January 2022

Do Suicide Attempt Survivors Have Reduced Long-Term Well-Being? A Study of Veterans Across Three Nationally Representative Cohorts

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Do Suicide Attempt Survivors Have Reduced Long-Term Well-Being?

A Study of Veterans Across Three Nationally Representative Cohorts

by

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A thesis submitted in partial fulfillment
of the requirements for the degree of
Master of Arts
Department of Psychology
College of Arts and Sciences
University of South Florida

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Date of Approval:
November 15, 2021

Keywords: Suicidality, Military, Recovery, Mental Health

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ABSTRACT

Prior suicide attempts are known to elevate the risk for re-attempting suicide and death by suicide. However, most people who attempt suicide will neither die by suicide nor re-attempt suicide. Establishing comprehensive knowledge about the prognosis of suicide attempts would be valuable for multiple stakeholders, including suicide attempt survivors, their loved ones, and mental health professionals treating suicidal patients. Nearly all work on functioning after a non-fatal suicide attempt centers on elevated risk, and the effects of a suicide attempt on long-term psychological well-being are unknown. The present study addressed this gap in the literature by comparing psychological well-being among veterans with and without a prior suicide attempt using data from three cohorts in a nationally representative sample of US veterans. At each cohort, veteran suicide attempt survivors evidenced large deficits in psychological well-being relative to veteran non-attempters (i.e., $d > 0.8$). Suicide attempt survivors with more time since their last attempt had increased levels of psychological well-being as did attempt survivors with high levels of curiosity and optimism. Situated in the larger psychological well-being literature, results suggest that the aftermath of a suicide attempt may be accompanied by deficits in long-term psychological well-being that are markedly higher than other serious medical events (e.g., cancer diagnosis) and signal an urgent need to broaden the research and treatment of suicide to include a greater focus on long-term psychological well-being. Data were cross-sectional, precluding inferences of any causal effects of a suicide attempt on psychological well-being. The

findings from the present study provide an empirical foundation for future research on psychological well-being in suicide attempt survivors.

CHAPTER ONE:

INTRODUCTION

Suicide is a global public health concern, claiming the lives of over 800,000 people per year worldwide, including over 48,000 deaths in the United States (US) in 2018 (CDC, 2020). In 2018, the Center for Disease Control and Prevention (CDC) reported a 35% increase in US suicide deaths over the last two decades (Hedegaard et al., 2018). It is estimated that for every death by suicide, another 25 people attempt suicide and survive (Nock et al., 2008)—henceforth referred to as suicide attempt survivors—with higher survival among subgroups, such as adolescents (i.e., 100 to 200 suicide attempts per suicide death; Goldsmith et al., 2002). In 2019, an estimated 1.4 million American adults attempted suicide (SAMSHA, 2021; Drapeau & McIntosh, 2018). Critically, estimates of suicide attempt survivors are likely an undercount, as some people who attempt suicide do not report their attempt due to stigma-related concerns or fear of involuntary hospitalization (e.g., Kerkhof, 2000). Clearly, a vast number of people attempt suicide every year and survive.

Given the tragic and harrowing nature of death by suicide, most research on suicide attempt survivors focuses on ongoing risk. Consequently, we know astonishingly little about the full range of psychological outcomes for this population, such as their long-term trajectory of psychological well-being (PWB). The present study addresses this gap by examining if, and to

what extent, suicide attempt survivors differ from non-suicidal individuals in their long-term PWB.

Long-Term Outcomes for Suicide Attempt Survivors

A suicide attempt is defined as a non-fatal, self-directed injurious behavior with a non-zero degree of intention to die as a result of the behavior. It is well-documented and intuitive that suicide attempts are precipitated by extreme mental anguish (e.g., Baumeister, 1990; Joiner, 2005; Shneidman, 1998). A history of suicide attempts is associated with various negative outcomes (e.g., Fergusson et al., 2005; Goldman-Mellor et al., 2014; Owens et al., 2002), including mental health problems (e.g., depression; Fergusson et al., 2005), physical health problems (e.g., inflammation; Goldman-Mellor et al., 2014), and financial difficulties (Goldman-Mellor et al., 2014). Critically, suicide attempt survivors are at an increased risk for re-attempts and death by suicide (Bostwick et al., 2016; Harris & Barraclough, 1997; Owens et al., 2002).

While suicide attempt survivors are at elevated risk for adverse outcomes, the majority of suicide attempt survivors neither re-attempt suicide nor die by suicide. Indeed, long-term follow-up studies suggest that approximately 90% of suicide attempt survivors do not die by suicide in their lifetime (e.g., De Moore & Robertson, 1996; Owens et al., 2002; Suominen et al., 2004). For instance, in a systematic review of 90 longitudinal studies investigating fatal and non-fatal re-attempts among suicide attempt survivors, Owens and colleagues (2002) found that just 7% of suicide attempters died by suicide over a period of nine or more years, and 70% did not re-attempt suicide. Suominen and colleagues (2004) found similar rates of death by suicide among suicide attempt survivors, reporting that 12% of suicide attempters died by suicide over the 37-year study period. Given the devastation left in the wake of a suicide death, it is understandable

that research predominantly focuses on the future risk associated with a suicide attempt and other suicide-related phenomena (e.g., suicidal thoughts).

This exclusive focus on adverse outcomes may also have unforeseen negative consequences. Focusing on negative consequences may contribute to public stigma around suicide, with research documenting common public perceptions that a suicide attempt is invariably linked to adverse outcomes (e.g., "once suicidal, always suicidal"; Rimkeviciene et al., 2015) and that good outcomes (e.g., recovery) are improbable or impossible (Sheehean et al., 2016, 2017). Similar perceptions are also held by some medical health professionals (Pompili et al., 2015). These beliefs consequently devalue the need to study positive outcomes in this population. Strikingly, despite nearly 125 years of systematic study of suicide (Durkheim, 1951), there is almost no generalizable data concerning positive outcomes for suicide attempt survivors (Tong et al., 2021).

An untested assumption seems to underlie this neglect of research on positive outcomes among suicide attempt survivors: that non-fatal suicide attempts are associated with reductions in long-term PWB. This assumption manifests across domains, including societal stereotypes depicting suicide attempt survivors as being unlikely to recover (Sheehan et al., 2016). In this vein, Tong and colleagues (2021) recently published a call for research on longer-term well-being among suicide attempt survivors, ideally using representative population samples. Among the benefits of studying long-term well-being in suicide attempt survivors is an enhanced patient-centered communication through a more accurate and comprehensive picture of the prognosis for suicide attempt survivors and reducing suicide-related stigma (Tong et al., 2021). Ultimately, this line of research may have direct applications in reducing suicide risk by identifying malleable factors that predict recovery and well-being among suicide attempt survivors (Tong et al., 2021).

Psychological Well-Being

Part of the rationale for why PWB is important to study in suicide attempt survivors is that well-being has demonstrated prognostic significance in other areas of human health. For instance, higher levels of PWB are associated with a lower risk for disease and mortality (for a review, see Trudel-Fitzgerald et al., 2019), increased cardiovascular health, (Boehm & Kubzansky, 2012), positive behavior change (e.g., Van Cappellen et al., 2018) and a healthy lifestyle (e.g., Trudel-Fitzgerald et al., 2019). Moreover, the absence of PWB predicts future MDD—the most common psychiatric disorder among suicide attempt survivors—above and beyond common negative factors of MDD such as neuroticism, prior depressive episodes, and depressive symptoms (Wood & Joseph, 2010). Aspects of PWB have also been linked to better functioning in domains germane to suicidality including problem-solving abilities (e.g., Joiner et al., 2001) and epidemiological evidence suggests that PWB predicts cessation of suicidal behavior more robustly than psychopathology in some populations (e.g., young women; Teismann et al., 2016). PWB is ultimately associated with better positive mental and physical functioning, both within and beyond the scope of suicidality.

PWB is a multifaceted and complex construct that lacks a uniform definition (e.g., Cooke et al., 2016; Diener et al., 2003; Ryan & Deci, 2001), and is subject to spirited debate about its composition, how it is attained, and how best to measure it (e.g., Disabato et al., 2018; Goodman et al., 2018, 2020; Ryff, 1995; Seligman, 2018). Nevertheless, there is at least some agreement about the factors that characterize PWB. In Diener's (1984) tripartite model, three affective and cognitive elements are suggested to make up subjective well-being: the presence of positive affect, infrequent negative affect, and life satisfaction. Building upon this work, Ryff's (1995) eudaimonic model for PWB proposes that PWB consists of six dimensions of positive

functioning: self-acceptance, positive relations with other people, autonomy, environmental mastery, purpose in life, and personal growth. Accounting for the influence of social factors on PWB (e.g., Baumeister & Leary, 1995; Goodman et al., 2018; Myers, 2000), Keyes (1998) proposed the integration of social well-being into the existing models of PWB. This integration culminated in measures like the 14-item Mental Health Continuum Short-Form (MHC-SF; Keyes, 2002; Keyes et al., 2008) that assess dimensions of emotional (e.g., positive affect), eudaimonic (e.g., purpose in life), and social well-being (e.g., social integration). Taken together, many scholars accept that PWB involves elements of positive emotional, intrapersonal, and interpersonal functioning.

Benefits of Studying Psychological Well-Being Among Suicide Attempt Survivors

It is encouraging that the large majority of suicide attempt survivors do not re-attempt suicide nor die by suicide; however, we know very little about suicide attempt survivors beyond the scope of future suicidality. Moreover, it cannot be inferred that the absence of future suicidal behavior is a marker of PWB. Many observers have pointed out that the absence of symptoms or problematic behaviors (e.g., suicide attempts) does not account for the full complexity of human functioning (e.g., Fava et al., 2007; Goodman et al., 2018). For instance, a person may have substantial time without a suicide attempt and still report dissatisfaction with life or other indicators of low PWB. There is a need for a comprehensive picture of the prognosis for suicide attempt survivors that includes both traditional endpoints (i.e., symptoms, risk) and positive outcomes (well-being, good functioning). Indeed, data from a variety of patient groups indicate desires for more than just the decrease or absence of symptomatology. For example, when asked to define the most important features of recovery from major depressive disorder (MDD), people with MDD rate aspects of positive indicators such as optimism, self-confidence, and a return to

positive functioning as more important relative to decreases in symptoms (Zimmerman et al., 2006). Similarly, in a 2019 thematic analysis of recent suicide attempters (McGill et al., 2019), survivors highlighted the importance of receiving information about positive outcomes after suicide, such as recovery and a return to well-being.

Moreover, an enumeration of good outcomes after suicide attempts is important to having sound prognosis data. Elsewhere, healthcare practitioners are urged to meet their obligation to provide accurate information to patients when describing their prognosis, as a foundation of clinician-patient communication (Ha & Longnecker, 2010). Sound prognosis information is essential to ensure that a patient can make informed, health-related decisions (e.g., Levit et al., 2013). Given the research gap on PWB after a suicide attempt and other less benign outcomes, practitioners are presently ill-equipped to provide a comprehensive, data-driven picture of the psychological sequelae of a suicide attempt to patients and their stakeholders.

Research examining well-being among suicide attempt survivors may help challenge and reduce suicide-related stigma (McGill et al., 2019). Mental illness stigma, defined as negative views and beliefs about those with a mental illness has pervasive effects, including but not limited to discrimination (Parcespe & Cabassa, 2013; Corrigan & Shapiro, 2010), social rejection (Link et al., 1987), and feelings of shame and lower self-esteem (Link et al., 2001), as well as the internalization of stigma (i.e., self-stigma; Corrigan et al., 2009), all of which are associated with elevated suicide risk. Moreover, some evidence suggests that suicide-related stigma differs from other forms of mental illness-related stigma. For instance, participants are more likely to identify the target of a vignette describing someone who made a suicide attempt as “crazy” and less likely to recover than a vignette describing someone with major depression (Sheehan et al., 2017). Additionally, clinicians, on average, are less willing to work with suicidal patients and more

likely to refer them to other providers compared to patients with other presenting concerns (e.g., Almaliah et al., 2020; Groth & Boccio, 2019; Levi-Belz et al., 2020). Research dedicated to exploring the scope of long-term outcomes for suicide attempters stands to provide a more balanced picture that may challenge unfounded assumptions about suicide attempt survivors—which has value regardless of the exact percentage of attempt survivors who achieve positive outcomes.

Lastly, a better understanding of long-term PWB may decrease suicide risk for suicide attempt survivors. Numerous components of PWB protect against suicidality (e.g., gratitude; purpose in life; Heisel & Flett, 2004; Straus et al., 2019; social connectedness; Kleiman et al., 2013; Pietrzak et al., 2017). This makes sense, given that thwarted psychological needs (e.g., social connections, competence) are posited to contribute to suicidality (Shneidman, 1998; Tucker & Wingate, 2014). Further, psychotherapeutic approaches that target enhancing well-being (e.g., Well-being therapy; Fava & Ruini, 2003) are associated with reductions in depressive symptoms (Fava et al., 1998; Seligman et al., 2006) and are effective in improving optimism and hopelessness for suicidal inpatients (e.g., Huffman et al., 2014; c.f., Celano et al., 2017). Aspects of PWB may also predict recovery from suicide attempts (e.g., substantial time without a suicide attempt; Bommersbach et al., 2020; Sun et al., 2017) and suicidal ideation (Baiden et al., 2016; Teismann et al., 2016). Thus, exploring the effect of a prior suicide attempt on salutogenic factors may inform the literature on protective factors against suicidality through identifying if aspects of long-term PWB are impacted (and how they are impacted) among suicide attempt survivors.

Preliminary Evidence of Long-Term Psychological Well-Being Among Suicide Attempt Survivors

Anecdotal evidence and qualitative data suggest that people who have attempted suicide can go on to live full, meaningful lives. In her 2019 memoir, *Building a Life Worth Living*, Dr. Marsha Linehan, the pioneer of Dialectical Behavioral Therapy, describes her struggles with mental illness, including a suicide attempt. In a similar vein, Dr. Kay Jamison, a professor of psychiatry and behavioral science at Johns Hopkins University, details her struggles and recovery from suicidality including a past suicide attempt in her memoir, *An Unquiet Mind: A Memoir of Moods and Madness*. Such stories are not restricted to academics. For instance, Kevin Hines, who survived a suicide attempt when he jumped off the Golden Gate Bridge, now shares his story of resilience and recovery from suicidality with audiences worldwide.

A body of qualitative research has likewise detailed themes of recovery and PWB among suicide attempt survivors which include the (re)establishment of a purposeful life, a reconnection to life and the people in it, and personal growth (e.g., Chesley & Loring-McNulty, 2003; for a review, see Lakeman & FitzGerald, 2008). While anecdotal and qualitative evidence is valuable, particularly for nascent areas of research (i.e., PWB and suicide), it is limited in its generalizability. Ultimately, the field needs to move towards systematic quantitative investigations, ideally with datasets that can generate generalizable inferences (e.g., large, nationally representative samples).

To my knowledge, only one study has quantified PWB after suicide attempts (Bryan et al., 2019), and one other study has documented long-term PWB in a closely related phenomenon, MDD (Rottenberg et al., 2019), which is the most common psychiatric disorder among suicide attempt survivors and suicide victims (e.g., Hawton et al., 2013). In a study of PWB and MDD,

using longitudinal data from a nationally representative sample of adults in the US, Rottenberg and colleagues (2019) found that approximately 10% of people achieve high levels of PWB 10 years after a diagnosis of MDD. While long-term well-being after MDD is not direct evidence of well-being after a suicide attempt, it does encourage the investigation of well-being after a suicide attempt and intimates that some suicide attempt survivors may achieve long-term PWB.

Only one study has offered preliminary evidence of PWB after suicide attempts in a sound research design, with a nationally representative dataset and a meaningful comparison group (i.e., those without a suicide attempt; Bryan et al., 2019). Among 997 US National Guard service members, Bryan and colleagues (2019) found that levels of meaning in life and happiness were diminished in participants who reported prior suicidal thoughts but no attempt (n = 231) and a small group of persons who reported a prior suicide attempt (n = 40) compared to non-suicidal individuals (n = 616). Suicide attempt status accounted for 10% of the variation in happiness scores (η^2 = .10) and 8% of the variation in meaning in life (η^2 = .08). In this dataset, 59% of suicide attempt survivors reported below-average levels of happiness (compared to the group mean), and 37% reported below-average levels of meaning in life, whereas 10% of suicide attempt survivors reported above-average levels of happiness while 52% reported average (50%) or above-average (2%) levels of meaning in life. In other words, while suicide attempt survivors may have diminished levels on some indices of PWB compared to non-suicidal individuals, this study suggests that other survivors do not experience declines in their PWB. Furthermore, Bryan and colleagues (2019) found that participants with a history of suicidality (either prior ideation and/or attempt) evidenced higher levels of PWB as time increased since their last suicidal thought, suggesting a protective factor of time since last suicidal thought against reduced PWB.

While Bryan and colleagues (2019) study documents that a return to PWB is possible in those with a prior suicide attempt, the evidence should be considered preliminary. First, the low number of suicide attempt survivors in this sample limits the strength of any inferences about how long-term PWB differs between individuals with and without a suicide attempt. Second, Bryan and colleagues did not assess aspects of social well-being (e.g., social connectedness)—a necessary ingredient of PWB (e.g., Diener & Seligman, 2002; Keyes, 1998) and closely related to suicidal thoughts and behavior (e.g., Joiner, 2005; Kleiman & Liu, 2013; Van Orden et al., 2010).

The present study tested the notion that suicide attempt survivors experience reduced levels of long-term PWB. The current investigation improved and extended upon prior work in several ways. First, these questions were tested using a substantially larger sample size of suicide attempt survivors (n = 402) from a large, multi-cohort study on US veterans, making this the first study that can generate a credible effect size to determine the magnitude to which suicide attempt survivors differ from non-suicidal individuals in their PWB. This is critical, as the magnitude of difference between these two groups is important for interpretation. For instance, a relatively moderate (i.e., $d \geq .5$) to large effect size (i.e., $d \geq .8$) would signal the need for a greater focus on mitigating the downstream effects of a suicide attempt on PWB. In contrast, a relatively small effect (i.e., $d \leq .4$) would contest the idea that suicide attempts are invariably associated with adverse outcomes.

Second, the identified archival dataset included assessments of social well-being (i.e., community integration, social support) which were incorporated in the measure of PWB; this is a valuable addition since social well-being is particularly relevant to suicidal thoughts and behavior (e.g., Van Orden et al., 2010), especially among veterans (e.g., Pietrzak et al., 2011;

Sokol et al., 2021). Third, the present study explored these questions in a nationally representative sample of US veterans, thus extending knowledge about how these results generalize to military populations beyond active US National Guard members. Indeed, US veterans provide a useful context to answer this question, given that US veterans are at an increased risk for suicide compared to the general public (Department of Veteran Affairs, 2019). Fourth, the present study examined how time since last reported suicide attempt is related to PWB in a large sample of attempt survivors with substantial time without a suicide attempt (e.g., 20 years since attempt). Lastly, hypotheses were tested across three cohorts, each consisting of at least 1,400 individuals (8,716 in total), and at least 80 suicide attempt survivors per cohort (402 in total), which can enhance the confidence in our results by evaluating their reproducibility across cohorts.

Current Study

Using data from a nationally representative sample of veterans, the present study examined if—and to what magnitude—differences exist in the long-term PWB of veterans with and without a suicide attempt (Aim 1). To this end, I analyzed mean-level differences between veterans with and without a suicide attempt on a composite measure of PWB that included elements of emotional (i.e., happiness), social (i.e., perceived social support and community integration), and eudaimonic (i.e., purpose in life) well-being. Consistent with prior or on well-being among attempt survivors (Bryan et al., 2019) it was predicted that veterans with a previous suicide attempt will report lower levels of PWB compared to veterans without a suicide attempt history, with a small to moderate effect size (i.e., $.8 \geq d \geq .2$). Extending from work exploring well-being after suicidality (Bryan et al., 2019) and psychopathology (Rottenberg et al., 2019), the present study analyzed the prevalence of different well-being outcomes (average, above-

average, below-average) among veteran suicide attempt survivors (Aim 2). Drawing from studies on long-term well-being in MDD (Rottenberg et al., 2019) and happiness and meaning in life among suicide attempt survivors (Bryan et al., 2019), it was hypothesized that above-average levels of PWB will be endorsed by 3 to 10% of suicide attempt survivors across each cohort and that the majority of suicide attempt survivors will fall in the below-average category of PWB.

The nascent body of research on less benign and/or positive long-term outcomes for those with a history of suicidality (i.e., suicidal thoughts or attempts) suggests that those who have had more time without suicidality (e.g., one year free of suicidal thoughts) may endorse greater PWB than those with more recent suicidality (Bryan et al., 2019). However, it is unclear if time since a suicide attempt will yield similar findings in respect to PWB. To this end, the present study examined the effect that the time elapsed since last suicide attempt has on PWB (Aim 3). Consistent with limited studies that assess time elapsed since last suicide attempt (Bommersbach et al., 2020) and other suicide-related phenomena (i.e., suicidal ideation; Bryan et al., 2019), it was predicted that the amount of time elapsed since last suicide attempt will be positively associated with levels of PWB. Additionally, as an exploratory aim (Aim 4), the present study examined correlates of PWB for suicide attempt survivors and evaluated the relative strength of predictors of PWB in regression models. Recognizing the limited work on psychological well-being among suicide attempt survivors, these exploratory analyses were conducted with the goal of spurring future research on predictors of PWB among suicide attempt survivors.

CHAPTER TWO:

METHOD & PROCEDURE

Participants and Procedure

The present study utilized archival data from the National Health and Resilience in Veterans Study (NHRVS) to test research questions. The NHRVS is a multi-cohort study of a nationally representative sample of US veterans. Each cohort was drawn from a research panel of over 50,000 households. This research panel is developed and maintained by a survey research firm, GfK Knowledge Networks, Inc. using KnowledgePanel. KnowledgePanel is a comprehensive probability-based survey panel of a nationally representative sample of US adults covering approximately 98% of US households. Post-stratification weights were calculated using the demographic distribution of veterans in KnowledgePanel which were measured against the most recent demographic distribution of the US adult population using data from the US Census Bureau Current Population. For example, cohort one was measured against the data from the Current Population Survey from the US Census Bureau in 2011. Each participant provided informed consent and the NHRVS was approved by the Human Subjects Subcommittee of VA Connecticut Healthcare. For a detailed description of the original data collection procedures, see Pietrzak and Cook (2013).

The initial cohort (i.e., cohort one) consisted of data from 3,157 US veterans (M_{age} = 60.26 (*SD* =15.01), 90.6% Male; 76.2% White) and was collected in October 2011. In 2013, a

second cohort (i.e., cohort two) of 1,484 US veterans (M_{age} = 60.44 (*SD* = 15.25), 89.7% Male, 75.4% White) were surveyed and in 2019/2020, a third cohort (i.e., cohort three) of 4,069 US veterans (M_{age} = 62.19 (*SD* = 15.72), 90.2% Male, 78.1 % White) were surveyed.

Only the data of participants who responded to the suicide attempt status question were included in study analyses. For cohort one, nine of 3,157 participants did not answer the item assessing prior suicide attempts and were excluded from the analyses, resulting in a final sample of 3,148 (M_{age} = 60.23 (*SD* =15.01), 90.6% Male; 76.2% White). For cohort 2, 10 of 1,484 participants did not answer the item assessing prior suicide attempts and were excluded from the analyses, resulting in a final sample of 1,474 (M_{age} = 60.48; *SD* = 15.22; 89.6% Male; 75.6% white). For cohort 3, 45 of 4,069 participants did not answer the item assessing prior suicide attempts and were excluded from the analyses, resulting in a final sample of 4,042 (M_{age} = 62.20; *SD* = 15.72; 90.2% Men; 78.1% white). A summary of descriptives for each cohort is reported in Table 1.

For the present study, all demographic measures that were assessed for each cohort were included. Two questions about suicide attempt history were included. These two questions were consistent across cohorts and involved asking the participant if they ever attempted suicide, and if so, what age they were when they last attempted suicide. All measures that assessed dimensions of emotional (e.g., positive affect), social (e.g., social support), or eudaimonic well-being (e.g., purpose in life) *and* were assessed in each cohort were included in the study. The percentage of missing data on variables examined in the study fell below 3.0% across cohorts: cohort 1 (1.3%), cohort 2 (2.0%), cohort 3 (1.2%).

Measures

Demographics

Demographic information included age, gender, race, education, marital status, employment status, household income, and source of healthcare (VA as primary healthcare or not).

Suicide Attempt History

Participants were asked: “Have you ever tried to kill yourself?” and could respond with “yes”, “no”", or “refuse to answer”. If participants said yes, they were considered to have had a history of suicide attempts

Time Since Last Attempt

Participants who responded “yes” to the question “Have you ever tried to kill yourself?” were then asked to report how old they were when they last attempted suicide. This value was subtracted from the participant’s current age to calculate a single score to indicate the time elapsed since their last suicide attempt.

Suicidal Ideation

Two items from the Patient Health Questionnaire (PHQ-9; Kroenke & Spitzer, 2002) assessed the presence of suicidal ideation over the last two weeks. These two items assessed passive suicidal ideation (“How often have you been bothered by thoughts that you might be better off dead?”) and active suicidal ideation (“How often have you been bothered by thoughts of hurting yourself in some way?”). Participants rated each item on a 3-point Likert scale from 0 = (*not at all*) to 3 = (*nearly every day*). If participants responded to either item with a score greater than 0, they were considered to have had suicidal ideation during the past two weeks. For

the present study, the variable was dichotomized to represent either the absence (0) or presence (1) of suicidal ideation over the past two weeks.

Happiness

Happiness was measured using a single item that asked participants to rate the extent to which they viewed themselves to be a happy or not happy person. Participants rated this item using a 7-point Likert scale from 1 = (*not a very happy person*) to 7 = (*a very happy person*). This item was drawn from the larger 4-item Subjective Happiness Scale (Lyubomirsky & Lepper, 1999). Scores ranged from 1 to 7. Higher scores on this measure indicated greater levels of happiness.

Purpose in Life

Purpose in life was measured using the 4-item Purpose in Life Test Short-Form (PIL-SF; Schulenberg et al., 2011). The four items in the PIL-SF cover four domains: the presence of clear life goals, meaning in life, life goal completion, and the presence of life purpose. Participants rated each item using a 7-point Likert scale. The anchors differed for each item. For example, for the meaning in life item, participants responded to the prompt "My personal existence is:" where 1 = (*Utterly meaningless without purpose)* and 7= (*Very purposeful and meaningful*). These items were summed and averaged to create an average purpose in life score for each participant. Scores ranged from 1 to 7. Higher scores denoted greater purpose in life.

Social Support

Perceived social support was measured using the 5-item Medical Outcomes Study Modified Social Support Survey-5 Item Version (MOS MSSS-5; Sherbourne & Stewart, 1991). Participants rated the degree to which they perceive specific aspects of social support to be available. The MOS MSSS-5 measure consists of four domains of social support:

emotional/informational support (e.g., “Someone to give you good advice about a crisis”); tangible support (e.g., “Someone to help you if you were confined to bed”); affectionate support (e.g., “Someone to make you feel loved and wanted”); and positive social interaction (e.g., “Someone to get together with for relaxation”). Participants responded to each item on a 5-point Likert scale ranging from 1 = (*none of the time*) to 5 = (*all of the time*). Prior to author accessing data, these items were summed to create an overall functional social support index for each participant. Scores ranged from 5 to 25. Higher scores indicated greater levels of perceived social support.

Community Integration

The extent to which participants felt like they were embedded within their community (e.g., having social ties to the community, having an active role in the community) was assessed using a single-item response measuring the extent they agreed or disagreed with the statement: “I feel well integrated in my community.” Participants rated this item on a 7-Point Likert scale ranging from 1 = (*strongly disagree*) to 7 = (*strongly agree*). Higher scores on this measure indicated greater levels of community integration.

Major Depression

Two items from the Patient Health Questionnaire 4 (PHQ-4; Kroenke et al., 2009) assessed current MDD. The PHQ-4 is a self-report measure that captures symptoms of both MDD and GAD over the past 2 weeks. Two items from the PHQ4 assess depressed mood and anhedonia—the two core symptoms of MDD. The item used to measure depressed mood was: “Over the last two weeks, how often have you been bothered by feeling down, depressed, or hopeless?” The item used to measure anhedonia was: “Over the last two weeks, how often have you been bothered by little interest or pleasure in doing things?” Participants rated the two

MDD-specific items on a 4-point Likert scale from 0 to 3 where 0 = (*not at all*) and 3 = (*nearly every day*). A sum score was created using these two items. Scores ranged from 0 to 6. Consistent with prior research (Gilbody et al., 2007; Manea et al., 2016), a total score of 3 or more was indicative of a probable positive screen for current MDD. This information was dichotomized to represent either the absence (0) or presence (1) of current MDD.

Generalized Anxiety Disorder

The two GAD-specific items from the PHQ 4 assessed current GAD. These two items capture two core symptoms of GAD: excessive and uncontrollable worry and physiological symptoms associated with worry. The item used to assess worry was: "Over the last two weeks, how often have you been bothered by not being able to stop or control worrying?" The item used to assess physiological symptoms was: "Over the last two weeks, how often have you been bothered by feeling nervous, anxious, or on edge?" Participants rated the two GAD-specific items on a 4-point Likert scale from 0 to 3 where 0 = (*not at all*) and 3 = (*nearly every day*). A sum score was created using these two items. Consistent with prior research (Kroenke et al., 2007), a total score of 3 or more was indicative of a probable positive screen for current GAD. This information was dichotomized to represent either the absence (0) or presence (1) of current GAD.

Alcohol Use Disorder

A modified self-report version of the alcohol dependence/abuse module of the Mini Neuropsychiatric Interview (MINI; Sheehan et al., 1998) was completed by participants to assess for the presence (1) or absence (0) of lifetime alcohol use disorder.

Data Analytic Strategy

For the analytic plan, participant demographics and clinical characteristics at each cohort were ascertained. Multiple imputation by chained equations was implemented to account for missing data at each cohort using the *mice* package in R (Van Burren & Groothuis-Oudshoorn, 2011). Raw unweighted frequencies are reported throughout whereas post-stratification weights were applied for prevalence and inferential statistics to allow the generalizability of results to the whole U.S. veteran population.

Outcome variables were evaluated for non-normality. A confirmatory factor analysis (CFA) was conducted within each cohort using the *lavaan* package in R (Rosseel, 2012) to assess the fit for a one-factor solution of a PWB index consisting of four theoretically supported indicators: happiness, purpose in life, community integration, and social support. Welch's *t*-tests were conducted at each cohort to examine mean-level differences in PWB between non-attempters and attempt survivors (Aim 1). Effect sizes for the *t*-tests were estimated with Cohen's *d*, which indicated the magnitude of the standardized difference between the means of the two groups. Regression models using the *stats* package in R (R Core Team, 2013) were conducted to examine the variance that SA status has on PWB when controlling for demographics (i.e., gender, age, economic status, education level) and documented risk factors (i.e., depression, anxiety, alcohol use disorder, history of mental health treatment, suicidal ideation) as indicated by R^2.

Participant-level *z* scores on the PWB index were calculated to examine the percentage of attempt survivors that fell into predefined categories of PWB (Aim 2): above-average (+ 1 SD above sample mean), below-average (- 1 SD below sample mean) and average (within 1 SD of sample mean). To assess the effect of time since suicide attempt on PWB (Aim 3), regression

models were conducted for the subsample of attempt survivors at each cohort with time since attempt predicting PWB, controlling for participant age. Lastly, bivariate analyses were conducted to examine correlates of PWB among attempt survivors at each way (Exploratory Aim). All significant correlates were included in a regression model with PWB as the outcome.

CHAPTER THREE:

RESULTS

Descriptive Statistics

Of the 3,148 participants included in the primary analyses at cohort 1, 165 (weighted prevalence = 6.9%) reported a prior suicide attempt. Of the 1,474 participants included in the primary analyses at cohort 2, 80 (weighted prevalence = 6.8%) endorsed having a prior suicide attempt. Of the 4,042 participants included in the primary analyses at cohort 3, 136 (weighted prevalence = 3.9%) endorsed having a prior suicide attempt. Thus, suicide attempt survivors made up approximately 5% of each cohort. This percentage is consistent, though slightly higher, with estimates of lifetime suicide attempts from epidemiological studies of the US adult population, typically falling in the range of 3.0% - 5.0% (Nock et al., 2008). A summary of descriptive statistics for suicide attempt survivors at each cohort is reported in Table 2.

Factor Analysis for Psychological Well-Being Index

For each cohort, a CFA was conducted using the *lavaan* package in R (Rosseel, 2012) to examine the fit for a one-factor solution of the PWB index using the four well-being indicators: purpose in life, happiness, community integration, and social support. Models were estimated using maximum likelihood ratio (MLR). The comparative fit index (CFI), Tucker-Lewis index (TLI), root-mean-square error of approximation (RMSEA), and standardized root-mean-squared residual (SRMR) were used to evaluate model fit. The omega coefficient was calculated to assess

the internal consistency of the one-factor PWB index (Hayes & Coutts, 2020). A model was deemed to have acceptable fit if CFI and TLI > .90, RMSEA < .06, and if SRMR < .08 (Hu & Bentler, 1999). A one-factor solution for PWB yielded acceptable fit across the three cohorts: cohort 1 (SRMR = .010; RMSEA = .046; TLI = .989; CFI = .996); cohort 2 (SRMR = .011; RMSEA = .047; TLI = .988; CFI = .996); cohort 3 (SRMR = .012; RMSEA = .048; TLI = .987; CFI = .996). Reliability for the PWB index was acceptable across cohorts: cohort 1 (ω = .78); cohort 2 (ω = .78); cohort 3 (ω = .77). Standardized factor loadings ranged from .53 to .87 and were significant at the .001 level.

Given adequate fit for a one-factor PWB index, the four indicators were summed and averaged to create a PWB index at each cohort to denote participants' average level of PWB. The social support measure (i.e., MOS MSSS-5) was rescaled from a 5-point scale to a 7-point scale prior to creating the PWB index so that all PWB indicators were measured on a 7-point scale. The PWB index ranged from 1-7, with higher scores reflecting higher levels of PWB. The distribution of the PWB index was moderately and negatively skewed at each cohort, suggesting that many participants scored at the higher end of the PWB index. Skewness fell within an acceptable range and did not indicate non-normality, precluding the need for non-parametric analyses (i.e., absolute skewness value larger than 2 for samples > 300; Kim, 2003). Means, standard deviations, skewness, and correlation coefficients for the PWB index and PWB indicators at each cohort are presented in Table 3.

Aim 1: Mean-Level Differences in Psychological Well-Being

A *t*-test was conducted to examine mean-level differences in PWB between suicide attempt survivors and non-attempters. A summary of the *t*-test results for group differences on

PWB and PWB indicators are presented in Table 4. Regression models were then conducted to control for demographic characteristics.

Cohort 1

As predicted, suicide attempt survivors (M = 4.01; SD = 1.52) reported significantly lower levels of PWB relative to non-attempters (M = 5.18; SD = 1.06;95% CI [.97, 1.38], t (230.93) = 11.17, $p < .001$, d = 1.1). This effect was large (Cohen's $d > 1$) indicating that non-attempters scores on PWB were over one standard deviation higher than PWB scores of attempt survivors. Linear regression models suggest that history of a suicide attempt was a significant predictor of PWB (b = –1.17, 95% CI [–.131, –.98], t = –15.19, $p < .001$, R^2 = .07), with suicide attempt status accounting for 7.0% of the variance in PWB. The effect of suicide attempt status on PWB remained significant after controlling for participant demographics (for a full model summary see Table 5) and risk factors (for a full model summary see Table 6).

Cohort 2

As predicted, suicide attempt survivors (M = 3.91; SD = 1.20) reported significantly lower levels of PWB relative to non-attempters (M = 5.16; SD = 1.08; 95% CI [1.01, 1.50], t (111.25) = 10.16, $p < .001$, d = 1.2). This effect was large (Cohen's $d > 1$) indicating that non-attempters scores on PWB were over one standard deviation higher than PWB scores of attempt survivors. Linear regression models found that suicide attempt status was a significant predictor of PWB (b = –1.25, 95% CI [–1.54, –1.05], t = –11.15, $p < .001$, R^2 = .08), with suicide attempt status accounting for 8.0% of the variance in PWB. The effect of suicide attempt status on PWB remained significant after controlling for participant demographics (for a full model summary see Table 5) and risk factors (for a full model summary see Table 6).

Cohort 3

As predicted, suicide attempt survivors (M = 4.10; SD = 1.40) reported significantly lower levels of PWB relative to non-attempters (M = 5.03; SD = 1.07) (95% CI [.75, 1.10], t (163.94) = 8.21, $p < .001$, d = 0.9). This effect was large (Cohen's $d >$. 8) indicating that non-attempters scores on PWB were nearly one standard deviation higher than PWB scores of attempt survivors. Linear regression models indicated that suicide attempt status was a significant predictor of PWB (b = –0.93, 95% CI [–1.16, –0.80], t = –10.52, $p < .001$, R^2 = .03), with suicide attempt status accounting for 3.0% of the variance in PWB. The effect of suicide attempt status on PWB remained significant after controlling for participant demographics (for a full model summary see Table 5) and risk factors (for a full model summary see Table 6).

Aim 2: Descriptives for Psychological Well-Being Among Attempt Survivors

To examine levels of well-being across cohorts relative to the sample mean, each participant's PWB score was standardized, thus reflecting their deviation from the sample mean. Scores equal to or greater than 1.0 indicated "above-average levels of well-being", scores equal to or less than –1.0 were indicated "below-average levels of well-being", and scores between 1.0 and –1.0 indicated "average levels of well-being."

Cohort 1

Among non-attempters, 439 reported above-average levels of well-being (weighted 15.6%), 427 fell in the below-average category (weighted 13.4%) and 2,117 fell within the average level of well-being (weighted 71.0%). In contrast, 6 suicide attempt survivors reported above-average levels of well-being (weighted 7.1%), 78 reported below-average levels of well-being (weighted 47.9%), and 81 fell within the average level of well-being (weighted 45.0%). Results from chi-square test revealed that group membership in PWB categories differed by

suicide attempt status ($\chi^2(2, N = 3,149) = 183.75, p < .001$). The effect size, using Cramer's *V*, was small, .24 (Cohen, 1988). Non-attempters were more likely to be in the above-average or average category ($p > .05$) and suicide attempt survivors were more likely to be in the below-average category ($p > .05$).

Cohort 2

Among non-attempters, 204 reported above-average levels of well-being (weighted 15.6%), 188 reported below average levels of well-being (weighted 13.1 %), and 1,002 reported average levels of well-being (weighted 71.3%). In contrast, 2 suicide attempt survivors reported above-average levels of well-being (weighted 1.4%), 38 reported below average levels of well-being (weighted 46.6%) and 40 fell in the average range (weighted 52.1%). Results from chi-square test revealed that group membership in PWB categories differed by suicide attempt status ($\chi^2(2, N = 1,474) = 87.71, p < .001$). The effect size, using Cramer's *V*, was small, .24 (Cohen, 1988). Non-attempters were more likely to be in above-average or average category ($p > .05$) and suicide attempter survivors were more likely to be in the below-average category ($p > .05$).

Cohort 3

Among non-attempters, 591 reported above-average levels of well-being (weighted 15.6%), 570 reported below average levels of well-being (weighted 14.7%), and 2,727 reported average levels of well-being (weighted 69.7%). In contrast, 7 attempt survivors reported above-average levels of well-being (weighted 7.3%), 59 reported below average levels of well-being (weighted 39.1%), and 70 reported average levels of well-being (weighted 53.6%). Results from chi-square test revealed that group membership in PWB categories differed by suicide attempt status ($\chi^2(2, N = 4,024) = 71.75, p < .001$). The effect size, using Cramer's *V*, was small, .13 (Cohen, 1988). Non-attempters were more likely to be in above-average or average category ($p >$

.05) and suicide attempter survivors were more likely to be in the below-average category ($p >$ .05).

Aim 3: Time Since Last Attempt and Psychological Well-Being

To assess whether the amount of time elapsed since last suicide attempt affected well-being among suicide attempt survivors, a time since attempt variable was created by calculating the difference between the value recorded in response to the question "how old were you the last time you attempted suicide?" from participants reported age at assessment. Given the strong relationship between time elapsed since last attempt and participants' age at assessment across cohorts (*r*s = .51–.67), all analyses included age as a covariate.

Cohort 1

Of the 165 suicide attempt survivors, 149 provided data on their age at last attempt. The average length of time elapsed since last attempt was 18.41 years (*SD* = 14.00). There was a significant relationship between time elapsed since last attempt and well-being when controlling for age at assessment (b = .23, 95% CI [.004, .04], t = 2.40, $p < .05$) such that levels of PWB increased as more time since the last suicide attempt elapsed.

Cohort 2

Of the 80 suicide attempt survivors, 72 provided data on their age at last attempt. The average length of time elapsed since last attempt was 16.01 years (*SD* = 13.51). There was a significant relationship between time elapsed since last attempt and well-being when controlling for age at assessment (b = .04, 95% CI [.02, .06], t = 3.66, $p < .001$) such that levels of PWB increased as more time since the last attempt elapsed.

Cohort 3

Of the 136 suicide attempt survivors, 131 provided data on their age at last attempt. The average length of time elapsed since the last attempt was 18.44 years (*SD* = 14.17). There was a significant relationship between time elapsed since last attempt and well-being when controlling for age at assessment (*b* = .04, 95% CI [.02, .06], *t* = 3.42, *p* < .001) such that levels of PWB increased as more time since last attempt elapsed.

Exploratory Aim: Correlates of Psychological Well-Being

To further investigate PWB among attempt survivors, correlates of PWB were examined among attempt survivors at each cohort. Bivariate correlations were conducted for measures of sociodemographic factors (i.e., gender, age, race, education, marital status, income status, employment status, VA healthcare status, combat veteran status), protective factors (i.e., curiosity, optimism, dispositional gratitude, altruism, resilience) and risk factors (i.e., history of an alcohol use disorder, history of mental health treatment, current depression symptoms, current GAD symptoms, and current SI) that were measured at each cohort. For a full summary of PWB correlates among suicide attempt survivors see Table 7. Variables that were significantly associated with PWB at the $p < .05$ level were included in a multiple regression analysis to examine the strength of predictors and % of variance explained. To evaluate the importance of each predictor on PWB, a relative importance analysis was conducted using the *relaimpo* package in R (Grömping, 2006) to assess the relative variance explained (RVE) for each predictor in the regression model.

Cohort 1

Of the sociodemographic factors recorded at cohort 1, only marital status, VA healthcare status, combat status, and income were significantly related to PWB among attempt survivors.

These results indicate that marriage was associated with higher PWB while having the VA as the main source of healthcare, having combat exposure, and an income greater than $60,000 were each associated with lower PWB. Of the protective factors, greater levels of optimism, gratitude, curiosity, altruism, religious service attendance, private spiritual activities, and intrinsic religiosity were all significantly associated with greater PWB. A history of alcohol use disorder and a history of MDD were both negatively associated with PWB as was current MDD, current GAD, and current SI. For a full summary, see Table 7.

All significant predictors were entered into a multiple regression analysis. This model explained 71% of the variance in PWB (i.e., $r^2 = .71$). Of the included variables, only VA healthcare status, marital status, optimism, curiosity, resilience, and current GAD, and current MDD remained significant predictors of PWB. Relative importance analysis revealed that curiosity was the strongest predictor of PWB (15.2% RVE), accounting for 15.2% of the variance explained in PWB. For a full model summary see Table 8.

Cohort 2

Of the sociodemographic factors recorded at cohort 2, only marital status, age at the time of the study, income, and combat status were significantly correlated with PWB in attempt survivors. These results suggest that attempt survivors who were older, married, and had an income greater than $60,000 reported increased PWB, whereas having combat exposure was associated with decreased PWB. Time elapsed since suicide attempt was positively correlated with PWB. Of the protective factors, greater levels of optimism, gratitude, curiosity, and altruism were all significantly associated with greater PWB. A history of alcohol use disorder and a history of mental health treatment were negatively associated with PWB as were current MDD, current GAD, and current SI. For a full summary, see Table 7.

All significant predictors were entered into a multiple regression analysis. This model explained 78% of the variance in PWB (i.e., $r^2 = .78$). Of the included variables, only combat status, current GAD, time since attempt, optimism and curiosity remained significant predictors of PWB. Relative importance analysis revealed that curiosity (14.6% RVE), and optimism (13.0% RVE) were the stronger predictors of PWB. For a full model summary see Table 8.

Cohort 3

Of the sociodemographic factors recorded at cohort 3, only VA healthcare status was significantly correlated with PWB in attempt survivors. These results suggest that indicating the VA as the main source of healthcare was associated with lower PWB. Time elapsed since suicide attempt was positively correlated with PWB. Of the protective factors, greater levels of optimism, gratitude, curiosity, resilience, religious service attendance, private spiritual activities, and intrinsic religiosity were all significantly associated with greater PWB. A history of receiving mental health treatment and a history of MDD were both negatively associated with PWB, as was current MDD, current GAD, and current SI. For a full model summary see Table 7.

All significant predictors were entered into a multiple regression analysis. This model explained 80% of the variance in PWB (i.e., $r^2 = .80$). Of the included variables, only optimism, curiosity, resilience, gratitude, and current MDD status remained significant predictors of PWB. Relative importance analysis revealed that curiosity (17.7% RVE) and optimism (14.1% RVE) were the strongest predictors of PWB. For a full model summary see Table 8.

Table 1: Descriptive statistics at each cohort

Factor	**Cohort 1 (*N* = 3,148)**	**Cohort 2 (*N* = 1,474)**	**Cohort 3 (*N* = 2,024)**
Age	*M* = 60.23 *SD* = 15.01	*M* = 60.48 *SD* = 15.22	*M* = 62.20 *SD* = 15.72
Gender (%)			
Male	2,827 (90.6)	1,317 (89.6)	3,527 (90.2)
Female	321 (9.4)	157 (10.4)	497 (9.8)
Race/Ethnicity **(%)**			
White/Caucasian	2,632 (76.2)	1,197 (75.6)	3,288 (78.2)
Non-Caucasian	516 (23.8)	277 (24.4)	736 (21.8)
Marital Status (%)			
Married	2,474 (75.5)	1,074 (70.1)	2,859 (72.5)
Not Married	674 (24.5)	400 (29.9)	1,1165 (27.5
Income (%)			
$60,000 or more	1,644 (44.0)	740 (43.8)	2,330 (58.4)
Below $60,000	1,504 (56.0)	734 (56.2)	1,694 (41.6)
Employment Status **(%)**			
Working	1,282 (40.8)	473 (34.0)	1,590 (48.2)
Not Working	1,866 (59.2)	289 (21.8)	2,434 (51.8)
Retired	N/A	712 (44.2)	N/A
Education (%)			
Up to high school	482 (33.3)	234 (33.0)	2,217 (67.4)
Some college or higher	2,666 (66.7)	1,240 (67.0)	1,807 (32.6)
Main Source of Healthcare **(%)**			
VA	533 (19.3)	290 (21.0)	782 (20.6)
Non-VA/None	2,610 (80.6)	1,179 (78.5)	3,324 (79.4)
Refuse to Answer	5 (0.1)	5 (0.5)	-
Combat Status **(%)**			
Combat Veteran	1,100 (34.5)	561 (38.2)	1,336 (34.8)
Non-combat Veteran	2,038 (65.1)	909 (61.6)	2,680 (65.0)
Refused to answer	10 (0.4)	4 (0.2)	8 (0.2)
Suicide Attempt History **(%)**			
Attempt Survivors	165 (6.9)	80 (6.8)	136 (3.9)
Non-attempters	2,983 (93.1)	1,394 (94.6)	3,888 (96.1)
Current Depression **(%)**			
Positive	212 (7.8)	94 (7.2)	292 (8.8)
Negative	2,936 (92.2)	1,380 (92.8)	3,732(91.2)
Current GAD **(%)**			
Positive	202 (7.9)	101 (6.9)	231 (7.9)
Negative	2,944 (92.1)	1,373 (93.1)	3,793 (92.1)
Current SI (%)			
Positive	232 (9.4)	109 (8.4)	311 (9.0)
Negative	2,916 (90.6)	1,365 (91.6)	3,713 (91.0)

Note. GAD = Generalized anxiety disorder. SI = Suicidal ideation. NA = Item not assessed.

Unweighted *n* and weighted percentages using post-stratification weights are reported for each variable.

Table 2: Descriptive statistics for suicide attempt survivors

Factor	**Cohort 1 (*N* = 165)**	**Cohort 2 (*N* = 80)**	**Cohort 3 (*N* = 136)**
Age	*M* = 49.34 *SD* = 13.95	*M* = 50.06 *SD* = 16.44	*M* = 54.63 *SD* = 13.94
Age of last SA	*M* = 30.40 *SD* = 11.31	*M* = 32.20 *SD* = 14.23	*M* = 28.90 *SD* = 12.04
Time since last SA	*M* = 18.41 *SD* =14.00	*M* = 16.01 *SD* = 13.51	*M* = 18.44 *SD* = 14.17
Gender **(%)**			
Male	123 (79.4)	61 (77.2)	89 (76.4)
Female	42 (20.6)	19 (22.8)	47 (23.6)
Race/Ethnicity **(%)**			
White/Caucasian	121 (67.2)	57 (65.8)	98 (73.2)
Non-Caucasian	44 (32.8)	23 (34.2)	38 (26.8)
Marital Status **(%)**			
Married	110 (62.1)	44 (51.9)	75 (58.1)
Not Married	55 (37.9)	36 (48.1)	61 (41.9)
Income (%)			
$60,000 or more	56 (24.1)	26 (37.4)	58 (40.9)
Below $60,000	109 (75.9)	54 (62.6)	78 (59.1)
Employment Status **(%)**			
Working	62 (39.9)	25 (34.7)	66 (58.7)
Not Working	103 (60.1)	33 (39.1)	70 (41.3)
Retired	N/A	22 (26.3)	N/A
Main Source of Healthcare **(%)**			
VA	52 (40.5)	33 (36.9)	57 (45.9)
Non-VA/None	113 (59.5)	47 (63.1)	79 (54.1)
Combat Status **(%)**			
Combat Veteran	63 (39.9)	34 (55.8)	47 (37.7)
Non-combat Veteran	102 (60.1)	46 (44.2)	89 (62.3)
Current MDD **(%)**			
Positive	54 (34.8)	25 (32.0)	44 (36.0)
Negative	111 (65.2)	55 (68.0)	92 (64.0)
Current GAD **(%)**			
Positive	44 (33.2)	26 (35.1)	29 (23.5)
Negative	121 (66.8)	54 (64.9)	107 (76.5)
Current SI (%)			
Positive	61 (42.9)	35 (42.9)	37 (27.9)
Negative	104 (57.1)	45 (57.1)	99 (72.1)

Note. SA = Suicide attempt. VA = Veteran affairs. Current MDD = Probable depression. Current GAD = Probable generalized anxiety disorder. Current SI = Suicidal ideation over last two weeks. Unweighted *n* and weighted percentages using post-stratification weights are reported for each variable.

Table 3: Means, standard deviations, and correlations for psychological well-being variables

	Factor	1	2	3	4	5
Cohort 1						
	1. PWB	-				
	2. Happiness	.84**	-			
	3. PIL	.81**	.70**	-		
	4. Social Support	.75**	.53**	.47**	-	
	5. Comm. Int.	.78**	.52**	.54**	.36**	-
	M	5.10	5.50	5.34	5.29	4.26
	SD	1.13	1.33	1.13	1.53	1.73
	Skewness	–0.85	–1.20	–1.11	–0.88	–0.20
Cohort 2						
	1. PWB	-				
	2. Happiness	.84**	-			
	3. PIL	.79**	.69**	-		
	4. Social Support	.73**	.48**	.41**	-	
	5. Comm. Int.	.78**	.51**	.46**	.35**	-
	M	5.08	5.51	5.28	5.20	4.32
	SD	1.13	1.32	1.23	1.50	1.75
	Skewness	–0.74	–1.20	–1.10	–0.66	–0.27
Cohort 3						
	1. PWB	-				
	2. Happiness	.83**	-			
	3. PIL	.82**	.71**	-		
	4. Social Support	.68**	.44**	.43**	-	
	5. Comm. Int.	.77**	.45**	.47**	.31**	-
	M	4.99	5.41	5.29	5.20	4.06
	SD	1.10	1.40	1.22	1.29	1.77
	Skewness	–0.63	–0.91	–0.89	–0.59	–0.11

Note. PWB = Psychological well-being index. PIL = Purpose in Life. Comm. Int. = Community integration.

* indicates $p < .05$. ** indicates $p < .01$.

Table 4: Group differences in psychological well-being variables

			Attempt Survivors	Non-Attempters		
	Factor	**Range**	***M* (*SD*)**	***M* (*SD*)**	***t***	***d***
Cohort 1						
	PWB	1-7	*M* = 4.01 (1.52)	*M* = 5.18 (1.06)	11.17	1.07***
	PIL	1-7	*M* = 4.33 (1.65)	*M* = 5.42 (1.04)	9.54	0.99***
	Happiness	1-7	*M* = 4.23 (1.83)	*M* = 5.60 (1.24)	10.66	1.04***
	Soc. Sup	1-7	*M* = 4.32 (1.86)	*M* = 5.36 (1.48)	8.02	0.68***
	Comm. Int.	1-7	*M* = 3.13 (1.88)	*M* = 4.35 (1.68)	9.26	0.72***
Cohort 2						
	PWB	1-7	*M* = 3.91 (1.20)	*M* = 5.16 (1.08)	10.16	1.15***
	PIL	1-7	*M* = 4.20 (1.55)	*M* = 5.36 (1.17)	7.34	0.96***
	Happiness	1-7	*M* = 4.33 (1.83)	*M* = 5.60 (1.24)	6.80	0.98***
	Soc. Sup	1-7	*M* = 4.23 (1.66)	*M* = 5.27 (1.47)	6.09	0.70***
	Comm. Int.	1-7	*M* = 2.87 (1.75)	*M* = 4.42 (1.70)	8.62	0.91***
Cohort 3						
	PWB	1-7	*M* = 4.10 (1.40)	*M* = 5.03 (1.07)	8.21	0.86***
	PIL	1-7	*M* = 4.44 (1.61)	*M* = 5.33 (1.19)	6.89	0.74***
	Happiness	1-7	*M* = 4.12 (1.82)	*M* = 5.46 (1.36)	9.15	0.97***
	Soc. Sup	1-7	*M* = 4.77 (1.65)	*M* = 5.21 (1.27)	3.36	0.35***
	Comm. Int.	1-7	*M* = 3.08 (1.67)	*M* = 4.10 (1.76)	7.18	0.58***

Note. PWB index = Psychological well-being index. PIL = Purpose in life. Comm. In = Community integration. Soc. Sup = Social support. *t* = *t*-statistic. *d* = Cohen's *d* value.

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

Table 5: The effect of suicide attempt status on PWB controlling for demographics

	Factor	*b*	*b [95% CI]*	*t*	Fit
Cohort 1	Intercept	3.33	[3.15, 3.51]	36.46***	
	SA Status[a]	–0.84	[–0.98, –0.70]	–11.23***	
	Age	0.02	[0.02, 0.02]	15.56***	
	Gender[b]	0.18	[0.05, 0.30]	2.71**	
	Marital Status[c]	0.50	[0.41, 0.59]	11.40***	
	Income[d]	0.23	[0.17, 0.33]	6.24***	
	Education[e]	0.18	[0.10, 0.23]	4.47***	
					R^2 = .159**
Cohort 2	Intercept	3.45	[3.19, 3.71]	26.11***	
	SA Status[a]	–0.99	[–1.20, –0.78]	–9.16***	
	Age	0.02	[0.01, 0.02]	9.83***	
	Gender[b]	0.32	[.14, 0.49]	3.49***	
	Marital Status[c]	0.47	[0.35, 0.59]	7.72***	
	Income[d]	0.25	[0.14, 0.37]	4.33***	
	Education[e]	0.19	[0.07, 0.31]	3.21***	
					R^2 = .194**
Cohort 3	Intercept	3.68	[3.52, 3.83]	46.37***	
	SA Status[a]	–0.61	[–0.78, –0.45]	–7.13***	
	Age	0.01	[0.01, 0.02]	12.96***	
	Gender[b]	0.14	[0.03, 0.25]	2.40**	
	Marital Status[c]	0.26	[0.18, 0.33]	6.76***	
	Income[d]	0.34	[0.27, 0.41]	9.42***	
	Education[e]	0.17	[0.10, 0.24]	4.60***	
					R^2 = .11**

Note. SA = suicide attempt. *b* represents unstandardized regression weights. *t* = *t*-statistic. CI = 95% Confidence interval.

[a] 0 = non-attempters and 1 = suicide attempt survivors

[b] 0 = Male and 1 = Female

[c] 0 = No married and 1 = Married

[d] 0 = Income < $60,000 and 1 = Income > $60,000

[e] 0 = Up to high school and 1 = Some college or higher

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

Table 6: The effect of suicide attempt status on PWB controlling for risk factors

	Factor	*b*	*b [95% CI]*	*t*	Fit
Cohort 1	Intercept	5.45	[5.40, 5.49]	232.29***	
	SA Status[a]	–0.32	[–0.47, –0.17]	–4.24***	
	Dep Hx[b]	–0.38	[–0.48, –0.27]	–7.06***	
	AUD Hx[c]	–0.27	[–0.34, –0.20]	–7.39***	
	Current GAD[d]	–0.16	[–0.35, –0.04]	–1.53	
	Current Dep[e]	–1.09	[–1.30, –0.87]	–10.00***	
	Current SI[f]	–0.54	[–0.69, –0.40]	–7.36***	
					R^2 = .27***
Cohort 2	Intercept	5.44	[5.38, 5.51]	169.72***	
	SA Status[a]	–0.34	[–0.55, –0.13]	–3.21***	
	Dep Hx[b]	–0.28	[–0.44, –0.11]	–3.31***	
	AUD Hx[c]	–0.35	[–0.45, –0.23]	–6.69***	
	Current GAD[d]	–0.72	[–0.98, –0.46]	–5.45***	
	Current Dep[e]	–0.69	[–0.96, –0.43]	–5.11***	
	Current SI[f]	–0.98	[–1.19, –0.78]	–9.39***	
					R^2 = .31***
Cohort 3	Intercept	5.33	[5.29, 5.37]	266.66***	
	SA Status[a]	–0.26	[–0.42, –0.10]	–3.24***	
	Dep Hx[b]	–0.34	[–0.43, –0.25]	–7.46***	
	AUD Hx[c]	–0.25	[–0.31, –0.19]	–8.02***	
	Current GAD[d]	–0.43	[–0.57, –0.30]	–6.29***	
	Current Dep[e]	–0.76	[–0.90, –0.62]	–10.92***	
	Current SI[f]	–0.75	[–0.87, –0.63]	–12.44***	
					R^2 = .26***

Note. SA = suicide attempt. *b* represents unstandardized regression weights. CI = 95% Confidence interval.

[a] 0 = non-attempters and 1 = suicide attempt survivors

[b] 0 = No history of major depression and 1 = History of major depression

[c] 0 = No history of alcohol use disorder and 1 = History of alcohol use disorder

[d] 0 = Negative screen for general anxiety disorder and 1 = Positive screen for general anxiety disorder

[e] 0 = Negative screen for current major depression and 1 = Positive screen for current major depression

[f] 0 = Negative screen for current suicidal ideation and 1 = Positive screen for current suicidal ideation

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

Table 7: Correlates of psychological well–being among suicide attempt survivors

	Cohort 1	Cohort 2	Cohort 3
Factor	**Correlation with PWB**	**Correlation with PWB**	**Correlation with PWB**
Marital Status[a]	.27**	.27**	.08
Age	–.01	.33**	.07
Gender[b]	.09	.07	.02
Education[c]	.04	.01	.02
Income[d]	–.14*	.22*	.06
VA Primary Healthcare[e]	–.26**	.06	–.15
Combat Status[f]	–.17*	–.27**	–.06
AUD Hx[g]	–.17*	–.22*	.02
MDD Hx	–.17*	–.14	–.26**
Lifetime MH Tx[h]	–.05	–.30**	–.19*
Resilience	.67**	.71**	.68**
Optimism	.68**	.60**	.75**
Gratitude	.68**	.34**	.68**
Curiosity	.71**	.60**	.78**
Altruism	.21**	.35**	.14
Time Since Attempt	.12	.45**	.26**
Religious Service Attendance	.40**	.12	.27**
Private Spiritual Activities	.29**	.20	.28**
Intrinsic Religiosity	.47**	.15	.30**
Current MDD[i]	–.54**	–.35**	–.60**
Current GAD[j]	–.32**	–.53**	–.38**
Current SI[k]	–.34**	–.47**	–.47**

Note.

[a] 0 = No married and 1 = Married.

[b] 0 = Male and 1 = Female.

[c] 0 = Up to high school and 1 = Some college or higher.

[d] 0 = Income < $60,000 and 1 = Income > $60,000.

[e] 0 = VA as main source of healthcare and 1 = VA not main source of healthcare.

[f] 0 = Did not see combat and 1= Combat veteran.

[g] 0 = No lifetime history of alcohol use disorder and 1 = Positive history of alcohol use disorder.

[h] 0 = No lifetime mental health treatment and 1 = History of mental health treatment.

[i] 0 = Negative screen for general anxiety disorder and 1 = Positive screen for general anxiety disorder

[j] 0 = Negative screen for current major depression and 1 = Positive screen for current major depression

[k] 0 = Negative screen for current suicidal ideation and 1 = Positive screen for current suicidal ideation

* indicates $p < .05$. ** indicates $p < .01$.

Table 8: Regression results using PWB as the criterion and significant correlates of PWB as the predictor among suicide attempt survivors

	Factor	*b*	*b [95% CI]*	*t*	Fit
Cohort 1	Intercept	1.35 ***	[0.59, 2.12]	3.50	
	Marital Status[a]	0.70***	[0.42, 0.99]	4.81	
	Income	–0.19	[–0.49, 0.10]	–1.29	
	VA Healthcare[b]	–0.48**	[–0.78, –0.19]	–3.24	
	Combat Status	0.24	[–0.08, 0.55]	1.49	
	AUD Hx[c]	0.06	[–0.21, 0.33]	0.45	
	MDD Hx	0.08	[–0.23, 0.39]	0.49	
	Resilience	0.02*	[0.01, 0.05]	2.24	
	Optimism	0.19***	[0.08, 0.30]	3.44	
	Gratitude	–0.04	[–0.16, 0.08]	–0.64	
	Curiosity	0.26***	[0.14, 0.39]	4.25	
	Altruism	0.10	[–0.04, 0.24]	1.46	
	Rel. Att.	–0.04	[–0.16, 0.07]	–0.70	
	Spirituality	–0.01	[–0.13, 0.05]	–0.89	
	Religiosity	0.06*	[0.01, 0.10]	2.53	
	Current MDD[d]	–1.33**	[–1.75, –0.91]	–6.26	
	Current GAD[e]	0.73**	[0.32, 1.14]	3.53	
	Current SI[f]	0.09	[–0.21, 0.40]	0.59	
					$R^2 = .71^{***}$
Cohort 2	Intercept	1.68**	[0.47, 2.88]	2.77	
	Marital Status[a]	0.01	[–0.34, 0.35]	.03	
	Age	0.01	[0.01, 0.02]	1.99	
	Income	0.09	[–0.23, 0.41]	0.57	
	Combat Status	–0.38*	[–0.72, –0.04]	–2.23	
	AUD Hx[c]	–0.10	[–0.43, 0.23]	–0.60	
	Lifetime MH Tx	–0.14	[–0.48, 0.20]	–0.82	
	Time Since SA	–0.01	[–0.01, 0.01]	–0.67	
	Resilience	0.03*	[0.01, 0.04]	2.18	
	Optimism	0.18***	[0.09, 0.26]	3.94	
	Gratitude	0.04	[–0.07, 0.15]	0.66	
	Curiosity	0.17***	[0.07, 0.27]	3.27	
	Altruism	0.12	[–0.02, 0.25]	1.74	
	Current MDD[d]	–0.21	[–0.63, 0.22]	–0.97	
	Current GAD[e]	–0.47*	[–0.84, –0.11]	–2.56	
	Current SI[f]	–0.10	[–0.40, 0.38]	–0.05	
					$R^2 = .73^{***}$
Cohort 3	Intercept	0.71*	[0.05, 1.38]	2.11	
	MDD Hx	–0.10	[–0.34, 0.14]	–0.79	
	Lifetime MH Tx	–0.13	[–0.37, 0.12]	–1.01	
	Time since SA	0.01	[[–0.01, 0.01]	0.93	
	Resilience	0.03**	[0.01, 0.04]	2.68	
	Optimism	0.23***	[0.14, 0.31]	5.46	
	Gratitude	0.12**	[0.03, 0.21]	2.63	
	Curiosity	0.25***	[0.14, 0.35]	4.77	
	Rel. Att.	0.06	[–0.04, 0.16]	1.25	

Table 8 (Continued)

	Factor	*b*	*b [95% CI]*	*t*	Fit
Cohort 3	Spirituality	–0.07	[–0.16, 0.02]	–1.61	
	Religiosity	0.02	[–0.02, 0.07]	1.00	
	Current MDD[d]	–0.71**	[–1.03, –0.40]	–4.48	
	Current GAD[e]	0.06	[–0.25, 0.37]	0.39	
	Current SI[f]	0.08	[–0.24, 0.39]	0.49	
					$R^2 = .80^{***}$

Note. A significant *b*–weight indicates the semi–partial correlation is also significant. *b* represents unstandardized regression weights. SA = Suicide attempt. Rel. Att. = Religious attendance.

[a] 0 = No married and 1 = Married.

[b] 0 = VA as main source of healthcare and 1 = VA not main source of healthcare.

[c] 0 = No lifetime history of alcohol use disorder and 1 = Positive history of alcohol use disorder.

[d] 0 = Negative screen for general anxiety disorder and 1 = Positive screen for general anxiety disorder

[e] 0 = Negative screen for current major depression and 1 = Positive screen for current major depression

[f] 0 = Negative screen for current suicidal ideation and 1 = Positive screen for current suicidal ideation

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

CHAPTER FOUR:

DISCUSSION

Leveraging data from three cohorts in a nationally representative sample of US veterans, the present study examined a neglected question in the study of suicide: Do suicide attempt survivors exhibit long-term impairments in PWB? Veteran suicide attempt survivors reported large and significant deficits in PWB compared to veterans without a suicide attempt, and these effects were consistently large across cohorts. Suicide attempt survivors with more time elapsed since their last suicide attempt evidenced increased levels of PWB, suggesting that the passage of time since the last attempt is important to long-term PWB. Nevertheless, though attempt survivors were nearly 20 years removed from their last attempt on average, they still evidenced significant deficits in PWB relative to non-attempters, suggesting a strong and enduring association between a suicide attempt history and reduced longer-term PWB. The results of our study expand the current understanding of the long-term sequela of a suicide attempt by highlighting the significant diminishment in PWB relative to non-attempters in a nationally representative sample.

Deficits in PWB Among Suicide Attempt Survivors

Findings from the present study offer initial evidence that PWB is markedly reduced among veterans who previously attempted suicide, even among those who are decades removed from their last suicide attempt. Possibly more alarming was the substantial magnitude of this

effect across cohorts (Cohen's d = 0.90–1.2). Context is critical when considering the interpretations made from statistical benchmarks for the strength of an effect (i.e., d > 1; Lakens, 2013). Other large-scale studies of PWB in samples with afflictions that compromise PWB (e.g., cancer patients) offer points of comparison. In one large-scale study of PWB in cancer survivors and a matched control group with no cancer history, cancer survivors reported significantly lower levels of positive affect than those without cancer (Costanzo et al., 2009); the effect on cancer survivors PWB (R^2 = .008) was more than seven times smaller than the effect on suicide attempt survivor's PWB in the present study (R^2 = .03 –.08). Another point of comparison is effect sizes for having one or more reported adverse childhood experiences (e.g., abuse, household dysfunction) on lower levels of purpose in life (d = .2) and social integration (d = .1) relative to those without adverse childhood experiences (Mosley-Johnson et al., 2019); these effect sizes again were markedly smaller than those found in the present study. The pattern of large effects across three nationally representative cohorts in the present study signals the need for concerted efforts to mitigate downstream effects of a suicide attempt on PWB.

Study findings have several implications for the field of suicide research. As noted, a prior suicide attempt is one of the more robust predictors of re-attempt and eventual suicide. High levels of PWB confer resilience against suicidality (e.g., Kleiman & Liu, 2013; Pietrzak et al., 2010, 2011; Wingate et al., 2006) while diminished levels of PWB is a potent risk factor for future psychopathology (e.g., Lamers et al., 2015; Sisak et al., 2008; Wood & Joseph, 2010). Targeting diminished levels of PWB in suicide attempt survivors may be a critical target for mitigating future suicidality. Interestingly, in a recent content analysis of reasons given for not attempting suicide (Mason et al., 2021), themes of social connection, purpose, curiosity, and optimism were the most frequently endorsed, even compared to reasons that are central in

prominent theories of suicide (e.g., fear of pain; Joiner, 2005), suggesting the importance of fostering PWB for those at elevated risk for future suicide attempts (i.e., suicide attempt survivors). Despite extensive research on risk factors for suicide, the study of protective factors (e.g., PWB) is severely underrepresented in research, both as a predictor of suicidality (Franklin et al., 2017) and as an outcome (Tong et al., 2021). By examining PWB as an outcome in our study, we add novel data to a much-needed area of suicide research (i.e., protective factors) that may contribute to suicide prevention efforts in suicide attempt survivors.

Time Since Last Suicide Attempt and Psychological Well-Being

Nascent work examining recovery after suicidality finds that elements of PWB increase with the length of time since suicidal thoughts or attempts (Bommersbach et al., 2021; Bryan et al., 2019). We found similar patterns in the present study. Suicide attempt survivors reported higher levels of PWB as more time elapsed since their last suicide attempt, even when controlling for age, which was positively associated with PWB and negatively associated with current psychopathology (providing support for the "paradox of aging effect"; Thomas et al., 2016). The characterization of suicide attempts often include deficits in finding alternative solutions to suicide when distressed. Suicide attempt survivors whose last attempt was more distant may have developed coping strategies that promote self-efficacy and a sense of control (e.g., internal locus of control) relative to those with less time since attempt, which may contribute to both reduced suicidal behavior over time and their increased PWB.

To offer another interpretation, it may be that attempt survivors with less time elapsed since last attempt were more likely to be multiple attempters (i.e., have multiple lifetime suicide attempts) in this study. Multiple attempters have more clinically severe clinical profiles relative to single attempters (e.g., Forman et al., 2004; Rudd et al., 1996) thus, the number of suicide

attempts may impact the positive correlation between time since attempt and PWB; however, this interpretation is speculative since we did not have data on the number of lifetime attempts.

Despite the trend of increases in PWB as time since last attempt increased, PWB remained significantly reduced relative to non-attempters, with moderate to large effects even among veterans whose last attempt was over 20 years ago. This enduring impact of a suicide attempt on PWB over time is different from Bryan and colleagues (2019) findings that the effect of time since last suicidal thought on PWB, which found that participants who were one year removed from their last suicidal thought reported similar levels of PWB than their non-suicidal counterparts. Accordingly, it may be that the trajectory of PWB after suicidality differs across distinct suicidal phenomena (e.g., ideation versus attempt). This is particularly likely considering evidence that suicide attempt survivors present with more severe clinical profiles than ideators (Klonsky et al., 2017; May & Klonsky, 2016). The bulk of work examining clinical differences between attempt survivors, non-attempters with suicidal ideation, and non-attempters without ideation relies on a single question history (e.g., have you ever attempted suicide (y/n)?). Our results underscore the need to include measures that account for time since last attempt. It is important to note that due to the cross-sectional design, it cannot be concluded that within-person changes in PWB occurred over time. As a next step, future longitudinal research is needed to establish the trajectory of PWB, which can be accomplished by utilizing retrospective longitudinal methods or follow-up designs after an index suicide attempt.

Correlates of Psychological Well-Being

Recent work suggests that some people with a history of suicide attempts and related psychopathology (re)establish high levels of PWB (Bryan et al., 2019; Rottenberg, 2019). Using standardized scores on the PWB index, we examined the percentage of suicide attempt survivors

who reported above-average levels of PWB (i.e., one standard deviation or higher than the sample mean). In these samples, only a relatively small percentage of attempt survivors (i.e., weighted prevalence of 1.4–7.3% across cohorts) reported above-average levels of PWB. These results were similar to a study of active service members which found that 2.6% of suicide attempt survivors reported above-average levels of meaning in life (compared to 27.8% of non-attempter) and 10.3% reported above-average levels of happiness (compared to 25% of non-attempters) (Bryan et al., 2019). We also found that roughly 50% of suicide attempt survivors at each cohort reported average levels of PWB (within one standard deviation of the sample mean). In sum, while our results suggest a trend of a significantly diminished PWB among attempt survivors, there were attempt survivors who evidenced average to above-average levels of PWB.

These emerging data increasingly support the possibility of recovery among those who survive a suicide attempt. Receiving comprehensive prognostic information that also includes hope for recovery after a suicide attempt is important for suicide attempt survivors and their loved ones (McGill et al., 2019). Results from this large, multi-cohort study advance the current understanding of the prognosis for suicide attempt survivors. Moreover, these data may provide hope for the possibility of positive outcomes, suggesting that while PWB is often reduced, some attempt survivors obtain high levels of PWB and many (the slight majority in this sample) can return to normative levels of PWB. The dissemination of these findings, and the findings from future work on PWB among attempt survivors, will be important towards the goal of equipping health care providers with data to impart accurate and comprehensive prognostic information (i.e., including the likelihood of adverse outcomes *and* less benign or positive outcomes) to suicide attempt survivors and their loved ones.

The present study extended work on PWB after an attempt by offering novel data about potential predictors of PWB. We found several significant predictors of PWB among attempt survivors across cohorts: two indices of psychopathology (i.e., current MDD, current GAD) were significantly associated with lower levels of PWB and several personality strengths (e.g., curiosity, optimism, resilience) were significantly associated with higher levels of PWB. Interestingly, when all variables from the dataset that were significantly associated with PWB were included in regression models, personality strengths emerged as the most important variables (in terms of variation in PWB accounted for). In particular, curiosity and optimism were the strongest predictors of PWB in each cohort. Empirical work on personality strengths suggests that they confer a degree of resilience against adverse life events (e.g., Goodman et al., 2017; Isaacs et al., 2017), which may be an important factor for long-term PWB for suicide attempt survivors. Future longitudinal work can elucidate what factors predict PWB over time. For example, future work can leverage prospective designs using latent profile analysis to investigate which factors predict different PWB profiles (e.g., above-average; average; below-average).

Implications

When considering the large effect of reduced long-term PWB for veteran suicide attempt survivors, it is critical to bear in mind that veteran's physical and psychological well-being is often compromised relative to non-veterans, irrespective of suicide history (e.g., Olenick et al., 2015; Oster et al., 2017; Schult et al., 2019). Unique stressors for veterans can contribute to lower levels of well-being, including greater exposure to potentially traumatic experiences and physical injury, extended separation from family and loved ones, and the transition back to civilian life (e.g., Morin, 2011; Pease et al., 2016; Pietrzak et al., 2009). Indeed, the transition to

civilian life often causes conflict in veteran identity including feelings of loss of purpose and disconnection from others (e.g., Demers, 2011) which can increase suicide risk (Pease et al., 2016; Reger et al., 2015). Thus, study results of reduced PWB in veteran attempters is particularly alarming, as suicide attempt status may compound an already compromised level of PWB.

Investing resources that assess and foster PWB (e.g., implementing positive psychology-based models in wellness programs and programs facilitating the transition to civilian life; Angel et al., 2018; Matthews, 2008) may mitigate the long-term impairment of PWB and protect against future suicidality. Moreover, early detection of low PWB may provide windows for intervention that can ultimately contribute to longer, healthier, and more fruitful lives for suicide attempt survivors. Initiatives are already in place within the VA healthcare system to detect veterans at risk for suicide (e.g., veterans with a prior suicide attempt) to assess for suicide risk and overall mental wellness (e.g., VA REACH VET; US Department of Veteran Affairs, 2017; SAFE VET; Knox et al., 2011). These protocols can benefit from the assessment of important indicators of PWB (i.e., purpose in life, positive affect, social relationships) for case conceptualization and intervention formulation. Additionally, including the assessment of PWB may be critical for providing care to veteran suicide attempt survivors who are not deemed as a high suicide risk (e.g., last attempt was over 20 years ago), but who may still have significantly diminished PWB that could otherwise go unnoticed.

Moreover, because of the emphasis placed on the values of strength and resilience in military culture, veteran and active service members may be more receptive and willing to engage in treatment initiatives that highlight fostering elements PWB as opposed to deficit-based models (e.g., language centering around problems and causes) (Bryan et al., 2012). This is

notable because negative attitudes towards mental health care are one barrier to accessing treatment commonly endorsed among service members (e.g., Pietrzak et al., 2009). The majority of veteran attempt survivors in our study did not have the VA as their main source of healthcare. Accordingly, extending upon efforts of community-based initiatives to enhance PWB for veterans (e.g., Team Red, White, and Blue; Angel et al., 2018) may help promote PWB for the large number of veterans who are not in the VA healthcare system. In addition to ongoing suicide prevention efforts, results from the present research contend that subsequent initiatives for suicide prevention widen the scope to include a focus on PWB.

Study Limitations, Strengths, and Future Directions

Results should be interpreted in the context of several study limitations. First, the cross-sectional nature of these data precludes any inferences about causality. Thus, while participants completed retrospective assessments, including estimates of time elapsed since a prior attempt, we cannot conclude that a prior suicide attempt was a causal contributor to current PWB. Moreover, while suicide attempt status predicted PWB above and beyond a history of psychopathology (i.e., MDD, alcohol use disorder), we were unable to determine if participant suicide attempt(s) preceded, followed, or were concurrent with reported psychopathology. Nevertheless, the strong effect of the suicide attempt history on PWB in this study begs the question: what is it about a positive suicide attempt history that accounts for a strong negative relationship with PWB? Future work can use longitudinal designs to detect levels of PWB prior to and after a suicide attempt, ideally using large samples to increase the odds of capturing suicidal behavior (a low base-rate event) to probe this question.

Second, our assessment of suicide attempts was limited to endorsement of a past suicide attempt (yes/no) and age during last attempt. Other important elements of a suicide attempt (e.g.,

severity) and differences among attempt survivors (e.g., number of past attempts) may also be important to long-term PWB. For example, attempt survivors whose attempt(s) resulted in long-term physical or cognitive damage or disability may experience lower levels of PWB in the long term compared to those whose attempt(s) did not lead to permanent physical impairment. One interesting route for future investigation will be to examine how the circumstances of a suicide attempt and the immediate physical and emotional aftermath (e.g., hospitalization, feelings of relief versus shame) influence the trajectory of PWB post-attempt.

The creation of our PWB index was both theory-driven and data-driven, using items that cover the three largely agreed upon facets of PWB: eudaimonic (i.e., purpose in life), hedonic (i.e., happiness), and social well-being (i.e., social connectedness; social support), and factor analyses supported this model. Nonetheless, our parsimonious approach omitted certain elements of PWB that may be especially relevant in the aftermath of a suicide attempt (e.g., personal growth; Zoellner & Maercker, 2006). Last, while the use of a nationally representative sample of US Veterans was a notable strength of the study, these findings may not generalize to other populations. Future work in this arena will benefit from further investigation in different demographic populations (e.g., adolescents and young adults) to see if the patterns of impairment on longer-term PWB replicate.

Conclusion

The study of PWB has been neglected in the study of suicide attempt survivors. Using data from a nationally representative, multi-cohort sample of veterans, the present study provided some of the first empirical evidence of substantial long-term impairments in PWB among attempt survivors. Impairment in PWB was evident even among veteran suicide attempt survivors who were decades removed from their last attempt. Nevertheless, some suicide attempt

survivors evidence average- to above-average levels of PWB. The amount of time elapsed since suicide attempt and personality strengths including curiosity and optimism facilitate higher levels of PWB. Results from the study provide a foundation for future examination of PWB in attempt survivors.

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