

## Rates of Non-Suicidal Self-Injury: A Cross-Sectional Analysis of Exposure

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Published online: 12 August 2008  
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**Abstract** Research on the social influences associated with rates of non-suicidal self-injury (NSSI) is scarce and limited to studies of contagion within inpatient and residential treatment settings. Using an archival dataset that included 1,965 college students, the current study examined whether exposure to acts of NSSI and/or suicidal behavior in others was associated with increased rates of NSSI. Results supported hypotheses in that participants who knew someone who had engaged in NSSI only, or knew someone who engaged in both NSSI and suicidal behavior were more likely to have engaged in NSSI compared to those not exposed. The findings provide preliminary, albeit indirect, evidence of the potential for social modeling to influence rates of NSSI within college students. Directions for future studies are offered.

**Keywords** Non-suicidal self-injury · Deliberate self-harm · Contagion · Social learning · Modeling · College student · Exposure · Suicide

There is concern that rates of non-suicidal self-injury (NSSI; an intentional act resulting in immediate tissue damage without suicidal intent often performed to reduce emotional distress, Walsh 2006) are increasing among adolescents (Hawton et al. 2000; O’Laughlin and Sherwood 2005) and college students, where prevalence rates range from fourteen to thirty-five percent (Gratz 2001; Whitlock et al. 2007). It is unclear what is fueling these possible increases, but one hypothesis is that acts of NSSI are influenced by social factors. Bandura’s (1977, 2001) social learning theory posits that behaviors such as NSSI can be learned through direct and indirect experiences within the social environment via social modeling. Prior research has established that problem behavior such as drinking (Wood et al. 2001), smoking

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(Leatherdale et al. 2005), disordered eating (Lieberman et al. 2001), and sexual behavior (Rodgers and Rowe 1993) are directly influenced by social modeling. Furthermore, research on suicidal behavior has found that individuals who are exposed to suicide attempts or deaths directly (siblings) or indirectly (media reports) are more likely to be suicidal and have made an attempt themselves (Brent et al. 2003; Gould et al. 2003; Joiner 2003; Poijula et al. 2001). Thus, there is evidence to suggest that direct and indirect exposure to self-destructive behaviors in others may increase a person's likelihood of engaging in similar behavior.

It has been hypothesized that social learning may contribute to increasing rates of NSSI. Specifically, some experts have suggested that being exposed to NSSI in others will increase the chances of engaging in NSSI among those exposed (Walsh 2006). However, there are no known studies that have examined this hypothesis outside of inpatient and residential treatment settings. Of the few empirical studies examining social clusters of NSSI acts within inpatient and residential treatment settings, most have found support for social clustering (Rosen and Walsh 1989; Ross and McKay 1979; Walsh and Rosen 1985; Taiminen et al. 1998). In contrast, one study (King et al. 1995) failed to find a significant pattern of NSSI clustering. Thus, conclusions regarding the potential social modeling of direct exposure to NSSI acts must be made tenuously.

Given the high rates of NSSI noted in non-clinical, non-treatment community settings (Gratz 2001; Whitlock et al. 2006) it seems important to examine whether or not being exposed to NSSI is associated with higher rates of NSSI among those exposed. Due to the lack of research in this area, it is important to first demonstrate that an association between social modeling, that is exposure, and rates of NSSI exists. Since there are no known studies that have tested this hypothesis within a non-clinical sample, the current study adopted a cross-sectional, exploratory approach. Using an archival dataset from a sample of college students, the current study tested the hypothesis that individuals who knew someone who had engaged in NSSI would be more likely to have also engaged in NSSI themselves. Given previous findings supporting social modeling of suicidal behaviors (Gould et al. 2003; Joiner 2003), we also hypothesized that being exposed to suicidal behavior in others would increase the likelihood of engaging in NSSI acts among those exposed.

## Methods

### Participants and Procedure

The sample was derived from an archival dataset consisting of 1,965 undergraduate students. The mean age of the sample was 19.34 years ( $SD=1.41$ ), and the majority of the participants were female (65.7%) and Caucasian (94.1%). The remaining participants identified as Native American (1.9%), Hispanic (0.6%), Asian (0.5%), African American (0.4%), and 4.0% selected "other" in response to questions about race/ethnicity. Of the total sample, 21.2 percent reported having engaged in at least one act of NSSI in their lifetime, and 48.3 percent of those endorsing lifetime NSSI reported an act within the previous 12 months. The most common forms of NSSI

were cutting, carving, and severe scratching. Behaviors such as piercings and tatoos were not included as forms of self-injury because these are viewed as socially/culturally sanctioned behaviors and are often performed for aesthetic reasons rather than coping strategies (Walsh 2006). The mean number of forms used was 1.97 (SD=1.63; range 1 to 11). The frequency of NSSI acts ranged from one to over fifty, with a mean of 2.48 (SD=1.95).

Participant responses used in the current study are archival data that were obtained from a large NSSI screening dataset that was used to identify potential participants for a study examining personality variables and NSSI. The data analyzed in the current study comes from the screening protocol and addresses research questions independent from the original project. At the beginning of each academic semester during the 2006–2007 school year undergraduate students enrolled in psychology courses were asked to voluntarily complete a set of screening measures to determine eligibility for participation in research projects being conducted by faculty. The screening process associated with this study was approved by the University's institutional review board, and consisted of having students complete, during a single class period, the Deliberate Self-Harm Inventory (Gratz 2001; see below) along with a demographic questionnaire that inquired about exposure to both suicidal behavior and NSSI in others.

## Measures

*Deliberate Self-harm Inventory* (DSHI; Gratz 2001) The DSHI is a seventeen-item self-report questionnaire assessing multiple aspects of NSSI. Participants respond to each item by indicating whether or not they have engaged in a specified behavior (for example, Have you ever intentionally [i.e., on purpose] cut your wrist, arms, or other area[s] of your body without intending to kill yourself?). For items positively endorsed, participants complete follow-up questions inquiring about onset, frequency, and time of last episode. The DSHI is scored by summing the number of items to which the respondent answered “yes.” Gratz (2001) reported strong internal consistency ( $\alpha=0.83$ ), and two to four week test–retest reliability of 0.68 within a sample of college students. A high correlation for number of NSSI behaviors endorsed between the first and second administrations ( $r=0.92$ ) was also found. The validity of the DSHI is supported by significant, moderate correlations with the self-harm items of other standard measures (Gratz 2001). History of suicide attempts was correlated 0.20 and 0.21 with the dichotomous and frequency items of the DSHI, indicating the DSHI measures a behavior distinct from suicide.

*Demographic Questionnaire* (Muehlenkamp 2007) The demographic questionnaire was created for the purpose of the current study and included items assessing a range of demographic characteristics such as age, race/ethnicity, and sex. Included on the demographic questionnaire are two items assessing exposure to suicide (Have you ever known someone who has attempted or died by suicide?) and NSSI (Have you ever known someone who has purposefully injured themselves (e.g., cutting) without wanting to die?). Participants responded to these items either positively (“yes”) or negatively (“no”).

## Results

Based on responses to the exposure questions from the demographic questionnaire, participants were divided into four groups: no exposure, suicide only exposure, NSSI only exposure, Suicide and NSSI (both) exposure. Within the sample, 16.7% ( $n=328$ ) of participants indicated no exposure to either suicide or NSSI acts in others. Three hundred and eighty (19.3%) participants reported knowing someone who had engaged in suicidal behavior but not knowing anyone who had engaged in NSSI (suicide only exposure). The NSSI only exposure group included 229 (11.7%) participants, and just over half (52.3%,  $n=1028$ ) of the sample reported knowing someone who had engaged in either suicidal and NSSI behavior.

Due to the categorical nature of the data, Pearson chi-square analyses were used to test the study hypotheses. An initial  $2(\text{NSSI status}) \times 4(\text{exposure group})$  crosstab was conducted to determine if there were significant differences in rates of NSSI across the four exposure groups. Results indicated a significant difference did exist,  $\chi^2(3, N=1816)=63.42, p<0.000$ . Follow-up comparisons were conducted in which each exposure group was compared to controls using a  $2(\text{NSSI status}) \times 2(\text{exposure group vs. no exposure})$  chi-square analysis. To control for type I error, a Bonferroni correction ( $0.05/4$ ) of  $p=0.01$  was used. Significant differences were found for those exposed to NSSI in others and those exposed to both suicidal behavior and NSSI. Those who were exposed were more likely to have engaged in NSSI (see Table 1). Since the NSSI only and Both exposure groups were significant, we also compared the rates of NSSI between these two groups, finding no significant difference,  $\chi^2(1, N=1172)=4.27, p>0.01$ . Participants who engaged in NSSI were no more likely to have been exposed to both suicidal and NSSI behaviors in others compared to those exposed to only NSSI.

Given some research documenting sex differences in the prevalence of NSSI (Whitlock et al. 2006), we also ran the same set of analyses separately for males and

**Table 1** Crosstab results of exposure and rates of NSSI

Comparison	NSSI Status		$\chi^2$	df: <i>N</i>	<i>p</i> -value
	Yes	No			
Suicide only					
No exposure	262	36			
Yes exposure	299	47	0.322	1; 644	0.570
NSSI only					
No exposure	262	36			
Yes exposure	165	49	10.53	1; 512	<b>0.001</b>
Both suicide and NSSI					
No exposure	262	36			
Yes exposure	671	287	38.03	1; 1,256	<b>0.000</b>
NSSI vs. both					
NSSI exposure	165	49			
Both exposure	671	287	4.27	1; 1,172	0.039

NSSI status, participants who have and have not engaged in NSSI; Both, participants who know someone who has engaged in suicidal behavior and know someone who has engaged in NSSI  
 NSSI Non-suicidal self-injury (e.g., cutting, carving, self-bruising)

females. A similar pattern of associations were found such that among females, those exposed to NSSI only,  $\chi^2(1, N=313)=11.97, p<0.002$ , and those exposed to both NSSI and suicidal behavior,  $\chi^2(1, N=888)=29.23, p<0.001$ , were more likely to have engaged in NSSI themselves. For males, being exposed to both NSSI and suicidal behavior in others was associated with increased likelihood of having engaged in NSSI,  $\chi^2(1, N=366)=15.46, p<0.001$ .

## Discussion

There has been strong speculation that NSSI rates are influenced by social modeling of the behavior, or social contagion/copying (Walsh 2006); yet, empirical support for this hypothesis is scarce. The current results provide the first empirical support for a positive association between exposure to NSSI and higher rates of NSSI acts among those exposed, suggesting that social factors may influence rates of NSSI. These findings are similar to those found within residential treatments samples (Taiminen et al. 1998), but extend evidence to non-treatment populations. Furthermore, the current results are consistent with Bandura's (1977) social learning theory of behavioral acquisition such that college students who knew someone that had engaged in NSSI were significantly more likely to have also self-injured. This positive association between exposure and engaging in NSSI acts provides preliminary support for the need to further study the social modeling influences of NSSI among young adults.

Related to the potential to support a social modeling hypothesis of NSSI, are our findings of specificity of exposure. It was noted that higher rates of having engaged in NSSI were only found within groups that were exposed to NSSI. Being exposed to only suicidal behaviors in others was not associated with increased rates of NSSI. Interestingly, knowing both someone who engaged in suicidal behavior and NSSI did not significantly increase the likelihood of engaging in NSSI compared to being exposed to only NSSI in others. These patterns were maintained regardless of sex, indicating that collectively, being exposed to NSSI in others is likely to be associated with increased possibility of engaging in the behavior.

These findings suggest that it may be exposure to NSSI specifically, that contributes to heightened risk. While causality cannot be determined with this data, the current results offer indirect support for a social modeling hypothesis. If this is the case, the current data would suggest that group treatments of individuals with NSSI should have clear rules restricting self-injury discussions (Miller et al. 2009), and that schools may also want to develop specific protocols for managing students who self-injure to avoid social modeling or behavioral copying outbreaks (Walsh 2006).

However, because the current data does not permit analysis of temporal sequencing of exposure and NSSI acts, there are other explanations for the positive association noted. In addition to the possibility of social modeling, it is also possible that individuals who engage in NSSI are better able to recognize others who engage in the behavior and elect to socialize with them. Thus, knowing other self-injurers would not necessarily lead to increased risk for the behavior, but would rather be indicative of the social network of the individual. It is also possible that those who

self-injure may just assume NSSI behavior in others who they perceive to be like them, leading them to have endorsed the exposure item erroneously. This possibility is consistent with research indicating that perceived norms can influence an individual's likelihood of engaging in a behavior (Bandura 2001), and warrants further consideration. Additional research is needed to determine which of these possibilities is most accurate, and to evaluate the temporal patterns between exposure and acts of NSSI within non-treatment environments.

Along with providing the initial, preliminary, support of the association between NSSI exposure and behavioral engagement, the current data also offer the first documentation of rates of exposure to NSSI. The rates of exposure across our groups in the current sample appear to be very high (83% had some level of exposure to either NSSI and/or suicidality), but there are no known studies documenting exposure rates for comparison. There may also be reason to believe that the current methodology could have led to an inflated exposure rate. For example, the questions used to assess exposure were non-specific and may have captured both direct and indirect exposure. Participants may have also been overly inclusive in their interpretation of "knowing someone" and could have endorsed "yes" if they knew *of* a person rather than knowing someone who had a close relationship to them. Therefore, future studies on this topic will need to utilize more specific exposure questions to determine both general rates of exposure and variations based upon direct and indirect exposure levels. Until then, the current rates of exposure noted will need to be used as the baseline.

While the current findings contribute new information pertaining to potential social influences of NSSI, there are some important limitations. First, the data represent a cross-sectional analysis so temporal causality cannot be determined. Due to the measures used, we were unable to evaluate the timeframe between exposure and acts of NSSI. Thus, as noted earlier, the current results cannot directly support a social modeling explanation of NSSI. The data are also limited by the reliance on single items assessing exposure and the lack of questions assessing the strength of connection to the persons known to have engaged in the NSSI or suicidal behavior. It is possible that the strength of the relationship between persons may mediate the effects of exposure, and future research will need to examine this possibility. The exposure to suicidality question also blended suicide deaths and attempts, which may be problematic since it is unclear whether exposure to attempts or suicide deaths would differentially influence NSSI. Future studies in this area should examine the impact of the two suicidality experiences on NSSI separately. The sample is also one of convenience and was relatively homogenous with respect to race/ethnicity, which restricts the generalizability of the findings. Finally, it is possible that due to our belief in the possibility for social modeling of NSSI we may have introduced bias into the way we interpreted our data; however, we carefully discussed the possibility of bias and came to the conclusion that little to no bias was operating in our interpretations of the data.

In sum, the current findings are consistent with a social learning theory of behavioral acquisition of NSSI, suggesting that exposure to NSSI is associated with an increased likelihood of engaging in such behavior. These results build upon prior research conducted within inpatient and residential treatment settings (Rosen and Walsh 1989; Taiminen et al. 1998) by extending the results to a community sample.

It has been established that community samples of adolescents and college students have high rates of NSSI (Laye-Gindhu and Schonert-Reichl 2005; Whitlock et al. 2006), so studying possible social influences within normative samples is important to understanding the patterns of NSSI. However, it remains unclear as to what factors contribute to the possible social modeling of NSSI behaviors. Rosen and Walsh (1989) speculated that the need to belong to a group or establish status within a peer group partly contributed to the NSSI clusters they observed within their residential setting, and these same factors may influence others' decisions to self-injure. It may also be that individuals learn of the behavior from others and decide to experiment with the behavior to see what it is like, or to see if it will "work" for them to help cope with distress thus, contributing to increased rates of NSSI observed among those exposed. More than likely, it is a combination of these external, social, and internal motivating factors that contribute to a person's decision to first engage in NSSI.

It will be important to better understand the factors underlying social modeling effects of NSSI as this may lead to the development of specific guidelines to minimize social contagion within schools, treatment settings, and the general community. The next step for research in this area is to replicate the current findings within more diverse samples, evaluate the temporal sequencing of exposure and NSSI initiation in non-clinical samples, examine the pathways through which social contagion may occur, and begin to evaluate potential differences in the impact of direct and indirect exposure, such as media, may have on current rates of NSSI.

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