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Factors Affecting Mental Health Service Use among University Students following an Episode of Mass Violence

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Abstract

Objective: Episodes of mass violence can increase mental health (MH) symptoms among survivors, possibly leading to increased MH service use. Within the context of an episode of mass violence that impacted a university community, we prospectively explore the *predisposing* (demographics, clinical levels of MH symptoms, victimization history, objective exposure, and social support), *enabling* (MH stigma, prior MH service use,), and *need* (MH symptoms, current social support) variables that influence post-tragedy MH service use. **Method:** In the original study, 593 students completed surveys at two time points during their first year of college. After the tragedy, students were invited to participate in a post-event survey for a final sample of n = 142. **Results:** A total of 14.3% of our sample accessed MH services post-event. Results indicate that demographic factors were not related to MH service use. When examined jointly in a logistic regression, the final model suggests that prior MH service use and greater objective exposure were related to post-tragedy MH service use. Other predisposing, enabling, and need factors were not associated with MH service use. **Conclusion:** Prior experience with MH services may help survivors engage in services following a disaster. As disaster MH service models tend to target outreach to those with the greatest exposure, this may be why those survivors had greater MH service use.

Keywords: Mental health; service use; mass violence; university students

Clinical Impact Statement: In a university student sample, a minority of survivors accessed MH services. They were more likely to access MH services if they had prior use of MH services and more objective exposure to the tragedy. Demographic factors, prior clinical levels of MH symptoms, current or past social support, current MH symptoms, and MH stigma were not related to post-tragedy MH service use.

Unfortunately, episodes of mass violence (e.g., mass shootings, attacks with cars) have shown a tendency towards increasing frequency (Lowe & Galea, 2015) with a record number of mass killings occurring in 2019 in the United States (BBC, 2019). On Friday, May 23, 2014, a young man unaffiliated with the university murdered six students from University of California, Santa Barbara (UCSB) and wounded over a dozen others, across 17 different crime scenes, before killing himself (Santa Barbara County Sheriff's Office, 2015). Reviews of research on mass shootings indicated that they were characterized by a large number of unsuspecting victims from the broader society that were unconnected to the perpetrator, and that they could increase mental health (MH) symptoms among community members, such as posttraumatic stress, depression, and anxiety symptoms (Lowe & Galea, 2015; Shultz et al., 2014).

Research following the Oklahoma City bombing documented short and long-term impacts of direct exposure on MH symptoms, indicating possible MH needs requiring immediate and long-term interventions (e.g., North et al., 1999; North, 2001). Although the relation of exposure to an episode of mass violence and the potential for short- and long-term distress has been well-documented, MH service use post-tragedy has received little attention. Only a minority of survivors developed ongoing psychopathology, but when that rate is multiplied across an entire population, that can result in a large absolute number of individuals accessing MH services, potentially overwhelming the capacity of the existing MH service system (Bonanno,

Brewin, Kaniasty, & La Greca 2010). Not all survivors in need accessed services; thus, we need to understand the factors associated with post-disaster MH service use in order to effectively screen those in need and target services (Elhai & Ford, 2009). Using a prospective, longitudinal design, we assessed the *predisposing*, *enabling*, and *need* factors that affect post-tragedy MH service use, defined as seeking either drop-in counseling immediately post-tragedy or counseling within the first six months post-tragedy, among a university student sample.

Model of Post-Disaster MH Service Use

The disaster MH research field has focused on both human-made (e.g., terrorism, mass violence) and natural (e.g. hurricanes) disasters, and their MH consequences. The Behavioral Model of MH service use (e.g., Andersen, 1995) has been applied to the post-disaster context (Elhai & Ford, 2009; Lowe, Fink, Norris, & Galea, 2015) and indicates that *predisposing* variables, *enabling* variables, and *need* variables are related to MH service use. *Predisposing* variables included sociodemographic and personal characteristics that were present before the current health condition, or in this case, prior to the episode of mass violence. This includes gender, age, ethnicity, prior trauma history or stressors, pre-disaster social support, and attitudes. These variables were also critical in explaining variance in post-disaster MH symptoms (e.g., Bonanno et al., 2010; Norris et al., 2002). Based on conceptual models predicting MH symptoms following disaster (e.g., La Greca, Silverman, Vernberg, & Prinstein, 1996) and empirical information to

date on mass shootings (Lowe & Galea, 2015; Shultz et al., 2014; Miquelon et al., 2014), we expected that for a disaster context, objective exposure may influence MH service use directly, or through increased risk of MH symptoms. Objective exposure involved the experiences directly associated with the event, such as tangible losses, injuries, and death of a loved one. Objective exposure has a direct influence on post-disaster MH symptoms (Bonanno et al., 2010; Lowe & Galea, 2015; Shultz et al. 2014), and was considered a predisposing variable in a prior review (Elhai & Ford, 2009).

Enabling variables were related to access to and availability of treatment. Although yet to be studied in the aftermath of an episode of mass violence, MH stigma was a barrier to treatment-seeking (Lowe et al., 2015; Wu et al., 2017). Related, accessing MH services prior to a traumatic event may reduce perceptions of MH stigma, produce a sense of familiarity with the process of engaging in treatment, and increase perceived benefit of engaging in MH services, that should be investigated in the context of predictors of MH service use following a community-wide traumatic event.

Finally, *need* variables were related to the MH condition, such as symptom severity. Prior research demonstrated that greater distress and MH symptoms were related to MH service use (Elhai & Ford, 2009; Stene & Dyb, 2015). In addition, based on conceptual model of post-disaster MH (La Greca et al., 1996), aspects of the recovery environment, such as social support in the disaster aftermath affect post-disaster MH (Bonanno et al., 2010), and thus warrant investigation.

Mental Health Service Use following an Episode of Mass Violence

A review of research on MH service use post-disaster found only post-event only studies, indicating a great need for prospective studies (Elhai & Ford, 2009). In the years since this review, we were unable to locate any other prospective studies on post-disaster MH service use. This review found a relatively low level of MH service use, 8-19%, often consistent with the rates found in non-disaster exposed community samples (Elhai & Ford, 2009). Of *predisposing* variables, younger age, White ethnicity, and objective exposure to the disaster were related to post-disaster MH service use. They found little association between *enabling* variables and service use, but did find an association with *need*. Survivors with great MH needs in terms of MH diagnoses or symptoms, most specifically symptoms of PTSD, depression, and anxiety, were more likely to use MH services.

Only a few studies have specifically explored MH service use following an episode of mass violence. Students and staff reported their MH service use 18 months after the Dawson College shooting, and only self-reported presence of a mental disorder and female sex predicted MH service use (Miquelon et al., 2014). Following the September 11, 2001 terror attacks, Boscarino, Adams, and Figley (2004) investigated MH service use in a community-based sample and found several predictors of new or increased use when compared to the year prior to the attacks. These included demographic factors such as age groups, with the 30-44 year old group as the highest likelihood of seeking services; race, with African-Americans the

least likely to seek services; and education, with non-college graduates significantly less likely to seek services (Boscarino, et al., 2004). Retrospective report of lifetime experience of depression, anxiety, and post-traumatic stress symptoms were related to increased MH service post-terror attack. Also, consistent with extant research, increased objective exposure had a strong positive relationship with increased MH service use (Boscarino et al., 2004). Although the large sample of New York City residents and the longitudinal design added to the existing understanding of the effects of community-level traumatic events on MH service use, their retrospective pre-tragedy assessments can be confounded by recall bias (Boscarino et al., 2004).

Prospective, longitudinal designs offer greater insight to post-mass violence outcomes by disentangling pre- and post-trauma indicators of MH (Miron, Orcutt, & Kumpula, 2014) without the added error of recall bias. However, the majority of available research is conducted post-event only, with assessments of pre-event functioning done retroactively. Of the few studies with prospective, longitudinal data following an episode of mass violence (e.g., Bardeen, Kumpula, & Orcutt, 2013; Miron et al., 2014; Littleton, Grills-Taquechel, Axsom, Bye & Buck, 2012), none examined predictors of MH service use. The available prospective studies addressed important pre-tragedy correlates to increased PTSS, which need to be investigated as possible links to subsequent MH service use. Prior trauma history and lower levels of social resources were related to post-event PTSS

(Littleton et al., 2012; Miron et al., 2014).

Current Study

Due to the unforeseen nature of these mass violence events, prospective studies are rare. Following an episode of mass violence that affected the UCSB community, we have the opportunity using prospective, longitudinal data to explore factors associated with MH service use post-tragedy. Our prior research with this sample demonstrated an increase in depression and anxiety symptoms from pre- to post-tragedy that corresponded with perception of resource loss (Felix, Dowdy, & Green, 2018). We now turn our attention to factors related to post-tragedy MH service use, to better understand who was and was not seeking treatment. We generally followed the Behavioral Model (Andersen, 1995) and assessed *predisposing, enabling,* and *need* variables in our study. In terms of *predisposing* factors, we investigated the role of sex, ethnicity, and pre-tragedy levels of victimization, mental health, social support; and objective exposure. Although prior research pointed to younger age as a predisposing factor, we did not study this as by original study design, all participants were first-year university students; thus, we have a restricted age range. For *enabling* factors, we assessed MH stigma as a potential barrier to access, and prior use of MH services as a factor that may increase likelihood of post-disaster MH service use. We did not assess the *enabling* variables of access and availability, because given the university student population, all students had access to the services of the university counseling center at no or very

low cost. Finally, we examined *need* variables in terms of current MH symptoms and current social support. We explored the following research questions (RQ):

RQ1. What *predisposing* variables including demographics; pre-event mental health, victimization history, and social support; and objective exposure, are related to post-tragedy MH service use?

RQ2. Do the *enabling* factors of MH stigma prior MH service use influence post-tragedy MH service use?

RQ3. What post-tragedy *need* variables including posttraumatic stress symptoms (PTSS), depression, anxiety, social support are related to MH service use?

Method

Participants and Procedures

Students from UCSB, who initially participated in a study exploring the relationship between prior experiences with peers and adjustment to college (see Holt et al., 2017), were asked to participate in the post-tragedy study. IRB approval was obtained from UCSB and we complied with American Psychological Association Ethical Standards. For the original study, students were asked to complete online surveys at two time points during their first year of college (2012-2013 academic year; pre-tragedy). Details about sampling and recruitment can be found in Holt et al. (2017). The original study was then closed, but after the Isla Vista tragedy on May 23, 2014, IRB approval was obtained to re-open the study, and the 593 original participants

were contacted and invited to participate in a post-tragedy survey in October and November 2014 (5-6 months post-tragedy). Participants were offered the choice of a $5 Amazon gift card or a $5 donation to a memorial fund for the victims of the tragedy as an incentive for participation. A total of 142 students (24% response rate) completed the post-tragedy survey, but due to missing data on variables of interest, 10 people were excluded from the final sample. This response rate is consistent with other online surveys following an episode of mass violence (see Hughes et al., 2011).

The final sample with pre- and post-data (n = 132) was 67.4% female, 39.7% White, 32.1% Asian/Pacific Islander, 13.0% Hispanic, and 15.3% mixed or other race. In comparison, the UCSB Campus Profile for the year the original study began shows the undergraduate demographics as 53% female and 43% White, 24% Asian/Pacific Islander, 24% Latino/a, 4% Black/African American, 1% American Indian/Alaskan, 0.4% Other, and 3% Unknown. By initial study design, all students were in their first year of college (18 or 19 years old) at study entry. T-tests and chi square analyses revealed no differences between the students who completed the post-tragedy survey, and those that did not, in terms of gender, ethnicity, MH symptoms, or any other psychosocial adjustment construct at study entry.

Measures

Pre-Tragedy.

***Victimization*.** To account for prior victimization as a proxy for prior trauma, a sum score was created by combining participant responses to a

question on prior bullying victimization (Swearer & Cary, 2003) and nine items from the Juvenile Victimization Questionnaire (JVQ). The JVQ is a comprehensive assessment tool designed to measure crime, child maltreatment, and other childhood victimization experiences with high internal reliability and validity (Finkelhor, Ormrod, Turner, & Hamby, 2005). The items included assessed for victimization, physical dating violence, attempted/completed rape, emotional dating violence, and physical and psychological abuse by a family member. Responses were on a dichotomous scale (0 = *no*, 1 = *yes*) and were aggregated to create a total score.

Both Pre- and Post-Tragedy

Depression. The Patient Health Questionnaire-9 (PHQ-9) is a self-report depression scale (Kroenke, Spitzer, & Williams, 2001). It measures different symptoms of depression (e.g., “feeling down, depressed, or hopeless”), where higher scores indicate greater severity and has good psychometric support (Kroenke, Spitzer, Williams, & Löwe, 2010). Participants answered how often, over the last two weeks, they had been bothered by each symptom on a 4-point scale of (0) *not at all* to (4) *nearly every day*. Items were summed to create a total score. Internal consistency was good for the current study: α = .91 (pre-1), .93 (pre-2), and .90 (post).

Anxiety. The Generalized Anxiety Disorder-7 (GAD-7) is a self-report measure of symptoms of anxiety (Spitzer, Kroenke, Williams, & Löwe, 2006). It has good sensitivity and specificity for detecting generalized anxiety, panic, social anxiety, and PTSD (Kroenke et al., 2010). Respondents reported

the frequency they experienced symptoms (e.g., “feeling nervous, anxious, or on edge”) within the last two weeks. Response options and scoring were the same as the PHQ-9. Internal consistency for this sample was good, α = .90 (pre-1), .93 (pre-2), and .91 (post). We explored whether students met clinical criteria for depression and/or anxiety at any of the two assessment time points prior to the tragedy. Per the instruction manual, students scoring 10 or higher on either or both measures indicate a clinical MH concern prior to the tragedy.

Multidimensional Scale of Perceived Social Support (MSPSS). The MSPSS (Zimet, Dahlem, Zimet, & Farley, 1988) is a 12-item self-report measure designed to subjectively assess students’ perceived social support from three sources: friends (e.g., I have friends with whom I can share my joys and sorrows), family (e.g., My family really tries to help me), and significant others. For this study, the eight items from the friends and family subscales were used to create a total social support score. Responses are provided on a 7-point response scale ranging from 1 (*very strongly disagree*) to 7 (*very strongly agree*) and a total mean score was created. Previous research demonstrated good internal and test-retest reliability and moderate construct validity (Zimet et al., 1988). Our data yielded strong reliability estimates of α = .96 (pre-1), .93 (pre-2), and .92 (post).

Mental Health Service Use. Prior to the tragedy, participants were asked “are you currently in psychotherapy or counseling for your emotions, nerves, or mental health?” and could respond *yes* or *no*. This was an adapted

and abbreviated version of the measure used in the World Health Organization World Mental Health International College Student Initiative (Bruffaerts et al., 2019). Following the tragedy, we asked two questions. One asked if the student attended drop-in counseling services in the weeks immediately after the tragedy, and the other was the same question asked pre-tragedy. Participants could respond *yes* or *no* for both questions. We created a composite indicator where *yes* (1) indicated they participated in either or both, and *no* (0) indicated did not seek counseling at all during the study time frame.

Post-Tragedy Only.

Objective Exposure. The lead investigator developed 14 yes/no questions based on the extant literature, contextual knowledge of the events, and prior disaster research experience, following the causal-indicator model used in many post-violence studies (see Netland, 2005). Per recommendations for event-list construction (Netland, 2005), a comprehensive-context dependent list of items was created. Sample items include: if they heard gunshots, if they saw the car with the gunman, if they were personally injured (see Felix et al., 2018). Responses were summed to create a total objective exposure score. Prior research with this sample supports its validity through its significant relation to post-trauma constructs, such as mental health symptoms (Felix, Moore, Meskunas, & Terzieva in press).

Posttraumatic stress symptoms. The 22-item Impact of Events

Scale-Revised (IES-R) is a widely used measure of traumatic stress (Weiss & Marmar, 1997) based on DSM-IV criteria. Participants responded to items assessing intrusion (e.g., “other things kept making me think about it”), avoidance (e.g., “I felt as if it hadn’t happened or wasn’t real”) and hyperarousal (e.g., “I was jumpy and easily startled”), during the past seven days, 0 (*not at all*) to 4 (*extremely*). Items were summed to create an overall symptom score. The IES-R has strong psychometric properties. Our sample had $\alpha = .94$.

MH Stigma. We used four items from the 10-item Self-Stigma of Seeking Psychological Help scale (Vogel, Wade, & Haake, 2006). Sample items include “I would feel inadequate if I went to a therapist for psychological help” and “Seeking psychological help would make me feel less intelligent.” Response options ranged on a 5-point scale from (1) *Strongly Disagree* to (5) *Strongly Agree*, and a mean total score was created. Psychometric studies supported the reliability and validity of the measure, including predictive validity of who seeks counseling (Vogel et al., 2006). Our sample had $\alpha = .78$.

Analytic Plan

Univariate analyses in the form of chi-square difference tests and independent samples t-tests compared those who accessed MH services and those who did not on *predisposing* (RQ1), *enabling* (RQ2), and *need* variables (RQ3). We then conducted multivariate analysis using a hierarchical logistic regression to see which factors emerged as predictors of post-tragedy MH

service use when examined jointly.

Results

None of the participants reported MH service use at entry to college. By the end of their first year of college (but before the tragedy), 6.3% were known to have accessed MH services. Following the tragedy, 14.3% reported MH service use. Approximately 11.8% of students reported accessing drop-in counseling services in the initial weeks after the mass murder, before the academic year ended. In addition, a minority were currently receiving mental health services (5.1%), and of those, half reported they discussed the mass murder in treatment. A total of 18 students (14.3%) accessed MH services using our combined indicator, with only one person who both accessed drop-in counseling services and continued in therapy at the time of our survey.

Univariate to Post-Tragedy MH Service Use

Table 1 displays the comparison of those who sought post-tragedy MH services and those who did not. Of the *predisposing* factors, no significant differences were found for sex, ethnicity, levels of pre-tragedy victimization, social support, or clinical levels of MH symptoms. There was a difference with objective exposure ($p<.001$; $d=.92$); participants reporting greater objective exposure were more likely to access MH services. Of the *enabling* factors, there were differences in prior MH service use ($\chi^2(1)=15.21$, $p<.000$; OR=14.75), but not in MH stigma. Of students with no prior MH service use, 7.8% had post-tragedy MH service use; whereas for students with pre-tragedy MH service use, 55.6% engaged in post-tragedy MH service use. Of

the *need* factors, participants with greater total PTSS (p=.008; d =.65) were more likely to access MH services post-tragedy. We investigated differences in PTSS symptoms cluster, and found differences for intrusion (p=.041; d=.62) and hyperarousal symptoms (p=.028; d=.68) between students that received post-tragedy counseling and those who did not. Analyses demonstrated moderate to strong effect sizes. Depression, anxiety, and social support were not significantly related to post-tragedy MH service use.

Joint Influences on Post-Tragedy Mental Health Service Use

The univariate results point to the potentially most salient pre- and post-tragedy factors affecting subsequent MH service use, and are useful for meta-analytic research. We follow this with a more stringent multivariate analysis (see Table 2). As demographics were not related to MH service use in our univariate analysis, nor in a logistic regression that included them (results not displayed), we did not include them in our final model to improve statistical power to detect the other potential influences. The final model (Nagalkerke R^2=.44; χ^2 (10)=32.89, p<.000) indicated that accessing pre-tragedy MH services and greater objective exposure were related to post-tragedy MH service use. The overall classification percentage was 89.5%. PTSS was no longer related to post-tragedy MH service use, although it was previously significant in univariate analysis. Objective exposure and PTSS were significantly correlated (r=.29, p=.001), which may explain this result.

Discussion

The most common trajectories of MH symptoms following collectively-

experienced traumas like natural disaster, terrorism, and mass shootings were recovery and resilience, with only a minority reporting chronic levels of impairment over time (Bonanno et al., 2010; Orcutt, Bonanno, Hannan, & Miron, 2014). Hence, most survivors did not develop levels of psychopathology requiring on-going intervention or support (Holder, Suris, Holliday, & North, 2017). However, even if a statistical minority develop ongoing psychopathology, when that rate is multiplied across an entire population like a university campus, that can result in a large absolute number of individuals accessing MH services, which can overwhelm the capacity of the existing MH service system (Bonanno et al., 2010). However, not all survivors in need accessed services; thus, we needed to understand what factors were associated with post-tragedy MH service use in order to effectively screen those in need and target services. It is rare to be able to prospectively assess MH service use following an episode of mass violence, which allowed us to disentangle pre- and post-tragedy factors that may influence MH service use.

We found that 14.3% of our sample accessed MH services following the mass murder, which is consistent with rates from other post-disaster studies (Elhai & Ford, 2009). A previous study with this sample found that 27.6% of participants reported symptoms reaching the clinical cutoff on any of our measures of MH (depression, anxiety, PTSS) (Felix et al. 2018). Therefore, there were more survivors who could potentially benefit from accessing MH services than were actually doing so. Prior experience with MH services and

the experience of the tragedy itself (objective exposure) influenced post-tragedy MH service use. Univariate results suggested a possible role for PTSS, although this was no longer significant when examined in a multivariate analysis. However, prior research supported a role for PTSS in increasing need for, and use of, services (Elhai & Ford, 2009).

Given prior literature (e.g., Boscarino et al., 2004; Elhai & Ford, 2009; Miquelon et al., 2014), we explored what demographic factors may be associated with post-tragedy MH service use to assess whether any group was less able or willing to access services. Contrary to prior research (Elhai & Ford, 2009), especially following the September 11, 2001 terror attack (Boscarino et al., 2004), we did not find a relation between demographic factors and MH service use. The Boscarino et al. (2004) study was from the general population and our study had a university student population. At the university, all students had access to the university counseling center services, without the barriers of cost and insurance status that the general adult population may face, especially at the time the Boscarino et al (2004) study took place, prior to universal insurance in the United States (e.g., Obamacare). This may have reduced barriers to access that had resulted in part in the demographic differences noted in previous studies. In addition, in our particular university student sample, there was an underrepresentation of some ethnicities; therefore, there were sociodemographic differences between our sample and the Boscarino et al. (2004) sample.

We also explored how aspects of the tragedy experience affected MH

service use and found that higher levels of objective exposure was significant. In terms of objective exposure, the constellation of individual items endorsed suggested that it was students who witnessed the events as they were happening and/or knew someone who was killed that were more likely to seek MH services. As the tragedy occurred over a holiday weekend, closely before final exams, students could have been in a variety of places the night the event occurred. A significant minority of students went out of town for the holiday weekend, and were not physically present to witness events, but may have known someone killed or injured. Other students were on campus, not in the community, and may not have seen the events, but were unable to get home that evening, experienced fear and uncertainty, or may have known someone killed or injured. Finally, as it was a Friday night, many students were socializing in the Isla Vista community where a large proportion of students live, and hence would have experienced the events live, as they occurred. A review of prior research on mass shootings has suggested a dose-response relationship between exposure and distress is common (Smith & Hughes, 2016). Our findings suggest objective exposure increases likelihood of MH services, either because students came to drop-in counseling, or because counselors often triage response by outreaching to people and organizations most likely to be highly affected; thus, going directly to those most exposed. For example, as sororities were targeted by the perpetrator in this mass murder, outreach to these organizations was initiated by our local MH first responders. This outreach could be one of the

reasons for the relationship of objective exposure to MH service use, in addition to the possibility that objective exposure increased risk for MH symptoms, thus increasing need.

Given the prospective nature of our study, we were able to assess what pre-tragedy *predisposing* and *enabling* factors were associated with post-tragedy MH service use without the potential interference of recall bias. Post-event only studies have to contend with recall bias when retrospective reports on pre-event factors are used. We found that prior use of MH services was associated with post-tragedy MH services. Pre-existing clinical levels of MH symptoms and pre-tragedy social support were not related to post-tragedy MH service use. It is possible that students who accessed MH services in the past may have felt more comfortable re-initiating services following the tragedy, or had simply continued services. It is interesting that previously accessing MH services was related to post-tragedy MH service use but pre-tragedy clinical levels of MH symptoms was not. As most of the research following an episode of mass violence is post-event only, researchers may be tempted to rely on a question about being in counseling or psychotherapy prior to the event as a proxy for pre-event MH. Our findings suggest that it may not be useful to do so, as pre-event MH service use and pre-event clinical levels of MH symptoms had a different relationship to post-tragedy MH service use, indicating limited overlap. This should be replicated in future studies.

MH stigma was not related to MH services in this sample. There were

no differences between groups on MH stigma, with both groups reporting low levels of perceived stigma (e.g., disagreeing with statements indicating stigma beliefs). Stigma may not be as much of a barrier with young adults in this generation, as it may be with adults of other ages or generations, which may be good for clinicians to know. This is consistent with other research on "Gen Z" and "Millennials" which shows that they were more likely to seek MH help than older generations (American Psychological Association, 2018). However, given the small sample size, we suggest MH stigma should be explored in future studies following an episode of mass violence, and with samples with a wider age range.

We found only a limited role for *need* variables, which was surprising given their significant role in prior research (Elhai & Ford, 2009; Stene & Dyb, 2015). Initially, in our univariate analyses, we found a role for PTSS, but that influence disappeared in our multivariate analysis. In neither univariate or multivariate analyses did anxiety or depression relate to post-tragedy MH services. Given our small sample size, the potential role of PTSS should continue to be explored, especially as it was found to be related to post-disaster MH service use in previous research (Elhai & Ford, 2009). It is important to remember that our measures were self-report symptom scales, and not diagnostic interviews to rule in or out certain diagnoses. As there is overlap amongst some symptoms of PTSS, depression, and anxiety, we cannot be precise in hypothesizing why PTSS at one point was related to MH service use, but depression and anxiety symptoms were not across all

analyses. Given that we were better able to account for *predisposing* and *enabling* factors given our prospective design, that may be why *need* variables found in post-event only studies were not significant in our study. However, given our small sample size, this needs to be replicated with other prospective studies, when available.

Strengths, Limitations, & Future Directions

There are very few studies on mass violence that have measures of pre-event functioning, and they are an important contribution to address issues of recall bias that are inherent in post-event only studies. Of these few prospective studies, we are unaware of any that addressed post-event MH service use. Thus, this study fills an important gap that has implications for clinical practice. It is crucial to know what is related to post-event MH services use, but equally important, what is not related. Smith and Hughes (2016) noted that most research following mass violence focuses on what is significantly related to distress, or what are efficacious services, rather than what is not, even though this bias has clear implications for our state of knowledge and clinical practice. Our results suggest that issues of stigma may not be as much of an issue in helping Gen Z survivors access MH services, whereas having accessed counseling in the past seems to help survivors come forward following a trauma. Our comprehensive assessment of pre- and post-tragedy factors allowed us to assess a variety of conceptually and empirically related constructs that could affect MH service use. Reporting the significant and non-significant factors also helps future

research trying to synthesize the factors that may affect MH service use following mass violence through meta-analysis, by reducing potential bias in our knowledge (e.g., file drawer effect).

Despite these strengths, our finding should be viewed as preliminary, and in need of replication. This is a sample from one episode of mass violence, and there are likely many contextual factors associated with any given episode (e.g., characteristics of the perpetrator, victims, crime, or community) that may affect rates of distress and MH service use. Thus, we need replication across different episodes of mass violence. We also had a relatively small sample size that reduced our statistical power; hence, replication with a larger sample size, in addition to a prospective design, is indicated. However, the relatively straightforward analyses, taken as a whole, reveal that survivors with prior experience with MH services and who had greater objective exposure are most likely to access services. Our post-tragedy response rate was low, but typical of other studies in this field, as no effort to retain the participants was made, given that the original study was closed at the time the mass murder occurred. In addition, there are limitations to our measures to note. Our measure of PTSS was based on the DSM-IV not DSM-V symptom criteria. Our assessment of MH service use does not directly delineate whether those who sought counseling were doing so due to the mass murder, versus another reason, although we know that half of participants currently in MH services discussed the mass murder. Finally, although MH service use is important to understand, our paper does not

address any barriers to accessing services, and why. Understanding these factors will help guide post-disaster mental health response efforts to ensure those that need the services the most, and want them, can access them. When episodes of mass violence affect educational institutions, there are a variety of other services, beyond MH services, that students may need. At UCSB, in the weeks that followed, students accessed emergency housing, academic advising and support, and financial aide. A limit of the current study is that we did not assess what other types of services students were accessing, beyond MH services. We hope future research can address this as well.

In sum, we have a growing base of literature on what MH services may be helpful, and what may be harmful, but we need to know more about bringing these services to those who may need it the most. Although 27.6% of our sample had clinical levels of MH symptoms, only 14.3% accessed MH services at the time of our study. We understand the correlates of MH service use in this university sample (pre-tragedy MH service use and objective exposure), in addition to what was unrelated (prior victimization, previous clinical levels of MH symptoms, current MH symptoms, social support, MH stigma). Outreach efforts tend to focus on those who had greater objective exposure, but our information on unmet MH needs suggests that proactive screening for clinical levels of distress may also be helpful in improving access to services. We hope that the current study is one step forward in continuing to improve our knowledge base about how to

best support survivors of episodes of mass violence.

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Table 1.

The Relation of Predisposing, Enabling, and Need Factors to Post-tragedy MH Service Use (N= 126)

	MH Service Use (n = 18)	No MH Service Use (n=108)	Total Sample		
Variables	%	%	%	χ^2	*p*-value
Ethnicity				1.78	.620
Asian or Pacific Islander	27.8%	34.6%	33.6%		
Hispanic	5.6%	14%	12.8%		
White	50.0%	37.4%	39.2%		
Mixed	16.7%	14.0%	14.4%		
Sex				0.21	.645
Female	61.1%	66.7%	65.9%		
Male	38.9%	33.3%	34.1%		
Clinical Levels of MH Symptoms	23.5%	23.6%	23.6%	0.0	.996
Pre-Tragedy MH Service Use	50.0%	6.3%	12.3%	15.21***	<.001
	M (SD)	M (SD)	M (SD)	*t*-value	*p*-value
Victimization	0.19 (0.17)	0.13 (0.15)	0.14 (0.15)	-1.38	-.171
Social Support	4.69 (2.01)	5.31 (1.49)	5.27 (1.59)	1.52	.130
Objective Exposure	3.39 (2.15)	1.65 (1.60)	1.91 (1.76)	-4.05***	<.001
MH Stigma	1.85 (.83)	2.00 (0.92)	1.98 (.90)	0.68	.506
PTSS	23.44 (17.93)	12.65 (15.19)	14.44 (16.11)	-2.71**	.008
Intrusion	7.89 (7.4)	3.92 (5.29)	4.61 (5.89)	-2.18*	.041
Hyperarousal	6.17 (6.27)	2.51 (4.23)	3.10 (4.75)	-2.38	.028

Avoidance	7.72 (6.76)	5.49 (6.51)	5.85 (6.55)	-1.30	.183
Depression	6.94 (5.12)	6.26 (6.12)	6.33 (5.93)	-0.45	.656
Anxiety	5.61 (4.88)	5.38 (5.31)	5.29 (5.17)	-.017	.865
Social Support	6.03 (.95)	5.67 (1.00)	5.71 (1.06)	-1.42	.158

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

Note. PTSS=posttraumatic stress symptoms; MH=mental health

Table 2.

Summary of Final Logistic Regression Model Predicting Post-Tragedy Mental Health Service Utilization (n = 114)

Predictors	*B*	*SE B*	Wald	*p*-value	OR
Predisposing Factors					
Victimization	.33	.23	2.06	.151	1.39
Pre-Tragedy Clinical MH Problems	-1.31	.98	1.77	.183	.27
Pre-Tragedy Social Support	-.34	.19	3.11	.078	.72
Objective Exposure	.50	.19	7.10	.008	1.65*
Enabling Factors					
Mental Health Stigma	.05	.39	.02	.895	1.05
Prior MH Service Use	4.15	1.17	12.67	.000	63.18**
Need Factors					
PTSS	.01	.02	.29	.594	1.01
Depression	-.04	.10	.17	.684	.96
Anxiety	.02	.09	.03	.857	1.02
Social Support	.54	.45	1.44	.231	1.72
Constant	-5.47	3.32	2.71	.100	.00

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

Note. PTSS=posttraumatic stress symptoms