



## Body image as a mediator of non-suicidal self-injury in adolescents

Jennifer J. Muehlenkamp<sup>a,\*</sup>, Amy M. Brausch<sup>b</sup>

<sup>a</sup> Department of Psychology, University of Wisconsin–Eau Claire, 105 Garfield Ave, PO Box 4004, Eau Claire, WI 54702-4004, USA

<sup>b</sup> Department of Psychology, Eastern Illinois University, Charleston, IL 61920, USA

### A B S T R A C T

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Attitudes towards the body have been largely overlooked as a potential risk factor for adolescent non-suicidal self-injury (NSSI) despite theorizing that a negative body image may play a critical role in the development of this behavior. The current study used structural equation modeling to evaluate the fit of a theoretical model specifying body image as a mediator between negative affect and NSSI in a combined clinical and non-clinical sample of 284 adolescents. The data supported the model, accounted for 21.6% of the variance in NSSI, and body image significantly mediated the relationship between negative affect and NSSI. These findings provide essential preliminary evidence that body image may represent a necessary but not sufficient risk factor for NSSI in adolescents and that treatment for NSSI should consider targeting body-related pathology in addition to emotion regulation. The findings also support including body image within developing etiological models of NSSI.

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### Body image and non-suicidal self-injury in adolescents

Research on non-suicidal self-injury (NSSI; defined as destruction of body tissue without suicidal intent and for non-socially sanctioned purposes) in adolescents has focused on identifying psychosocial risk factors associated with the behavior, as well as validating emotion regulation models believed to maintain the behavior (e.g., Chapman, Gratz, & Brown, 2006; Nock & Prinstein, 2004). Despite the value these studies provide to understanding the pathogenesis of NSSI and informing current treatment approaches (Gratz, 2007; Miller, Rathus, & Linehan, 2007; Nock, Teper, & Hollander, 2007), they have failed to fully explain the relationship between emotion dysregulation and self-inflicted injuries. One potential explanation for the observed link between emotion dysregulation and self-injury may be the way an adolescent experiences the body. Body image is defined as a multi-dimensional set of thoughts and feelings related to the physical experience, appraisal of, and satisfaction with one's body (Cash & Pruzinsky, 2002). The importance of body image as a developmental risk factor for NSSI has been espoused in theoretical writings (Lader, 2006; Orbach, 1996), some treatment approaches (Walsh, 2006), and supported by qualitative research (Rao, 2006; Wright, Briggs, & Behringer, 2005). The current study aims to evaluate the theoretical proposition that body image facilitates NSSI in the context of emotional distress by examining body image as a potential mediator of the association between negative affect and NSSI.

#### *Negative affect and NSSI*

Current theoretical conceptualization of NSSI views the behavior as a strategy for managing negative affect (Nock & Cha, 2009). Research with samples of inpatient and non-clinical community adolescents finds that affect regulation is the most

\* Corresponding author. Tel.: +1 715 836 4642; fax: +1 715 836 2214.

E-mail addresses: [muehlejj@uwec.edu](mailto:muehlejj@uwec.edu) (J.J. Muehlenkamp), [abrausch@eiu.edu](mailto:abrausch@eiu.edu) (A.M. Brausch).

commonly cited function of NSSI (Lloyd-Richardson, Perrine, Dierker, & Kelly, 2007; Nixon, Cloutier, & Aggarwal, 2002; Nock & Prinstein, 2004). Further supporting an emotion regulation model is that a large body of research suggests depression is a common correlate for NSSI. Hilt, Cha, and Nolen-Hoeksema (2008) found that adolescent females experiencing depressive symptoms were more likely to report using NSSI for emotion regulation functions than those not experiencing depression. Symptoms of depression, low self-esteem, and anxiety have demonstrated significant associations with NSSI for both boys and girls (e.g., Brunner et al., 2007; Claes, Houben, Vandereycken, Bijttebier, & Muehlenkamp, 2010; Lofthouse, Muehlenkamp, & Adler, 2009), and hopelessness has been suggested as another negative affective symptom related to NSSI (Brausch & Gutierrez, 2010; Stanley, Gameroff, Michalsen, & Mann, 2001). In a longitudinal study, Wildman, Lilienfeld, and Marcus (2004) found that depressive symptoms preceded the onset of NSSI in a sample of adolescents, and cross-sectional studies of young adults show depressive and hopeless mood states precede acts of NSSI (Klonsky, 2009; Muehlenkamp et al., 2009). A number of studies have also reported that depressive disorders are common among adolescents who report a history of NSSI (Jacobson, Muehlenkamp, Miller, & Turner, 2008; Nock, Joiner, Gordon, Lloyd-Richardson, & Prinstein, 2006).

The emotion regulation model of NSSI provides a mechanism for understanding one process associated with the maintenance of the behavior, and suggest that negative affect is important to the initiation of NSSI acts. While some self-injuring individuals may experience only negative affect as a precipitating factor for NSSI, the presence of negative affect and inability to regulate such experiences does not appear to be enough to fully explain how NSSI emerges within all adolescents. There remains a significant portion of adolescents who experience high levels of negative affect as aversive yet never engage in NSSI. Current models fail to consider other variables that may be important to the initiation of, and ability to chronically engage in, NSSI. An additional variable to consider may be negative body image.

### *Body image and NSSI*

Orbach (1996) proposed that a person's attitude towards and investment in protecting the body is a critical factor in understanding self-harm behavior. Specifically, he argues that body dissatisfaction facilitates self-harm because a person develops a disregard for the body. This disregard for the body contributes to feelings of detachment, or in extreme form, dissociation. This detachment and indifference towards protecting the body leads to physical anhedonia that can manifest as increased pain tolerance. Thus, a person who has a negative body image and/or views the body as an object separate from the self may experience decreased sensitivity to pain, and thereby will be more able to physically harm the body when facing mounting internal distress. Walsh (2006) offers a similar view based on clinical experience, postulating that one's relationship with and attitudes towards the body play a central role in the initiation and maintenance of NSSI. Studies of self-objectification theory (Fredrickson & Roberts, 1997) offer further evidence that objectifying the body places a person at increased risk for a range of psychopathology including disordered eating and self-harm because the objectification contributes to body dissatisfaction and a disconnection from internal/bodily experiences (Moradi & Huang, 2008; Muehlenkamp & Saris-Baglama, 2002; Muehlenkamp, Swanson, & Brausch, 2005). Thus, there is growing theoretical consensus that body image may be an important factor to consider when understanding risk for NSSI. However, there are no known studies that have tested a model of the meditational effects of negative body image as suggested by the theories.

Studies of suicidal adolescents have provided initial support for this theoretical model, finding that suicidal adolescents report more negative body image, that body dissatisfaction is predictive of suicidal ideation beyond depression and hopelessness, and that suicidal adolescents with a negative body image exhibit higher levels of dissociation and pain tolerance (Brausch & Gutierrez, 2009; Brausch & Muehlenkamp, 2007; Orbach & Mikulincer, 1998; Orbach, Stein, Shani-Sela, & Har-Even, 2001). Researchers have also noted that individuals reporting NSSI often report physical analgesia during their self-injury, which appears to be induced by physiological mechanisms tied to emotional distress systems (Stanley et al., 2001). In a related study, Hooley, Ho, Slater, and Lockshin (2010) reported that community-based adolescents with NSSI histories had significantly higher pain tolerance thresholds. Furthermore, longer pain endurance was associated with having greater self-critical cognitions and more negative beliefs about one's self-worth. Given that body image tends to be closely tied to self-worth for adolescents (Cash & Pruzinsky, 2002; Markey, 2010), it seems plausible that the theoretical propositions that negative body image facilitates NSSI via indifference to protecting the body and pain analgesia when facing emotional distress may have merit.

Most of the research on body image and NSSI has been descriptive in nature. Both Darce (1990) and Wright et al. (2005) provide qualitative evidence that self-injuring adolescents report greater discomfort and dislike of their bodies, and experience the body as being out of control relative to non-NSSI adolescents. In a study of Swedish 14 year olds, Bjärehed and Lundh (2008) found that negative body esteem was significantly correlated with acts of NSSI. Brunner et al. (2007) reported that 9th graders with a history of NSSI who reported being dissatisfied with their body had a three-fold greater risk for engaging in repetitive acts of NSSI. In this same study, occasional self-injurers (three or fewer acts) also reported less satisfaction with their appearance than no-NSSI controls. Research with samples of inpatient adolescents has also demonstrated that those engaging in NSSI report greater body alienation, dissociation, and eating disorder symptoms than those without NSSI (Walsh & Frost, 2005; Walsh & Rosen, 1988). Studies of individuals diagnosed with an eating disorder also find that those with both an eating disorder and NSSI score significantly higher on negative body attitude measures than non-NSSI eating disordered controls (Claes, Vandereycken, & Vertommen, 2003; Solano, Fernández-Aranda, Aitken, López, & Vallejo, 2005), lending credence to the idea that body image may be specifically important to NSSI behavior. Within the only

study to date of eating pathology and NSSI in nonclinical adolescents, Ross, Heath, and Toste (2009) found that regardless of gender, those reporting NSSI exhibited greater body dissatisfaction than controls. The consistency of these findings suggests that negative body image may be salient for NSSI risk and supports the need to consider body image as a component of NSSI behavior within etiological models.

Expanding theoretical conceptualizations of NSSI to include the potential contribution of body image may also enhance understanding as to why this behavior manifests predominantly during adolescence. Adolescence is a time period in which many major psychological disorders such as depression and eating disorders emerge (Fairburn, 2008; Kessler et al., 2005), and this is also the age at which first acts of NSSI are typically reported (Heath, Schaub, Holly, & Nixon, 2009). It is during adolescence that the body is also believed to become more salient to one's self-concept (Cash & Pruzinsky, 2002; Markey, 2010) and may therefore represent an avenue through which psychological distress is expressed.

It is clear from the literature that there exists a strong link between negative affect and NSSI. While regulating negative affect explains one function of NSSI, it does not seem to fully explain this behavior. Negative body image has been proposed as a potential mechanism for understanding why NSSI may occur in the context of negative affect, but research has yet to empirically evaluate the potential mediating effects of body image. The purpose of the current study was to test the theoretical notion that body image is a mediator between negative affect and NSSI (see Fig. 1). This study utilized a combined sample of inpatient adolescents and a high school-based community sample in order to obtain a fuller spectrum of NSSI behavior. Previous studies are limited in their exploration of NSSI as they have focused on either non-clinical or inpatient samples, each of which tend to have varying levels of prevalence, severity, and duration. Furthermore, because previous studies have been limited to one type of sample, no existing research has made direct comparisons between non-clinical and inpatient samples, nor have any studies been able to directly test the generalizability of their findings to the full range of NSSI behavior among adolescents. The current study also included both males and females in order to bolster support for the notion that issues of NSSI, body image, and negative affect are also salient for males (e.g., Borresen & Rosenvinge, 2003). It was hypothesized that the data would provide an adequate fit to the theoretically derived model (see Fig. 1), and that body image would significantly mediate the bivariate relationship between the latent constructs of negative affect and NSSI.

**Methods**

*Participants and procedures*

*High school sample*

A convenience sample of participants were recruited as part of an IRB-approved adolescent mental health screening project being conducted at a public high school in the Midwestern region of the United States of America. Participants were recruited through classroom announcements and consent letters sent home. A total of 578 letters were sent to student homes and 334 (57.8%) were returned. Of those returned, 241 (72.2%) had positive parental consent to participate and 93 (3.9%) had negative parental consent. Five (2.1%) adolescents refused to complete the study, some students were missed due to school absences on data collection days, two had grossly incomplete data, and one was a statistical outlier so was dropped from analyses. The final sample was comprised of 230 (90 males, 140 females) adolescents with a mean age of 15.72 (SD = 1.39). Caucasian students made up 44.5% of the sample, followed by students identifying as African American (33.9%), Hispanic (9.3%), or Asian (1.3%), and 11.0% selected either biracial or "other" to describe their ethnicity.

Adolescents were informed they would be asked to complete a packet of questionnaires asking about their thoughts, mood, views of their body, and different coping behaviors. They were told all information would be kept confidential, that

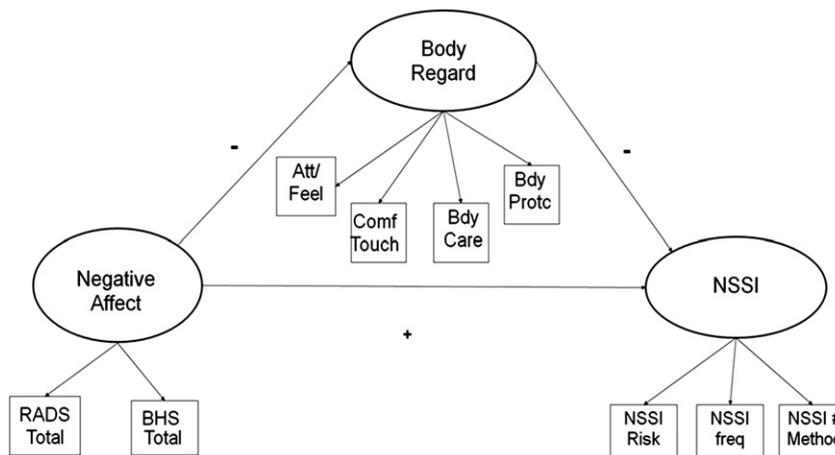


Fig. 1. Theoretical model with indicators and hypothesized pathway directions.

they could stop participation at any time without penalty, and that their responses would be screened for indication of depression and suicide. Those providing written assent completed a packet of counterbalanced self-report measures in small groups (up to 6) in semiprivate rooms in the library of the school, supervised by members of the research team. Upon completion of the questionnaires, each packet was examined for predetermined indicators of suicide risk and depression. Students requiring individual follow-up were given an appropriate referral to the school psychologist. Most students completed the packet within 60 min and no compensation was provided for participation.

#### *Clinical sample*

Adolescents were also recruited as part of an on-going study of adolescent psychopathology from consecutive admissions to an adolescent psychiatric inpatient unit at a hospital in the Midwestern United States. As part of the admissions process, guardians were informed of research being conducted in the unit, and those willing to permit their child to participate signed a standardized consent form used by the hospital. The study procedures were approved by the hospital IRB. A total of 56 adolescents were admitted during the 12-month course of the current study and 100% had guardian consent to participate. Two adolescents (3.7%) had incomplete protocols, leaving a total inpatient sample of 54 (22 males, 32 females) with a mean age of 15.43 ( $SD = 0.91$ ). Adolescents primarily identified as Caucasian (74.1%) or African American (13.0%). An additional 7.4% identified as Hispanic, 1.9% as Asian, and 3.7% as biracial. The three most common primary diagnoses were oppositional defiant disorder ( $n = 16$ ; 29.6%), conduct disorder ( $n = 12$ ; 22.2%), and major depressive disorder ( $n = 8$ ; 14.8%). The remaining diagnostic categories included attention deficit and hyperactivity disorder ( $n = 6$ ; 11.1%), adjustment disorder ( $n = 5$ ; 9.3%), substance abuse/dependence ( $n = 4$ ; 7.4%), and bipolar disorder ( $n = 3$ ; 5.6%).

Prior to completing the standard hospital intake questionnaires, the adolescents were approached by a member of the research team and informed about the study in the same manner as the high school students. Adolescents were told that completing the additional research questionnaires would in no way affect their treatment and that the data obtained would be kept confidential and used for research purposes only. Those who provided verbal agreement to participate were given the study questionnaires to complete in their individual rooms during prescribed testing or quiet time. No compensation was offered for participation.

#### *Measures*

##### *Reynolds adolescent depression scale – 2nd edition (RADS-2; Reynolds, 2002)*

The RADS-2 consists of 30 items designed to measure depressive symptoms in adolescents ages 11 to 20. The frequency with which each item occurs for the adolescent is rated on a 4-point Likert scale ranging from 1 “almost never” to 4 “most of the time.” Scores are obtained by summing responses and range from 30 to 120, with higher scores representing more severe depressive symptoms. The RADS-2 has demonstrated strong reliability and validity within both clinical and high school samples of adolescents (Reynolds, 2002). The total score of the RADS-2 was used as an indicator of the latent construct negative affect in the current study. The internal consistency of the RADS-2 in the current sample was  $\alpha = .94$ .

##### *Beck hopelessness scale (BHS; Beck & Steer, 1988)*

The BHS is a widely used measure in both community and inpatient samples of adolescents. It consists of 20 true-false items measuring hopelessness and negative expectations for the future. Scores are calculated by summing the number of items endorsed as “true.” Scores can range from 0 to 20, with higher scores indicating a greater degree of hopelessness and negative affect. The BHS has consistently demonstrated strong psychometric properties within a variety of adolescent samples (Beck & Steer, 1988; Lyndall, 2001). The total score of the BHS was used as an indicator of the negative affect construct and an internal consistency of  $\alpha = .89$  was obtained in the current sample.

##### *Body investment scale (BIS; Orbach & Mikulincer, 1998)*

The BIS is a 24-item scale assessing emotional investment in the body and consists of four unique subscales: feelings and attitudes towards the body (e.g., “I am satisfied with my appearance”), comfort with physical touch (e.g., “I enjoy physical contact with other people”), body care (e.g., “I like to pamper my body”), and body protection (e.g., “I’m not afraid to engage in dangerous activities”). Each of the four subscales consists of six items, responded to with a 5-point scale ranging from strongly disagree to strongly agree. Scores for each subscale are obtained by averaging item responses within each subscale and higher scores indicate more positive feelings about and investment in the body. For the current study, the body protection item, “Sometimes I purposefully injure myself” was excluded in the calculation of the subscale score. Research with the BIS has provided evidence of adequate reliability and validity with clinical and non-clinical adolescent samples (Orbach & Mikulincer, 1998; Orbach et al., 2001). The BIS subscales were used as indicators of the latent construct, body image, in the current study. Internal consistency estimates for each of the subscales within the current sample were: total scale  $\alpha = .87$ ; attitude/feeling  $\alpha = .84$ ; comfort with touch  $\alpha = .74$ ; body care  $\alpha = .77$ ; body protection  $\alpha = .76$ .

##### *Self-harm behavior questionnaire (SHBQ; Gutierrez, Osman, Barrios, & Kopper, 2001)*

The SHBQ was designed to assess the degree to which participants have engaged in a range of self-harmful behaviors including NSSI. The NSSI section begins with an item that assesses lifetime occurrence of intentional self-injury (“Have you ever hurt yourself on purpose without wanting to die? e.g., scratched yourself with finger nails or sharp object?”). If endorsed

positively, individuals answer a subsequent series of free-response questions that ask about the methods used, frequency, age of onset, and duration of the NSSI. Free response items are coded according to the scoring manual (published in Gutierrez & Osman, 2008), so a single numerical value for each item can be used in statistical analyses. For example, the written numerical responses to the item assessing frequency of NSSI are coded as follows: blank = 0, once = 1, twice = 2, 3 times = 3, 4 or more times = 4. Since the SHBQ asks about lifetime occurrence of NSSI, a risk item is calculated to give heavier weight to more recent instances of NSSI. To calculate the risk item, the age of the most recent NSSI act is subtracted from the individual's current age and are given the following scores: blank = 0, 1 year or less = 4, 1–2 years = 3, >2 years = 2. The SHBQ has been used to assess NSSI and suicidal behaviors among inpatient and high school samples of adolescents, demonstrating high levels of reliability and validity (Gutierrez & Osman, 2008; Muehlenkamp, Cowles, & Gutierrez, 2010). For the current study, the frequency of NSSI, number of methods used, and risk item were used as indicators of NSSI in the model.

## Results

There were no significant differences between the high school and inpatient samples on age,  $t(281) = 1.48, p > .13$ , gender,  $\chi^2(1) = .065, p > .80$ , or ethnicity,  $\chi^2(5) = .011, p > .10$ . Descriptive features of NSSI for the inpatient, high school, and combined samples are presented in Table 1. Of the total sample, lifetime NSSI was reported by 26.9% ( $n = 76$ ) and among those reporting any NSSI, 65.8% reported at least one act of NSSI within the past 12 months. The mean age of onset for NSSI was 12.88 ( $SD = 2.35$  years) and the average duration of the NSSI was 1.62 ( $SD = 0.99$ ) years. The mean frequency of the written numerical responses for NSSI episodes was 26.55 ( $SD = 38.90$ ), and participants reported engaging in an average of 1.41 ( $SD = 0.71$ ) different methods. Cutting, skin abrading/severe scratching, and self-battery were the most common methods used (see Table 1).

Adolescents within the inpatient sample were significantly more likely to report having engaged in at least one act of NSSI in their lifetime (68.5%) than the high school adolescents (17.0%;  $\chi^2(1) = 58.97, p < .001$ ). A MANOVA was conducted to examine potential differences between the inpatient and high school samples on the study variables. As would be expected, significant group differences were found,  $F(6, 270) = 19.12, p < .001$ , with the inpatient sample exhibiting more pathology across all the variables except the RADS-2,  $F(1, 275) = 3.26, p > .07$  (see Table 2). The observed group differences support the validity of the combined sample as being representative of the full range of adolescents who engage in NSSI in which to test the primary study hypotheses. Thus, the combined sample was used for all additional analyses.

Prior to conducting structural equation analyses, bivariate correlations were run to ensure there were significant associations among the variables of interest. All the variables were significantly correlated ( $p < .05$ ) with each other and ranged from  $r = .113$  to  $.651$ . To test the hypothesized model, LISREL 8.5 (Joreskog & Sorbom, 1996) was used. Analyses were conducted using the item covariance matrix. Model parameters were estimated using the maximum likelihood method because it is robust to violations of multivariate normality and tends to provide reliable estimates under less than optimal data conditions (Kline, 1998). Both absolute and incremental fit statistics were used to evaluate the overall fit of the structural model using the cut-off criteria proposed by Hu and Bentler (1999) and by Schermelleh-Engel and Moosbrugger (2003). Due to the tendency for sample size to influence chi-square values, the chi-square to degrees of freedom ratio was also employed, with values less than 3.0 indicating a good fit (Kline, 1998).

As recommended by Anderson and Gerbing (1988), the measurement model was evaluated first through a confirmatory factor analysis in which each self-report scale was specified to load on their latent construct (see Fig. 1) and the latent

**Table 1**  
NSSI characteristics within the inpatient, high school, and combined samples.

	Full sample ( $n = 76$ ) M or %; SD	Inpatient ( $n = 37$ ) M or %; SD	High school ( $n = 39$ ) M or %; SD
Age onset	12.88 (2.35)	12.46 (2.79)	13.26 (1.83)
# Methods used	1.41 (0.71)	1.57 (0.85)	1.26 (0.50)
NSSI frequency <sup>a</sup>	26.55 (38.90)	36.97 (42.84)	16.92 (32.53)
Methods used (%)			
Cutting	61.1	70.6	52.7
Skin Abrading	27.8	20.6	34.2
Burning	1.4	–	2.6
Banging	4.2	8.8	–
Self-Battery	13.9	2.9	23.7
Other <sup>b</sup>	19.5	26.5	13.2
Recency (%) <sup>c</sup>			
Within last 12mo	65.8	73.0	59.0
Within last 24 mo	14.5	21.6	7.7
Duration of NSSI (%)			
0–1 years	53.9	43.2	64.1
2–3 years	27.6	32.4	23.1
4 + years	14.5	21.6	7.7

<sup>a</sup> Frequencies reported represent the raw frequencies based on the actual written number of NSSI episodes on the SHBQ questionnaire.

<sup>b</sup> The "other" category included various responses written in by the participants such as ice burns, choking game, carving designs into skin, etc.

<sup>c</sup> Recency % represents the recency of an NSSI act among adolescents endorsing any NSSI in their lifetime.

**Table 2**  
Inpatient and high school sample group differences on study variables.

Variable	Inpatient (n = 54)	High school (n = 230)	F	p	$\eta^2$
	M (SD)	M (SD)			
BHS	4.82 (4.52)	3.46 (4.12)	4.39	.037	.02
RADS-2	66.26 (18.46)	70.30 (13.40)	3.26	.072	.01
BIS total <sup>a</sup>	3.46 (0.54)	3.74 (0.56)	10.19	.002	.04
Attitude/feel	3.37 (1.03)	3.72 (0.80)	8.03	.005	.03
Comfort touch	3.15 (0.69)	3.41 (0.74)	6.36	.012	.02
Body care	3.98 (0.77)	3.86 (0.74)	1.42	.234	.00
Body protect	3.36 (0.75)	3.84 (0.79)	15.75	.000	.05
NSSI risk	2.41 (1.85)	.53 (1.27)	76.63	.000	.22
# NSSI methods	1.04 (1.02)	.22 (0.52)	68.92	.000	.20
Frequency NSSI	24.10 (38.48)	2.92 (14.83)	41.58	.000	.13

BHS = Beck Hopelessness Scale, RADS-2 = Reynolds Adolescent Depression Scale, BIS = Body Investment Scale, NSSI = Nonsuicidal self-injury, NSSI Risk = Coded value for the difference between participants' current age and age of most recent act of NSSI (range 0–4).

<sup>a</sup> For all BIS variables a higher score is indicative of a more positive relationship with the body.

constructs were permitted to correlate with each other. To set the scale for each latent construct, the path loading of the first indicator was set to 1.0. Model fit statistics revealed the data fit the measurement model,  $\chi^2/df = 2.17$ , RMSEA = .07, SRMR = .06, GFI = .94, NFI = .95, CFI = .97, so evaluation of the full structural model was conducted.

Analyses of the hypothesized model in which body image was specified as a mediator between negative affect and NSSI indicated the data provided an adequate fit to the model,  $\chi^2/df = 2.37$ , RMSEA = .07, SRMR = .057, GFI = .96, NFI = .93, CFI = .96, accounting for 21.6% of the variance in NSSI.<sup>1</sup> To determine whether body image mediated the relationship between negative affect and NSSI, analyses were run to determine the magnitude of the relationship between negative affect and NSSI with and without body image in the model (e.g., Baron & Kenny, 1986). Analyses revealed a significant relationship between negative affect and NSSI ( $r = .40$ ,  $t = 4.77$ ,  $p < .01$ ) as well as a significant association between negative affect and body image ( $r = -.72$ ,  $t = -6.39$ ,  $p < .01$ ). The relationship between body image and NSSI was also significant ( $r = -.45$ ,  $t = -6.94$ ,  $p < .01$ ). When body image was added into the model as a mediator, the relationship between negative affect and NSSI was reduced and became non-significant ( $r = .146$ ,  $t = 1.13$ ,  $p > .05$ ). These results suggest body image is a mediator (Aroian Sobel Test = 4.68,  $p < .001$ ; MacKinnon, Warsi, & Swyer, 1995) of the relationship between negative affect and NSSI within the current sample (see Fig. 2).

## Discussion

Results from the current study provide the first known empirical evidence that body image is a mediator of the relationship between negative affect and NSSI within adolescents. As suggested by many clinicians and researchers (e.g., Orbach, 1996; Ross et al., 2009; Walsh, 2006), the current data support the idea that adolescents who evaluate their body negatively and experience a disregard for their body may be more prone to engaging in NSSI when confronted with aversive, overwhelming emotional states. Specifically, the mediational model accounted for almost 22% of the variance in NSSI behavior and the pathway from negative affect to NSSI was reduced and became non-significant when body image was added into the model. This suggests that body image may be a critical feature contributing to NSSI, and that it could play a greater role in NSSI than experiences of negative affect. The current results also offer one potential pathway for understanding how or why difficulties regulating negative affect get expressed through NSSI over other maladaptive coping behaviors.

Another potential contribution of the findings from this study is that body image should be considered alongside other potential risk factors when attempting to understand risk for NSSI. Prior studies have indicated that body dissatisfaction is correlated with NSSI (Bjärehed & Lundh, 2008; Brunner et al., 2007; Ross et al., 2009) and the current results suggest that body image may represent a particularly salient vulnerability factor to consider. Despite these consistent findings, many studies of risk for NSSI fail to consider body image and the current results indicate this may be an important oversight limiting current conceptualizations of the behavior. In addition, including body image in etiological models of NSSI may enhance the developmental salience of NSSI etiological models, as adolescence is the time period where body dissatisfaction appears to peak (Borresen & Rosenvinge, 2003) and other body related pathologies such as eating disorders also emerge. As noted earlier, eating disordered behavior is also strongly associated with the presence of NSSI and some research is pointing to many shared features and psychosocial risk factors between NSSI and disordered eating (Claes et al., 2003; Solano et al., 2005; Svirko & Hawton, 2007). Thus, the adolescent's experience of the body during this developmental period may offer a particularly important insight into the pathogenesis of maladaptive body-focused coping strategies. Efforts to promote healthy

<sup>1</sup> To ensure the results were not being driven solely by the level of pathology within the inpatient sample, the model was also run in just the high school sample. The mediated model provided adequate fit;  $\chi^2/df = 2.78$ ; GFI = .940; NFI = .907; RMSEA = .088; SRMR = .064, accounting for 20.8% of variance in NSSI.

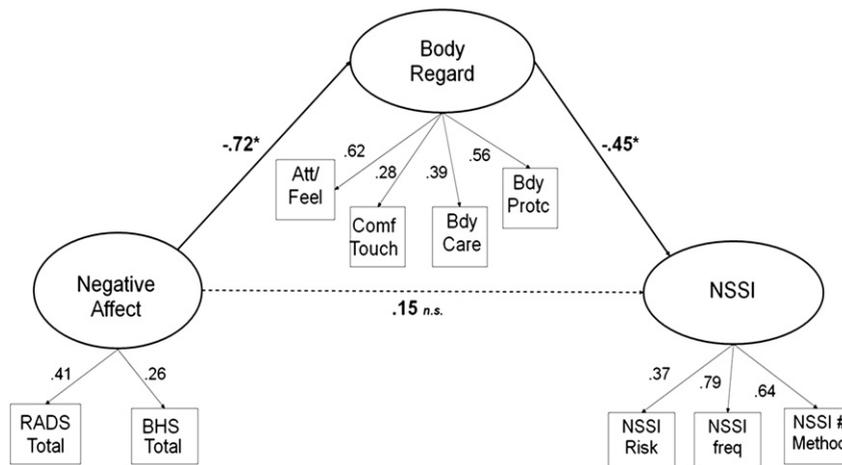


Fig. 2. Structural model with standardized path coefficients. Note. \* $p < .05$ .

acceptance and valuing of the body may be one avenue in which to reduce youth's vulnerability to behaviors such as NSSI, while also being a potentially important piece of clinical treatment for adolescent NSSI.

It is also important to note that an additional strength of the current study is the finding that the meditational model tested was supported in a combined sample of clinical and non-clinical adolescents. This is the first known study to examine potential risk correlates of NSSI within a clinically heterogeneous sample of adolescents, which strengthens the results' generalizability to the true population of adolescents who report NSSI. While specific model invariance could not be examined statistically due to the smaller inpatient sample, the model was run within the high school sample alone and was supported (see footnote). The fact that males were also included in the sample further strengthens the generalizability of the model. Numerous studies have documented the presence of NSSI among males, although there is mixed data as to whether or not the rates and risk factors of NSSI are comparable between males and females (Andover, Primack, Gibb, & Pepper, 2010). Thus, a strong fitting model in which body image was supported as a mediator within a mixed-gender sample has particular strength for adding to current understandings of NSSI. The finding that the body image model was supported for this sample is also consistent with Ross et al. (2009) report that body dissatisfaction was linked to NSSI for both males and females. It appears body image may be important to understanding risk for NSSI in both genders, which is consistent with Orbach's (1996) theorizing and research with suicidal adolescents. Additional research is needed to better understand how body image operates for males and females in relation to NSSI initiation, maintenance, method choice, and recovery.

### Limitations

Despite the value of the current findings in expanding conceptual models of NSSI, there are some important limitations to note. First, the data are correlational and cannot provide insight into the potential causal role of negative body image on NSSI. Additionally, the data were all self-report and subject to the biases inherent to this method. While a large majority of the sample reported an act of NSSI within the 12 months prior to the study, it is possible that only a small subset of participants were actively engaged in NSSI at the point of data collection. Thus, it is likely some of the data are biased by retrospective recall as well as the low base rate of the behavior particularly within the high school sample. In addition, while both samples included a greater amount of racial diversity than much of the published NSSI research, the racial composition of the high school and clinical samples varied such that proportion of Caucasian/White adolescents was greater in the clinical sample. Another important limitation to note is that the model tested in this study was a preliminary step, and thus did not include other potential correlates of NSSI risk such as the experience of childhood trauma, borderline personality features, emotion dysregulation, or other negative affective states such as anxiety and anger. It is likely that the model would have accounted for a greater amount of variance in NSSI if some of these additional variables were included. Future tests of body image as a mediating variable will be strengthened by the addition of some of these variables.

### Conclusions

There is an emerging body of evidence that body image is a salient factor to consider when developing etiological models of risk for NSSI. Studies of both males and females who report NSSI are finding that body dissatisfaction is associated with NSSI, and the current study found that body image mediated the relationship between negative affect and NSSI in a mixed-gender, combined clinical and non-clinical sample. Taken together, these research findings suggest body image needs to be

included in current conceptualizations of NSSI as it appears to be a salient factor and correlate of NSSI. Research should continue to examine the role of body image in the development of NSSI as well as in understanding mechanisms of change within treatments of NSSI behavior. For example, treatments that incorporate mindfulness training (e.g., DBT; Miller et al., 2007) or body acceptance methods (e.g., Walsh, 2006) may be more effective at reducing NSSI because they re-connect an individual to his or her body. It is possible that this re-connection to and learned sensitivity to bodily states helps a person develop stronger body image, thereby significantly reducing the sense of bodily detachment, or objectification, required to perform NSSI. Future research should begin to evaluate this assumption, which would lend further support to the theory that body image is a necessary but not sufficient factor in the development and maintenance of NSSI.

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