Published in final edited form as:

J Affect Disord. 2019 February 15; 245: 321–324. doi:10.1016/j.jad.2018.11.013.

Protective Factors Do Not Moderate Risk for Past-Year Suicide Attempts Conferred by Recent NSSI

Jennifer J. Muehlenkamp, Ph.D.^{1,a} and Amy M. Brausch, Ph.D.²

¹Department of Psychology, University of Wisconsin-Eau Claire, Eau Claire, WI.

muehlejj@uwec.edu

²Department of Psychological Sciences, Western Kentucky University, Bowling Green, KY.

amy.brausch@wku.edu

Abstract

Background: NSSI is a robust predictor of suicide attempts but little is known about what factors may serve protective functions in this relationship.

Methods: This study used a subsample of 828 young adults with past year NSSI. Participants were recruited from two universities to complete an on-line survey that included assessments of past year NSSI frequency and total NSSI methods used (versatility), past year suicide attempts, life satisfaction, subjective happiness, and resilience.

Results: Bootstrapping logistic regression models were used to test the protective factors as moderators between NSSI frequency, versatility and past year suicide attempts. Greater NSSI versatility and past year frequency were significantly associated with greater likelihood of past year suicide attempts in all models. Life satisfaction and subjective happiness were associated with decreased likelihood of past year suicide attempts in all models. Resilience was not associated with past year suicide attempts, and all moderation analyses were non-significant.

Limitations: Our sample had limited heterogeneity, focused on a college-age population with lower severity relative to clinical samples, and all data were collected on-line.

Conclusions: NSSI emerged as a robust predictor of recent suicide attempts as the strength of the relationship did not change in the presence of protective factors. Our results highlight the strong relationship between NSSI and suicide attempts that occur within the same time frame (past

^a**Corresponding Author.** Jennifer J. Muehlenkamp, Department of Psychology, 105 Garfield Ave, University of Wisconsin Eau Claire, Eau Claire WI 54701. Phone: 1-715-736-4642. Fax: 1-715-836-2214. muehlejj@uwec.edu.

Author Contributions

JJM and AMB designed the study protocol. JJM conceptualized the study, managed the literature search, and wrote the first draft of the manuscript. AMB conducted the statistical analyses and wrote the related portions of the manuscript. All authors contributed to and have approved the final manuscript. The funding source provided funds to assist with data collection and support JJM and AMB efforts conducting the research and writing the manuscript.

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Conflict of Interest

All authors declare that they have no conflicts of interest.

year in this study), and the need for future research to identify factors that do serve protective functions between NSSI and suicide attempts.

Keywords

self-injury; NSSI; suicide; protective factor; resilience; life satisfaction; happiness

Introduction

Deaths by suicide continue to rise within the United States (CDC, 2018). There is an urgent need to understand what contributes to acute risk for suicide as well as factors that protect against it. While studies have identified a range of risk factors for suicide, they are largely ineffective in predicting suicide attempts (Franklin et al., 2017). One exception is non-suicidal self-injury (NSSI), which has consistently emerged as a robust discriminator and predictor. A lifetime history of NSSI has been found to reliably differentiate suicide ideators from attempters (Taliaferro and Muehlenkamp, 2014), and confers greater risk for future suicide attempts than commonly studied factors such as suicidal ideation, hopelessness, and psychiatric diagnoses (Victor & Klonsky, 2014). Prospective studies show that a lifetime history of NSSI is associated with an approximate 4-fold increased likelihood of future suicide attempts (Riberio et al., 2016). The number of unique methods used for NSSI, method versatility, has also consistently demonstrated strong associations with suicide attempts (Victor & Klonsky, 2014). While lifetime frequency of NSSI and NSSI method versatility have been identified as the primary features contributing to suicide risk, the field lacks knowledge about the mechanisms through which NSSI confers its risk. Additionally, most studies have examined lifetime NSSI predicting lifetime suicidal ideation and attempts. This approach is problematic as clinicians need to look at risk factors in closer proximity to suicide behaviors to better understand acute risk.

Another notable limitation to understanding suicide risk are the few studies examining protective factors, and there are no known studies looking at elements that may mitigate some of the risk NSSI contributes. Protective factors are features that should alter or weaken the effect of risk factors on an outcome; thus, moderating the influence of a predictor variable (e.g., NSSI) on the outcome variable (e.g., suicide attempts; Kraemer, et al., 2001). Some research has found that factors such as resilience, life satisfaction, and subjective happiness are associated with lower rates of, and recovery from, NSSI (Kress et al., 2015) as well as reduced suicidal ideation (Siegman et al., 2017). Models of suicide focusing on protective factors have identified positive self-appraisals, such as positive coping beliefs, emotional states, and general life satisfaction, to be potential buffers between suicide risk factors, including NSSI, and suicidal thoughts and behaviors (Nagra, et al., 2016; Siegman et al., 2017). It is believed such factors mitigate risk for suicide, even among those with high emotional distress (e.g, NSSI), because positive self-appraisals can reduce experiences of hopelessness. Meta-analytic work has shown that NSSI is associated with elevated levels of hopelessness, and this may partially account for the strong connection between NSSI and suicide attempts (Victor & Klonsky, 2014).

However, the existing studies have been limited to examining lifespan associations, predominantly focused on suicidal ideation or combining ideation and attempts and have not evaluated positive self-appraisals as actual moderators of suicide risk; instead focusing on inverse linear relationships. The purpose of the current study was to address this need by examining the positive self-appraisal factors of resilience, life satisfaction, and subjective happiness as protective factors between NSSI and suicide attempts. We hypothesized that resilience, life satisfaction, and subjective happiness would moderate the association between past-year NSSI frequency, versatility, and past-year suicide attempts.

Methods

Participants

Participants for the current study were pulled from a sample of 6701 undergraduates ($M_{\text{age}} = 19.0$, $SD = 1.5$; 76% female, 15% racial/ethnic minority) from two Midwestern universities. Within this sample, 1539 students (23% of full sample) indicated a lifetime history of at least one act of NSSI and 828 (54% of NSSI sample) reported NSSI in the past year, which is the sample of the current study. These participants reflected the demographics of the larger sample with 83% identifying as female, 13% as male, 3.3% as gender fluid or transgender, and 14.4% identifying with a minority race (4.4% African American, 3.3% Asian or Hmong, 3.1% Hispanic/Latino, 3.6% other/multiracial). The mean age of the participants was 18.9 years ($SD = 1.3$). The most common forms of NSSI were cutting (79%), severe scratching (55%), self-battery (52.2%), and severe wound picking (50%). Average past-year frequency of NSSI was 12.7 acts ($SD = 17.4$ acts), and participants reported using an average of 3.1 methods ($SD = 1.6$). Those with a lifetime history of NSSI were significantly more likely to have ever attempted suicide (26.6%) than those without a lifetime NSSI history (1.2%), $\chi^2(1) = 681.59$, $p < .001$, $\phi = 0.21$.

Procedures

Undergraduates enrolled at two Midwestern universities were contacted by email and invited to participate in a screening survey to determine eligibility for entry into a separate, but related study. The screening survey inquired about history and characteristics of NSSI and suicidal behavior, life satisfaction, resilience, and subjective happiness. Participation was voluntary, and all participants indicated informed consent prior to entering the study. All procedures for the current study were approved by the internal review board at both institutions.

Measures

Self-Injurious Thoughts and Behaviors Inventory-NSSI Module (SITBI-NSSI; Nock et al., 2007).—Select items from the SITBI-NSSI module were used to assess NSSI engagement and frequency in the past year, as well as number of NSSI methods used. The SITBI has shown good reliability and validity across samples (Nock, et al., 2007).

Suicide Attempts.—One item was included to assess past-year suicide attempt status. Participants indicated yes/no to making a suicide attempt in the past 12 months.

Subjective Happiness Scale (Lyubomirsky and Lepper, 1997).—This four-item scale assesses an individual's perception of how happy they currently are on a 5-point Likert scale. A total score is calculated by averaging the response values for all items so that higher scores indicate greater subjective happiness. Internal consistency in the current sample was strong ($\alpha = 0.79$).

Satisfaction with Life Scale (SWLS; Diener et al., 1985).—The SWLS consists of four items inquiring about current, overall life satisfaction, rated on a 7-point Likert scale. A total score was calculated by averaging the response values so that higher scores indicated greater life satisfaction. Internal consistency of the items in the current sample was $\alpha = 0.84$.

Connor-Davidson Resilience Scale-Brief (CD-RISC; Campbell-Sill and Stein, 2007).—This scale consists of ten items assessing current perceptions of one's resilience including emotion coping skills, positive views of oneself and future, and ability to cope with hardships or setbacks. Items are rated on a 7-point Likert scale. A total scale score was calculated by averaging response values for all items, with higher scores indicating greater resilience. An alpha of 0.87 was obtained in the current sample.

Results

Data Analytic Plan

To test study hypotheses that protective factors would moderate the relationship between past-year NSSI and past-year suicide attempts, the Process macro for SPSS (Hayes, 2017) was used to run binary logistic regression moderation models. Independent variables included past-year NSSI frequency and total NSSI method versatility, moderator variables included total scores of life satisfaction, subjective happiness, and resilience, and the dependent variable was past-year suicide attempt (yes/no).

NSSI Frequency Results

The first model, using life satisfaction as the moderator, was significant, $\chi^2 = 37.8$, $p < .001$, Nagelkerke's $R^2 = .08$. Both past-year NSSI frequency ($B = .017$, $p < .05$) and life satisfaction ($B = -.07$, $p < .01$) significantly predicted past-year suicide attempt status but the interaction was not significant ($B = -.001$, $p = .37$). The overall model with subjective happiness as the moderator was also significant, $\chi^2 = 30.5$, $p < .001$, Nagelkerke's $R^2 = .07$. Both past-year NSSI frequency ($B = .021$, $p < .01$) and subjective happiness ($B = -.37$, $p < .01$) predicted past-year suicide attempt status but the interaction was not significant ($B = -.001$, $p = .82$). Lastly, the overall model with resilience as the moderator was significant, $\chi^2 = 22.7$, $p < .001$, Nagelkerke's $R^2 = .05$. Only past-year NSSI frequency was a significant predictor of suicide attempt status ($B = .02$, $p < .01$) while resilience was not ($B = -.013$, $p = .19$). The interaction was not significant ($B = .0003$, $p = .44$). In all models, greater past-year NSSI frequency was associated with an increased likelihood of having made a suicide attempt while higher scores on protective factors were associated with a decreased likelihood of past year suicide attempt.

NSSI Versatility Results

The overall model with life satisfaction as the moderator was significant, $\chi^2 = 33.5$, $p < .001$, Nagelkerke's $R^2 = .08$. Both NSSI versatility ($B = .224$, $p < .01$) and life satisfaction ($B = -.08$, $p < .01$) predicted past-year suicide attempt status but the interaction was not significant ($B = .013$, $p = .21$). The overall model with subjective happiness as the moderator was also significant, $\chi^2 = 26.2$, $p < .001$, Nagelkerke's $R^2 = .06$. Both NSSI versatility ($B = .208$, $p < .01$) and subjective happiness ($B = -.36$, $p < .05$) significantly predicted past-year suicide attempt status but the interaction was not significant ($B = -.10$, $p = .25$). Lastly, the model with resilience as the moderator was significant, $\chi^2 = 18.3$, $p < .001$, Nagelkerke's $R^2 = .04$. Only NSSI versatility was a predictor of suicide attempt status ($B = .243$, $p < .01$), while resilience was not ($B = -.015$, $p = .15$). The interaction also was not significant ($B = .005$, $p = .45$). In all models, greater NSSI versatility was associated with an increased likelihood of having made a suicide attempt while higher scores on protective factors were associated with a decreased likelihood of past year suicide attempt.

Discussion

Contrary to hypotheses, resilience, life satisfaction, and subjective happiness did not moderate the association between past-year NSSI frequency and past-year suicide attempt, nor did they moderate the relationship between NSSI method versatility and past-year suicide attempt. These results indicate that the features of NSSI known to be strong predictors of suicidal behavior are quite robust and do not appear to be influenced by the presence of protective factors known to impact mental well-being. However, the protective factors of life satisfaction and subjective happiness retained unique associations with a decreased likelihood of a past-year suicide attempt indicating that they may reduce suicide risk on their own, but not change the risk conferred by past-year NSSI frequency or versatility. Positive psychology and cognitive-behavioral interventions designed to increase gratitude, self-compassion, and challenge negative comparisons may help facilitate life satisfaction and subjective happiness/well-being in a way that reduces risk for suicide (e.g., Diener et al., 2017). Future work is needed to explore whether such interventions are effective in reducing risk and if effects would be stronger upstream, before NSSI, or at points of escalating suicide risk.

The lack of any significant effects observed for resilience is counter-intuitive given recent work indicating resilience is associated with lower suicide ideation (Nagra et al., 2016; Siegman et al., 2018). It may be that resilience is important to early prevention as a way to mitigate the development of mental health concerns, suicidal thinking, and maladaptive behaviors such as NSSI, but that once an individual is engaging in such behaviors, resilience is less impactful in reducing risk for suicide attempts (see Liu et al., 2016). Resilience is also operationalized in a myriad of ways. It could be that specific factors such as strong social connections (Taliaferro and Muehlenkamp, 2017), social problem-solving skills (Walker et al., 2017), self-compassion and grit (Blalock et al., 2015) which are sometimes labeled as resilience, are more important to reducing suicide attempts among those who are self-injuring than the construct of resilience assessed in the current study which measured perceptions of one's general, non-specific abilities to adapt to change, cope with setbacks,

persist in the face of obstacles, and manage negative emotions. Future studies need to explore these ideas and see if the current null findings are replicated in additional, diverse samples.

The current results highlight the robust connection between NSSI behaviors and suicide attempt risk but need to be considered in the context of the study limitations. While we had a large sample of participants with past-year NSSI and suicide attempts, the sample was very homogenous, comprised of college students, and relied on self-report questionnaires delivered on-line. The timeframe in which the protective factors were assessed may have also limited the ability to detect a true influence since they referred to current perceptions moderating behaviors that occurred within the past-year (including recent/current acts). Future studies will need to assess such factors on an explicitly concurrent time frame. Also, the data came from a screening survey which prevented the use of longer and more nuanced assessments of the study constructs. Given this is the first known examination of moderators of the NSSI – suicide attempt relationship, the current findings require replication and extension. It appears that increased past-year NSSI frequency and method versatility are strongly associated with a past-year suicide attempt, and this conferred risk does not seem to be mitigated by current life satisfaction, subjective happiness, nor resilience. Additional study of the mechanisms contributing to, and potentially reducing, this robust relationship are needed so that appropriate clinical and prevention interventions can be used to mitigate the risk for suicide attempts among those engaging in NSSI.

Acknowledgements:

This research was supported by the National Institute of Mental Health under Award Number R15MH110960. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

References

- Blalock DV, Young KC, & Kleiman EM (2015). Stability amidst turmoil: Grit buffers the effects of negative life events on suicidal ideation. *Psychiatry Research*, 228(3), 781–784. doi:10.1016/j.psychres.2015.04.041 [PubMed: 26070767]
- Campbell-Sills L, & Stein MB (2007). Psychometric analysis and refinement of the connor–davidson resilience scale (CD-RISC): Validation of a 10-item measure of resilience. *Journal of Traumatic Stress*, 20(6), 1019–1028. doi:10.1002/jts.20271 [PubMed: 18157881]
- Center for Disease Control (2018). Vital Signs: Trends in State Suicide Rates — United States, 1999–2016 and Circumstances Contributing to Suicide — 27 States, 2015. *Morbidity and Mortality Weekly Report*, 67, 617–624. [PubMed: 29879094]
- Diener E (1985). The Satisfaction with Life Scale. *Journal of Personality Assessment*, 49, 71–75. 10.1207/s15327752jpa4901_13 [PubMed: 16367493]
- Diener E, Heintzelman SJ, Kushlev K, Tay L, Wirtz D, Lutes LD, & Oishi S (2017). Findings all psychologists should know from the new science on subjective well-being. *Canadian Psychology*, 58, 87–104. DOI: 10.1037/cap0000063
- Franklin JC, Ribeiro JD, Fox KR, Bentley KH, Kleiman EM, Huang X, Musacchio KM, et al. (2017). Risk factors for suicidal thoughts and behaviors: A meta-analysis of 50 years of research. *Psychological Bulletin*, 143, 187–232. DOI: 10.1037/bul0000084 [PubMed: 27841450]
- Hayes AF (2017). *Introduction to Mediation, Moderation, and Conditional Process Analysis*, 2nd Edition New York, Guilford.

- Kraemer HC, Stice E, Kazdin A, Offord D, & Kupfer D (2001). How do risk factors work together? Mediators, moderators, and independent, overlapping, and proxy risk factors. *American Journal of Psychiatry*, 158, 848–856. 10.1176/appi.ajp.158.6.848 [PubMed: 11384888]
- Kress VE, Newgent RA, Whitlock J, & Mease L (2015). Spirituality/Religiosity, Life Satisfaction, and life meaning as protective factors for nonsuicidal self-injury in college students. *Journal of College Counseling*, 18, 160–174. 10.1002/jocc.12012
- Liu DWY, Fairweather-Schmidt A, Burns R, Roberts RM, & Anstey KJ (2016). Psychological resilience provides no independent protection from suicidal risk. *Crisis: The Journal of Crisis Intervention and Suicide Prevention*, 37(2), 130–139. DOI: 10.1027/0227-5910/a000364
- Lyubomirsky S, & Lepper HS (1999). A measure of subjective happiness: Preliminary reliability and construct validation. *Social Indicators Research*, 46, 137–155. 10.1023/A:1006824100041
- Nagra GS, Lin A, & Upthegrove R (2016). What bridges the gap between self-harm and suicidality? The role of forgiveness, resilience, and attachment. *Psychiatry Research*, 241, 78–82. 10.1016/j.psychres.2016.04.103 [PubMed: 27156028]
- Nock MK, Holmberg EB, Photos VI, & Michel BD (2007). Self-injurious thoughts and behaviors interview: Development, reliability, and validity in an adolescent sample. *Psychological Assessment*, 19(3), 309–317. doi:10.1037/1040-3590.19.3.309 [PubMed: 17845122]
- Ribeiro JD Franklin JC Fox KR, Bentley KH, Kleiman EM, Chang BP, & Nock MK (2016). Self-injurious thoughts and behaviors as risk factors for future suicide ideation, attempts, and death: A meta-analysis of longitudinal studies. *Psychological Medicine*, 46, 225–236. DOI: 10.1017/S0033291715001804 [PubMed: 26370729]
- Siegmann P, Teismann T, Fritsch N, Forkmann T, Glaesmer H, Zhang XC, Brailovskaia J, & Margraf J (2017). Resilience to suicide ideation: A cross-cultural test of the buffering hypothesis. *Clinical Psychology and Psychotherapy*, 25, e1–e9. DOI: 10.1002/cpp.2118 [PubMed: 28853242]
- Taliaferro LA & Muehlenkamp JJ (2014). Risk and protective factors that distinguish adolescent who attempt suicide from those who only consider suicide in the past year. *Suicide and Life-Threatening Behavior*, 44, 6–22. DOI: 10.1111/sltb.12046 [PubMed: 23855367]
- Taliaferro LA, & Muehlenkamp JJ (2017). Nonsuicidal self-injury and suicidality among sexual minority youth: Risk factors and protective connectedness factors. *Academic Pediatrics*, 17, 715–722. DOI: 10.1016/j.acap.2016.11.002 [PubMed: 28865597]
- Victor SE, & Klonsky ED (2014). Correlates of suicide attempts among self-injurers: A meta-analysis. *Clinical Psychology Review*, 34, 282–297. [PubMed: 24742496]
- Walker KL, Hirsch JK, Chang EC, & Jeglic EL (2017). Non-suicidal self-injury and suicidal behavior in a diverse sample: The moderating role of social problem-solving ability. *International Journal of Mental Health and Addiction*, 15(3), 471–484. DOI: 10.1007/s11469-017-9755-x

Highlights

- Past-year NSSI frequency and versatility predicted past-year suicide attempt
- Life satisfaction predicted lower likelihood of past-year suicide attempt
- Subjective happiness independently predicted lower likelihood of suicide attempt
- Protective factors did not change NSSI's influence on past-year suicide attempt
- Resilience was not protective against past-year suicide attempt