someone's experience of this pandemic influences social interaction for those with trauma exposure and/or PTSD. This study's cross-sectional design means directionality of the associations between trauma history and social behaviors cannot be inferred; therefore, future work should utilize longitudinal data to better understand the prospective impact of social isolation. Finally, there is little detail as to the context or perceived supportiveness of social interactions. Because social interactions differ in quality, content, and valence, additional research should examine the benefits of different forms

Hayden et al., 2021 (Postprint)

of social engagement, which could possibly lead to more effective implementations or recommendations for how to use social behaviors to enhance wellbeing during this stressful time.

In sum, this study presents data on adults in the United States early in the COVID-19 pandemic. As additional longitudinal data is leveraged, the present data may provide insight into the role of the patterns of social interaction among those with and without trauma histories and/or PTSD.

### References

- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders: DSM-5*. (5th ed.). American Psychiatric Association.
- Blevins, C. A., Weathers, F. W., Davis, M. T., Witte, T. K., & Domino, J. L. (2015). The Posttraumatic Stress Disorder Checklist for DSM-5 (PCL-5): Development and Initial Psychometric Evaluation. *Journal of traumatic stress*, 28(6), 489–498. <https://doi.org/10.1002/jts.22059>
- Bovin, M. J., Marx, B. P., Weathers, F. W., Gallagher, M. W., Rodriguez, P., Schnurr, P. P., & Keane, T. M. (2016). Psychometric properties of the PTSD Checklist for Diagnostic and Statistical Manual of Mental Disorders–Fifth Edition (PCL-5) in veterans. *Psychological Assessment*, 28(11), 1379–1391. <https://doi.org/10.1037/pas0000254>
- Brewin, C. R., Andrews, B., & Valentine, J. D. (2000). Meta-analysis of risk factors for posttraumatic stress disorder in trauma-exposed adults. *Journal of Consulting and Clinical Psychology*, 68(5), 748–766. <https://doi.org/10.1037/0022-006X.68.5.748>
- Charuvastra, A., & Cloitre, M. (2008). Social Bonds and Posttraumatic Stress Disorder. *Annual Review of Psychology*, 59(1), 301–328. <https://doi.org/10.1146/annurev.psych.58.110405.085650>
- Hara, K., Adams, A., Milland, K., Savage, S., Callison-Burch, C., & Bigham, J. P. (2018). A data-driven analysis of workers' earnings on Amazon Mechanical Turk. *Conference on Human Factors in Computing Systems - Proceedings*. <https://doi.org/10.1145/3173574.3174023>
- Hawryluck, L., Gold, W. L., Robinson, S., Pogorski, S., Galea, S., & Styra, R. (2004). SARS control and psychological effects of quarantine, Toronto, Canada. *Emerging Infectious Diseases*, 10(7), 1206–1212. <https://doi.org/10.3201/eid1007.030703>
- Jeong, H., Yim, H. W., Song, Y. J., Ki, M., Min, J. A., Cho, J., & Chae, J. H. (2016). Mental health status of people isolated due to Middle East Respiratory Syndrome. *Epidemiology and Health*, 38, e2016048. <https://doi.org/10.4178/epih.e2016048>
- Johnson, D. M., Palmieri, P. A., Jackson, A. P., & Hobfoll, S. E. (2007). Emotional numbing weakens abused inner-city women's resiliency resources. *Journal of Traumatic Stress*, 20(2), 197–206. <https://doi.org/10.1002/jts.20201>
- Joseph, S., Dalgleish, T., Thrasher, S., & Yule, W. (1997). Impulsivity and post-traumatic stress. *Personality And Individual Differences*, 22(2), 279–281. [https://doi.org/10.1016/s0191-8869\(96\)00213-9](https://doi.org/10.1016/s0191-8869(96)00213-9)
- Kates, J., Michaud, J., & Tolbert, J. (2020, April 5). Stay-at-home orders to fight COVID-19 in the United States: The risks of a scattershot approach. *Kaiser Family Foundation*. <https://www.kff.org/coronavirus-policy-watch/stay-at-home-orders-to-fight-covid19/>
- Klein, N. (2016). Prosocial behavior increases perceptions of meaning in life. *The Journal Of Positive Psychology*, 12(4), 354–361. <https://doi.org/10.1080/17439760.2016.1209541>
- Kohli, A., Perrin, N., Mpanano, R. M., Case, J., Murhula, C. M., Binkurhorhwa, A. K., Mirindi, A. B., Banywesize, J. H., Bufole, N. M., Ntwali, E. M., & Glass, N. (2014). Social interaction in the aftermath of conflict-related trauma experiences among women in Walungu Territory, Democratic Republic of Congo. *Global Public Health*, 10(1), 55–70. <https://doi.org/10.1080/17441692.2014.972426>
- Liu, X., Kakade, M., Fuller, C. J., Fan, B., Fang, Y., Kong, J., Guan, Z., & Wu, P. (2012). Depression after exposure to stressful events: Lessons learned from the severe acute

Hayden et al., 2021 (Postprint)

- respiratory syndrome epidemic. *Comprehensive Psychiatry*, 53(1), 15–23.  
<https://doi.org/10.1016/j.comppsy.2011.02.003>
- Liu, N., Zhang, F., Wei, C., Jia, Y., Shang, Z., Sun, L., Wu, L., Sun, Z., Zhou, Y., Wang, Y., & Liu, W. (2020). Prevalence and predictors of PTSS during COVID-19 outbreak in China hardest-hit areas: Gender differences matter. *Psychiatry Research*, 287(March), 112921.  
<https://doi.org/10.1016/j.psychres.2020.112921>
- McFarlane, A. C. (2010). The long-term costs of traumatic stress: intertwined physical and psychological consequences. *World Psychiatry*, 9(1), 3–10.  
<https://doi.org/10.1002/j.2051-5545.2010.tb00254.x>
- McGuire, A. P., Gauthier, J. M., Anderson, L. M., Hollingsworth, D. W., Tracy, M., Galea, S., & Coffey, S. F. (2018). Social support moderates effects of natural disaster exposure on depression and posttraumatic stress disorder symptoms: Effects for displaced and nondisplaced residents. *Journal of Traumatic Stress*, 31(2), 223–233.  
<https://doi.org/10.1002/jts.22270>
- McGuire, A. P., Hayden, C., Frankfurt, S. B., Kurz, A. S., Anderson, A. R., Howard, B. A. N., Szabo, Y. Z. (under review). Social engagement early in the U.S. COVID-19 crisis: Exploring social support and prosocial behavior between those with and without depression or anxiety in an online sample.
- Monson, E., Brunet, A., & Caron, J. (2015). Domains of quality of life and social support across the trauma spectrum. *Social Psychiatry and Psychiatric Epidemiology*, 50(8), 1243–1248.  
<https://doi.org/10.1007/s00127-015-1029-y>
- Nelson, S., Layous, K., Cole, S., & Lyubomirsky, S. (2016). Do unto others or treat yourself? The effects of prosocial and self-focused behavior on psychological flourishing. *Emotion*, 16(6), 850–861. <https://doi.org/10.1037/emo0000178>
- Ozer, E. J., Best, S. R., Lipsey, T. L., & Weiss, D. S. (2008). Predictors of posttraumatic stress disorder and symptoms in adults: A meta-analysis. *Psychological Trauma: Theory, Research, Practice, and Policy*, 5(1), 3–36. <https://doi.org/10.1037/1942-9681.s.1.3>
- Perry, R., & Lindell, M. (2003). Understanding Citizen Response to Disasters with Implications for Terrorism. *Journal Of Contingencies And Crisis Management*, 11(2), 49–60.  
<https://doi.org/10.1111/1468-5973.1102001>
- R Core Team. (2017). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing, Vienna, Austria. <https://www.R-project.org/>.
- Revelle, W. (2020). psych: Procedures for Psychological, Psychometric, and Personality Research (Version 1.9.12.31) [computer software and manual]. <https://cran.r-project.org/web/packages/psych/index.html>.
- Schnurr, P. P., Lunney, C. A., Bovin, M. J., & Marx, B. P. (2009). Posttraumatic stress disorder and quality of life: Extension of findings to veterans of the wars in Iraq and Afghanistan. *Clinical Psychology Review*, 29(8), 727–735. <https://doi.org/10.1016/j.cpr.2009.08.006>
- Shakespeare-Finch, J., & Obst, P. L. (2011). The development of the 2-way social support scale: A measure of giving and receiving emotional and instrumental support. *Journal of Personality Assessment*, 93(5), 483–490. <https://doi.org/10.1080/00223891.2011.594124>
- Sippel, L. M., Watkins, L. E., Pietrzak, R. H., Hoff, R., & Harpaz-Rotem, I. (2019). Heterogeneity of posttraumatic stress symptomatology and social connectedness in treatment-seeking military veterans: a longitudinal examination. *European Journal of Psychotraumatology*, 10(1), 1646091. <https://doi.org/10.1080/20008198.2019.1646091>

Hayden et al., 2021 (Postprint)

- Smid, G. E., Kleber, R. J., Rademaker, A. R., van Zuiden, M., & Vermetten, E. (2013). The role of stress sensitization in progression of posttraumatic distress following deployment. *Social Psychiatry and Psychiatric Epidemiology*, 48(11), 1743–1754. <https://doi.org/10.1007/s00127-013-0709-8>
- Solomon, Z., & Mikulincer, M. (2007). Posttraumatic intrusion, avoidance, and social functioning: A 20-year longitudinal study. *Journal of Consulting and Clinical Psychology*, 75(2), 316–324. <https://doi.org/10.1037/0022-006x.75.2.316>
- Sun, L., Sun, Z., Wu, L., Zhu, Z., Zhang, F., Shang, Z., Jia, Y., Gu, J., Zhou, Y., Wang, Y., Liu, N., & Liu, W. (2020). Prevalence and Risk Factors of Acute Posttraumatic Stress Symptoms during the COVID-19 Outbreak in Wuhan, China. *MedRxiv*, March, 2020.03.06.20032425. <https://doi.org/10.1101/2020.03.06.20032425>
- University of Southern California Dornsife (2020) *Understanding america study*. <https://covid19pulse.usc.edu/>
- Veling, W., Hall, B. J., & Joosse, P. (2013). The association between posttraumatic stress symptoms and functional impairment during ongoing conflict in the Democratic Republic of Congo. *Journal of Anxiety Disorders*, 27(2), 225–230. <https://doi.org/10.1016/j.janxdis.2013.01.007>
- Weathers, F. W., Litz, B. T., Keane, T. M., Palmieri, P. A., Marx, B. P., & Schnurr, P. P. (2013). The PTSD Checklist for DSM-5 (PCL-5) – Standard [Measurement instrument]. Available from <https://www.ptsd.va.gov/>
- Wickham, H. (2019). *tidyverse (Version 1.3.0) [computer software and manual]*. <https://CRAN.R-project.org/package=tidyverse>.
- Woodhouse, S., Ayers, S., & Field, A. P. (2015). The relationship between adult attachment style and post-traumatic stress symptoms: A meta-analysis. *Journal of Anxiety Disorders*, 35, 103–117. <https://doi.org/10.1016/j.janxdis.2015.07.002>
- Wu, P., Fang, Y., Guan, Z., Fan, B., Kong, J., Yao, Z., Liu, X., Fuller, C. J., Susser, E., Lu, J., & Hoven, C. W. (2009). The Psychological Impact of the SARS Epidemic on Hospital Employees in China: Exposure, Risk Perception, and Altruistic Acceptance of Risk. *The Canadian Journal of Psychiatry*, 54(5), 302–311. <https://doi.org/10.1177/070674370905400504>