

# Nonsuicidal Self-Injury Among “Privileged” Youths: Longitudinal and Cross-Sectional Approaches to Developmental Process

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This investigation examined process-level pathways to nonsuicidal self-injury (NSSI; e.g., self-cutting, -burning, -hitting) in 2 cohorts of suburban, upper-middle-class youths: a cross-sectional sample of 9th–12th graders ( $n = 1,036$ , 51.9% girls) on the West Coast and a longitudinal sample followed annually from the 6th through 12th grades ( $n = 245$ , 53.1% girls) on the East Coast. High rates of NSSI were found in both the cross-sectional (37.2%) and the longitudinal (26.1%) samples. Zero-inflated Poisson regression models estimated process-level pathways from perceived parental criticism to NSSI via youth-reported alienation toward parents. Pathways toward the initiation of NSSI were distinct from those accounting for its frequency. Parental criticism was associated with increased NSSI, and youth alienation toward parents emerged as a relevant process underlying this pathway, particularly for boys. The specificity of these pathways was explored by examining separate trajectories toward delinquent outcomes. The findings illustrate the prominence of NSSI among “privileged” youths, the salience of the caregiving environment in NSSI, the importance of parental alienation in explaining these relations, and the value of incorporating multiple systems in treatment approaches for adolescents who self-injure.

*Keywords:* nonsuicidal self-injury, privileged youths, developmental psychopathology, delinquency, zero-inflated Poisson regression models

In recent years, nonsuicidal self-injury (NSSI; e.g., self-cutting, -burning, -hitting) has transcended the bounds of clinical wards and medical journals to reveal itself as a prominent and burgeoning health concern among community youths (Gratz, Conrad, & Roemer, 2002; Laye-Gindhu & Schonert-Reichl, 2005; Muehlenkamp & Guttierrez, 2004; Ross & Heath, 2002; Whitlock, Eckenrode, & Silverman, 2006). However, the extant literature on NSSI, particularly in community settings, has focused on descriptive studies to the relative neglect of theoretically informed, process-oriented investigations that recognize NSSI as both a developmental and clinical phenomenon. Addressing this gap in the literature, the present study examined putative developmental processes underlying self-injurious pathways in two cohorts of suburban, upper-middle-class youths: a cross-sectional sample of 9th–12th graders on the West Coast and a longitudinal sample that was followed annually from the 6th through 12th grades on the East Coast.

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## The Phenomenology of NSSI

Building on previous definitions of NSSI (see Simeon & Favazza, 2001, for review), this study examined self-inflicted, direct, socially unacceptable destruction or alteration of body tissue that occurred in the absence of conscious suicidal intent or pervasive developmental disorder. Recent community studies point to striking rates of NSSI, as defined here, among adolescents. For example, Gratz et al. (2002) found that 38% of a college student sample endorsed a history of NSSI, whereas Ross and Heath (2002) found that 14% of a high school sample reported NSSI (see also Laye-Gindhu & Schonert-Reichl, 2005). Drawing on a large, multisite study of more than 3,000 college students, Whitlock et al. (2006) found that 17% of college students reported NSSI and that 75% of these self-injurers endorsed more than one episode.

The prevalence and phenomenology of NSSI across different gender, ethnic, and economic groups remain unclear. Although some studies have suggested that girls are 1.5–3 times more likely to self-injure than are boys (Clery, 2000; Favazza, 1999), others have suggested that gender differences are less pronounced (Garrison et al., 1993; Gratz et al., 2002; Tyler, Whitbeck, Hoyt, & Johnson, 2003). In contrast to gender differences, socioeconomic and ethnic differences have rarely been examined in studies of NSSI. A recent survey of college students found no relation between social class (as indicated by parental education level) and NSSI (Whitlock et al., 2006), but other findings have suggested that rates of self-injury may be elevated among low-income individuals (Nada-Raja, Skegg, Langley, Morrison, & Sowerby,

2004). Similarly, although a few studies have reported elevated rates of NSSI among Caucasian individuals (e.g., Ross & Heath, 2002), others have revealed significant rates among minority youths (Gratz, 2006; Lipschitz et al., 1999; Marshall & Yazdani, 1999; Nada-Raja et al., 2004). Building on this literature, the present study examined the phenomenology and sociodemographic patterning of NSSI among 1,300 high school students who were attending suburban coeducational schools that primarily cater to children of highly educated, white-collar professionals.

### Developmental Pathways to NSSI

Relative to the descriptive literature on NSSI, less is known about developmental pathways toward self-injurious outcomes. Retrospective findings strongly implicate the quality of the caregiving environment in the etiology of NSSI, with up to 79% of adult self-injurers reporting a childhood history of abuse or neglect (Gratz et al., 2002; Low, Jones, MacLeod, Power, & Duggan, 2000; van der Kolk, Perry, & Herman, 1991; Wiederman, Sansone, & Sansone, 1999). However, little is known about etiologic and developmental processes underlying NSSI in adolescence, despite evidence that this is the period during which self-injurious pathways are typically initiated (Favazza, 1999). Moreover, researchers have rarely examined the potential contribution of less extreme forms of negative parent-child interactions (e.g., critical parenting) to NSSI (see Wedig & Nock, 2007). Building on a recent application of a developmental psychopathology perspective on NSSI (Yates, 2004), this study examined developmental pathways and mechanisms by which parental criticism may contribute to NSSI in adolescence.

Grounded in an understanding of normative development and informed by core tenets of attachment and organizational theories of development (Sroufe, 1990), Yates (2004) identified several process-level pathways toward NSSI that may follow from the deleterious impact of adverse caregiving on development. In this view, harsh or critical parenting may contribute to NSSI by undermining emerging representations of relationships as reliable and rewarding (i.e., motivational processes); complementary views of the self as worthy of care (i.e., attitudinal processes); capacities to integrate experience across multiple levels of thinking and feeling (i.e., integrative processes); abilities to modulate emotion and arousal (i.e., emotional processes); and/or resources to form reciprocal and empathic relationships (i.e., relational processes). This investigation tested a motivational pathway toward NSSI, wherein we hypothesized that parental criticism would undermine adolescents' representations of others, thereby prompting them to turn toward the self and the body, rather than to others, in times of challenge or distress. This motivational hypothesis is consistent with evidence that parental criticism is associated with invalidating and rejecting caregiving environments (McCarty, Lau, Valeri, & Weisz, 2004), which may instill a sense of alienation from caregivers and a broader mistrust of others (Fonagy, Target, & Gergely, 2000; Sroufe, 1990), as well as with the overwhelming evidence that NSSI subserves self- and affect-regulatory functions (Brain, Haines, & Williams, 1998; Nock & Prinstein, 2004, 2005).

### Developmental Specificity of Self-Injurious Pathways

Although recent studies have considered self-injurious pathways and relevant developmental processes theoretically (Yates, 2004)

and empirically (Ross & Heath, 2003; Yates, Carlson, & Egeland, in press), there remains a pressing need to ascertain whether identified risks and processes provide explanatory power that is unique to self-injurious outcomes or whether they are merely characteristic of global psychopathology. Contrary to the hypothesis that a sense of alienation from others will prompt individuals to turn in and against the self in times of duress or need, an alternative model predicts that adolescents may turn out and against others as a consequence of negative relational representations (Egeland, Yates, Appleyard, & van Dulmen, 2002; Sankey & Huon, 1999). Thus, our final aim in this investigation was to explore whether the motivational vulnerabilities that follow from critical parenting (i.e., youth alienation toward parents) contributed to delinquent outcomes in adolescence (i.e., rule-breaking behavior) and whether these paths differ between girls and boys and/or from those toward NSSI.

### Summary

This study evaluated theoretically informed, process-level pathways between perceived parental criticism and NSSI among “privileged” youths in a cross-sectional sample of 9th–12th graders and a longitudinal sample that was followed from the 6th through 12th grades. Our first aim in this study was to describe the phenomenology of NSSI among children of highly educated, white-collar professionals, a population that has been largely overlooked in previous studies of psychopathology (see Luthar, 2003, for discussion). Second, we sought to evaluate a motivational pathway to NSSI, in which we predicted that critical parenting would contribute to NSSI via its negative impact on parental representations, as reflected by increased feelings of alienation toward parents. Given prior evidence of meaningful gender differences in NSSI, these processes were estimated independently for girls and for boys. Our final goal was to explore the specificity of the proposed motivational pathway toward NSSI by examining a parallel model using delinquent behavior as the outcome. Together, these goals draw on the complementary strengths of cross-sectional and longitudinal research designs to enable the description and preliminary temporal specification of self-injurious pathways among suburban, upper-middle-class youths.

### Method

#### *Participants*

*West Coast cross-sectional sample.* Participants in this sample were drawn from a single high school in a West Coast suburban community. As of the 2000 census, the median household income in this community was \$91,904 (equivalent to ~\$111,116 in 2006); 69.1% of adults had at least a college degree, and only 1.9% of families lived at or below the poverty line. Of the original 1,185 participants, 1,036 (538 girls, 498 boys) provided complete data on NSSI. The current sample was evenly distributed across the 9th, 10th, 11th, and 12th grades. The ethnic composition of the sample was 70.7% Caucasian, 18.1% Asian, 2.4% Hispanic, 1.5% Black, 1% other minority (e.g., Native American), and 6.3% multiracial. Students who provided complete data on NSSI did not differ from the larger sample with respect to salient demographics, including ethnicity, gender, and grade membership. Participants who pro-

vided complete data on NSSI but not on other relevant variables (e.g., parental criticism) were not included in the path analyses ( $n = 57, 5.5\%$ ). The ethnic, gender, and grade distribution of the sample in the path analyses was comparable to that for the broader sample.

Students in the West Coast sample were assessed at the request of the local community and school. Following a series of incidents involving substance use and suicide attempts, community representatives invited Suniya S. Luthar to present available data on youths in such communities and to discuss possibilities for the assessment of students to ascertain intervention needs. Prior to data collection, the entire student body in both schools saw a videotaped presentation by Suniya S. Luthar that introduced the study, briefly explained that little was known about the lives of children of well-educated professionals, requested participation while clarifying that it was in no way required, and assured the anonymity of responses. Parents were sent letters that explained the study and gave them the opportunity to refuse consent for their child to participate. All 1,185 students who were in school (243 students were absent) and were eligible to participate (8 students were in special education) on the day of data collection completed the questionnaires, yielding an 82.9% response rate. Data collection occurred in the classrooms via paper-and-pen survey; there was no collection of personally identifying information. The administration of measures was performed by community personnel and teachers, who were instructed simply to maintain order (i.e., not to walk around the room and potentially glimpse students' responses). Upon completing the questionnaire, students sealed their response packets in an envelope and received a gift certificate in appreciation for their participation. All procedures were reviewed and approved by the Institutional Review Board for the Protection of Human Subjects, Teachers College, Columbia University.

*East Coast longitudinal sample.* Participants in this sample were drawn from the New England Study of Suburban Youth (NESSY), which is a longitudinal study of development and adaptation among a cohort of high-income, suburban schoolchildren first recruited in the 6th grade and followed annually thereafter through the 12th grade (Luthar & Goldstein, in press; Luthar & Latendresse, 2005; Luthar, Shoum, & Brown, 2006). The original NESSY sample consisted of 314 sixth graders (150 girls, 164 boys) from the two schools in this upper-middle-class community of highly educated, white-collar professionals. As of the 2000 census, the median household income in this community was \$125,381; 32.8% of the adults had earned a graduate degree, and only 3% of the students received free or reduced-price lunches (Luthar & Sexton, 2004). At the time of the 12th-grade assessment, when NSSI was assessed, all 245 students (130 girls, 115 boys) who were in school (48 students were absent) and were eligible to participate (17 students did not have parental consent) completed the questionnaires, yielding a 79.5% response rate. The sample was 89% Caucasian and 5% Hispanic; the remaining 6% of the sample was evenly distributed across Asian, African American, and other racial groups, including multiracial identifications. Relative to the original sample, there were no significant differences in the ethnic or gender makeup of the 12th-grade sample, though the current sample was slightly more diverse than the original sample, which was 93% Caucasian. Participants who provided complete data in Grade 12 but who were not assessed at earlier time points were not included in the path analyses, because they

were missing data on key predictor variables (e.g., parental criticism:  $n = 34, 13.9\%$ ). The ethnic and gender distribution of the sample in the path analyses was comparable with that for the broader sample.

As in the West Coast sample, the NESSY grew out of community concern about the welfare of children, which precipitated a school-based initiative to understand and encourage positive youth development. Student recruitment was based on passive consent procedures. Administrators sent letters to parents that described the study, emphasized that data would be presented only in aggregate form, and requested notification from parents who did not wish their child to participate. A few days prior to data collection, the parents were again informed about the study and given the opportunity to request that their child not participate. The children themselves were given the opportunity to decline to participate in the study. Data were collected in the classrooms. Test items were administered both visually and orally to prevent bias due to variability in reading abilities. Upon completion of each data collection, gift certificates were provided to all participating students. All procedures were reviewed and approved by the Institutional Review Board for the Protection of Human Subjects.

### Measures

*Parental criticism.* Parental criticism was measured with the Multidimensional Perfectionism Scale (MPS; Frost, Marten, Lahart, & Rosenblate, 1990). The MPS consists of 35 statements that describe a range of perfectionistic beliefs, which are rated with a 5-point Likert scale from 1 (*strongly disagree*) to 5 (*strongly agree*). The Parental Criticism subscale consists of 4 items, including "I am punished for doing things less than perfectly," "My parents never try to understand my mistakes," "I never feel like I can meet my parents' expectations," and "I never feel like I can meet my parents' standards." Parental criticism was assessed cross-sectionally in the West Coast sample ( $\alpha = .77-.85$ ) and was averaged across Grades 6, 7, and 8 in the East Coast sample ( $\alpha = .76-.86$ ).

*Parental alienation.* Adolescents' feelings of alienation toward their parents were assessed with the Alienation subscale of the Inventory of Parent and Peer Attachment (IPPA; Armsden & Greenberg, 1987). The IPPA consists of 50 items (25 pertaining to each parent), which are rated on a 5-point Likert scale from 1 (*almost never or never true*) to 5 (*almost always or always true*). The Alienation scale consists of 12 items (6 for each parent) that assess the youth's feelings of anger, isolation, and mistrust in relating to each parent (e.g., "Talking over my problems with my mother/father makes me feel ashamed or foolish," "I feel angry with my mother/father"). Due to the high correlations between maternal and paternal alienation ( $r_s = .67-.71$ ), we averaged these scales to create a global alienation score. Parental alienation was assessed cross-sectionally in the West Coast sample ( $\alpha = .86-.88$ ) and was averaged across Grades 9, 10, and 11 in the East Coast sample ( $\alpha = .76-.85$ ).

*NSSI.* We used the Functional Assessment of Self-Mutilation (FASM; Lloyd, Kelley, & Hope, 1997) to assess rates and methods of NSSI during the 12 months preceding the time of data collection. The utility of the FASM has been established across several studies (Guertin, Lloyd-Richardson, Spirito, Donaldson, & Boergers, 2001; Nock & Prinstein, 2004, 2005). Respondents indicated

whether and how often they had engaged in 11 different forms of NSSI, including cutting or carving skin, picking at a wound, self-hitting, scraping skin to bleed, self-biting, picking areas of body to bleed, inserting objects under skin or nails, self-tattooing, burning skin, pulling out hair, or erasing skin to bleed. Frequency was rated using a 5-point scale that ranged across 1 (*0 times*), 2 (*1 time*), 3 (*2–5 times*), 4 (*6–10 times*), and 5 ( $\geq 11$  times). NSSI was assessed cross-sectionally in the West Coast sample ( $\alpha = .84-.91$ ) and in the 12th grade in the East Coast sample ( $\alpha = .67-.85$ ).

*Delinquent behavior.* Delinquent behavior was assessed with the Rule-Breaking subscale of the Youth Self-Report (YSR) form of the Child Behavior Checklist (Achenbach, 1991b). This measure consists of 118 behavioral items rated by the adolescent on a 3-point scale as 0 (*not true*), 1 (*somewhat or sometimes true*), or 2 (*very true or often true*). *T* scores on the YSR stem from extensive normative data, evidence short-term test–retest reliability, and discriminate between clinic-referred and nonreferred youths (Achenbach, 1991a). The Rule-Breaking subscale includes items that capture a range of delinquent behaviors, such as associating with deviant peers, lying, and stealing. Delinquent behavior was assessed cross-sectionally in the West Coast sample ( $\alpha = .71-.76$ ) and in the 12th grade in the East Coast sample ( $\alpha = .83$ ).

### Statistical Analyses

As is often observed in community-based studies of psychopathology, NSSI was not normally distributed across participants in this investigation. In both samples, the distribution of NSSI was positively skewed with a precipitous drop, such that even a transformed distribution would substantially violate the assumptions of normality required for parametric analytic approaches (Papoulis & Pillai, 2002). This characteristic inherent in the data requires a special case of regression analysis called zero-inflated Poisson (ZIP) regression. ZIP models are well suited to the analysis of count data with excess zeros (Lambert, 1992). The present analyses employed ZIP path models to permit the simultaneous prediction of two variables that, together, describe the obtained distribution of NSSI: namely, the occurrence of NSSI (i.e., “0” representing noninjurers, “1” representing all NSSI values greater than zero) and the frequency of NSSI once initiated (i.e., the specific value of NSSI greater than zero).

While ZIP regression models appropriately account for the distinct nonnormality of NSSI, several characteristics of this analytic paradigm warrant consideration. First, the statistical power needed for detection of a given effect size is greater than in the standard linear regression paradigm (Dufour & Zung, 2005). Second, standardized model fit indices and estimates of effect sizes (e.g.,  $R^2$ , standardized regression weights) developed for linear regression analysis are not available (Muthén & Muthén, 1998–2006). Third, the estimation technique required for appropriate handling of missing data in a Poisson-distributed dependent variable requires Monte Carlo numerical integration, which precludes the estimation of the statistical significance of indirect pathways (Muthén & Muthén, 1998–2006). Therefore, we reported unstandardized parameter estimates and their standard errors and constructed 95% confidence intervals to compare parameters across groups.

The path models were conducted in a general latent-variable modeling framework with multiple groups, which allowed the

simultaneous estimation of hypothesized pathways across gender. Initial models specified only the direct relation between perceived parental criticism and NSSI. Next, the hypothesized mediating pathway from parental criticism through alienation to NSSI was introduced. As discussed previously, we also estimated these pathways in the prediction of delinquent behavior to test the specificity of the predicted motivational path for NSSI. In all models, the data from the West and East Coast samples were fit separately. Because the sample size was considerably smaller in the East Coast sample, resulting in relatively low statistical power, we have presented the results of the East Coast models as preliminary evidence of the directionality of the hypothesized processes.

## Results

### Descriptive Analyses

Table 1 details the frequency of NSSI methods in each sample for girls and for boys during the preceding year. The FASM item corresponding to “pick at a wound” was not included in these analyses, because disproportionately high rates of endorsement suggested that this item captured a largely normative adolescent behavior. Across the remaining forms of NSSI, West Coast participants endorsed higher levels of NSSI (7.7% reported one incident, 29.5% reported more than one incident) than did East Coast respondents (10.2% reported one incident, 15.9% reported more than one incident),  $\chi^2(2, N = 1,281) = 18.68, p < .001$ . Across samples, girls reported significantly higher rates of NSSI (8.8% reported one incident, 30.5% reported more than one incident) than did boys (7.5% reported one incident, 22.8% reported more than one incident),  $\chi^2(2, N = 1,281) = 11.76, p < .01$ . Chi-square analyses did not reveal developmental differences in rates of NSSI among the West Coast respondents across the 9th–12th grades. However, significant differences in NSSI rates were apparent across the ethnic groups in the West Coast sample with respect to all forms of injury,  $\chi^2(5, N = 1,026) = 15.57-51.41$  (all  $ps < .01$ ), except for self-biting. Students who endorsed “Black” or “Other” ethnic identities (most of whom were Native American) reported higher rates of NSSI than did White, Hispanic, Asian, and multi-racial respondents.

The means and standard deviations for perceived parental criticism, parental alienation, and delinquent behavior are presented separately by gender and sample in Table 2. A two-way multivariate analysis of variance (ANOVA; Sample  $\times$  Gender) revealed significant main effects for sample source, Wilks’s  $\lambda = 0.96, F(3, 1160) = 17.85, p < .001$ ; gender, Wilks’s  $\lambda = 0.96, F(3, 1160) = 17.30, p < .001$ ; and their interaction, Wilks’s  $\lambda = 0.96, F(3, 1160) = 16.36, p < .001$ . Follow-up univariate ANOVAs revealed that participants in the West Coast sample reported higher levels of parental criticism,  $F(1, 1166) = 6.71, p < .01$ , and of alienation,  $F(1, 1166) = 17.63, p < .001$ , than did participants in the East Coast sample. Girls endorsed higher levels of parental criticism,  $F(1, 1166) = 4.63, p < .05$ , and of alienation,  $F(1, 1166) = 38.41, p < .001$ , than did boys. One significant Sample  $\times$  Gender interaction emerged, with girls in the West Coast sample reporting higher levels of parental alienation than did boys, whereas rates of alienation were lower among girls than among boys in the East Coast sample,  $F(1, 1166) = 24.22, p < .001$ .



Table 1  
Frequencies of Nonsuicidal Self-Injury Among Female and Male Participants in the West Coast and East Coast Samples

Method of NSSI	No. (%) NSSI incidents in past year									
	0		1		2-5		6-10		≥11	
	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
West Coast (n = 1,036)										
Cut or carved skin	428 (79.6)	453 (91.0)	37 (6.9)	17 (3.4)	46 (8.6)	12 (2.4)	9 (1.7)	2 (0.4)	18 (3.3)	14 (2.8)
Picked at a wound	295 (54.8)	271 (54.4)	82 (15.2)	74 (14.9)	88 (16.4)	78 (15.7)	30 (5.6)	25 (5.0)	43 (8.0)	48 (9.6)
Hit yourself	436 (81.0)	406 (81.5)	34 (6.3)	30 (6.0)	45 (8.4)	33 (6.6)	12 (2.2)	11 (2.2)	11 (2.0)	18 (3.6)
Scraped skin to bleed	460 (85.5)	451 (96.0)	32 (5.9)	15 (3.0)	25 (4.6)	12 (2.4)	9 (1.7)	3 (0.6)	12 (2.2)	17 (3.4)
Bit yourself	477 (88.7)	444 (89.2)	25 (4.6)	21 (4.2)	19 (3.5)	18 (3.6)	9 (1.7)	2 (0.4)	8 (1.5)	13 (2.6)
Picked body to bleed	445 (82.7)	431 (86.5)	31 (5.8)	17 (3.4)	21 (3.9)	23 (4.6)	18 (3.3)	5 (1.0)	23 (4.3)	22 (4.4)
Inserted object under skin	513 (95.4)	468 (94.0)	6 (1.1)	8 (1.6)	9 (1.7)	11 (2.2)	2 (0.4)	2 (0.4)	8 (1.5)	9 (1.8)
Tattooed yourself	529 (98.3)	474 (95.2)	6 (1.1)	7 (1.4)	1 (0.2)	5 (1.0)	—	5 (1.0)	2 (0.4)	7 (1.4)
Burned your skin	488 (90.7)	458 (92.0)	33 (6.1)	20 (4.0)	12 (2.2)	9 (1.8)	3 (0.6)	4 (0.8)	2 (0.4)	7 (1.4)
Pulled out own hair	473 (87.9)	491 (92.6)	27 (5.0)	14 (2.8)	22 (4.1)	9 (1.8)	5 (0.9)	3 (0.6)	11 (2.0)	11 (2.2)
Erased skin to bleed	530 (98.5)	483 (97.0)	2 (0.4)	3 (0.6)	2 (0.4)	3 (0.6)	—	1 (0.2)	4 (0.7)	8 (1.6)
East Coast (n = 245)										
Cut or carved skin	126 (96.9)	109 (94.8)	3 (2.3)	3 (2.6)	—	2 (1.7)	1 (0.8)	—	—	1 (0.9)
Picked at a wound	78 (60.0)	78 (67.8)	23 (17.7)	25 (21.7)	19 (14.6)	6 (5.2)	5 (3.8)	4 (3.5)	5 (3.8)	2 (1.7)
Hit yourself	115 (88.5)	110 (95.7)	6 (4.6)	4 (3.5)	6 (4.6)	—	1 (0.9)	—	2 (1.5)	1 (0.9)
Scraped skin to bleed	125 (96.2)	111 (96.5)	2 (1.5)	—	2 (1.5)	3 (2.6)	—	—	1 (0.8)	1 (0.9)
Bit yourself	118 (90.8)	111 (96.5)	9 (6.9)	3 (2.6)	2 (1.5)	—	1 (0.8)	—	—	1 (0.9)
Picked body to bleed	117 (90.0)	105 (91.3)	7 (5.4)	5 (4.3)	2 (1.5)	3 (2.6)	1 (0.8)	—	3 (2.3)	2 (1.7)
Inserted object under skin	129 (99.2)	110 (95.7)	1 (0.8)	3 (2.6)	—	1 (0.9)	—	—	—	1 (0.9)
Tattooed yourself	126 (96.9)	110 (95.7)	3 (2.3)	4 (3.5)	1 (0.8)	1 (0.9)	—	—	—	—
Burned your skin	119 (91.5)	112 (97.4)	8 (6.2)	2 (1.7)	2 (1.5)	1 (0.9)	1 (0.8)	—	—	—
Pulled out own hair	122 (93.8)	109 (94.8)	7 (5.4)	1 (0.9)	1 (0.8)	2 (1.7)	—	1 (0.9)	—	2 (1.7)
Erased skin to bleed	129 (99.2)	114 (99.1)	1 (0.8)	1 (0.9)	—	—	—	—	—	—

Note. West Coast data are for 538 female participants and 498 male participants. East Coast sample data are for 130 female participants and 115 male participants. A dash indicates empty cells.

Zero-Inflated Poisson Path Analyses

NSSI. We used procedures within the Mplus program (Version 4.1; Muthén & Muthén, 1998–2006) to determine if and how parental criticism contributed to the occurrence of NSSI (i.e., “0” representing noninjurers, “1” representing all NSSI values greater than zero) and to the frequency of NSSI once initiated (i.e., the specific value of NSSI greater than zero). The presence of a mediated pathway through parental alienation was examined in

models, which showed a significant effect of criticism prior to the inclusion of the mediating pathway. The presented figures include tests of mediating paths through parental alienation.

Among girls in the West Coast sample, perceived parental criticism was associated with an increased probability of engaging in NSSI ( $B_{P(NSSI)} = 0.11$ ,  $SEB = 0.02$ ,  $p < .05$ , 95% CI = 0.07, 0.16) but was not related to the frequency of NSSI once initiated ( $B_{Frequency} = 0.02$ ,  $SEB = 0.01$ ,  $ns$ ). When parental alienation was added to the baseline model (see Figure

Table 2  
Descriptive Data for Independent and Dependent Variables by Sample and Gender

Variable	West Coast				East Coast				Univariate ANOVA		
	Female participants		Male participants		Female participants		Male participants		F sample	F gender	F Sample × Gender
	M	SD	M	SD	M	SD	M	SD			
Criticism	10.02	4.29	9.47	3.51	8.71	3.31	7.60	2.94	6.71**	4.63*	1.06
Alienation	15.65	5.01	13.84	4.29	13.47	3.76	15.08	3.88	17.63***	38.41***	24.22***
Delinquency	5.39	4.15	5.69	4.18	5.90	3.98	5.58	3.43	0.33	1.10	0.69

Note. West Coast data are for 530 female participants and 486 male participants. East Coast data are for 111 female participants and 100 male participants. F statistics with (1, 1166) degrees of freedom were used for testing each effect. \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

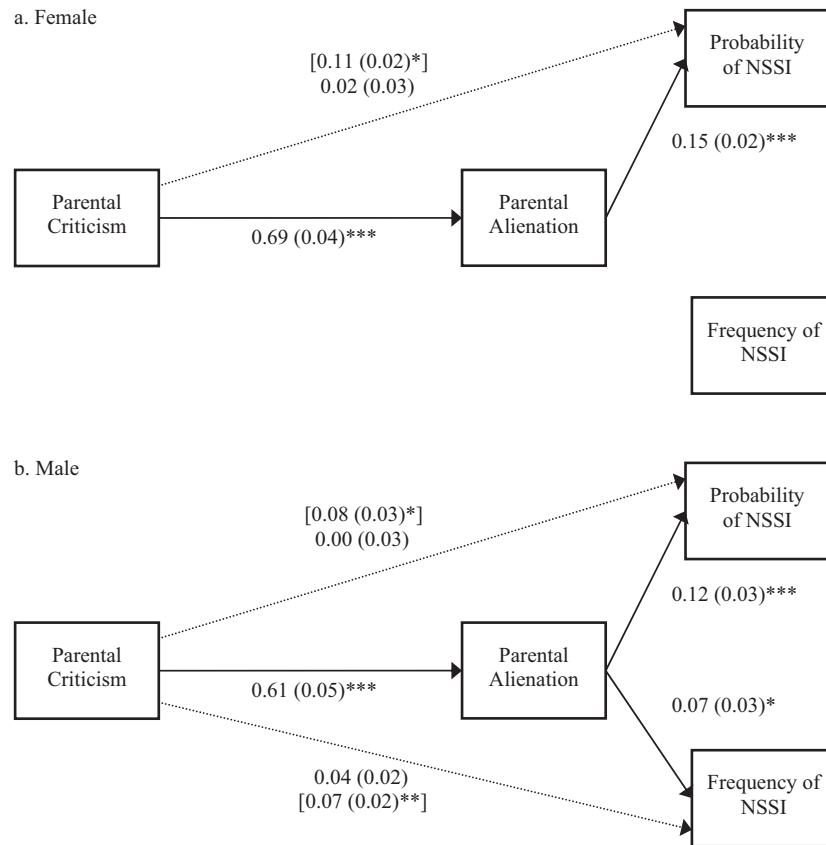


Figure 1. Zero-inflated Poisson path analysis predicting the impact of parental criticism on the probability and frequency of NSSI via alienation for female participants ( $n = 514$ ; top) and for male participants ( $n = 465$ ; bottom) in the West Coast sample. Coefficients reflect unstandardized point estimates, with standard errors of the estimate in parentheses. Coefficients prior to mediation are in brackets. NSSI = nonsuicidal self-injury. \* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

1, top), the direct relation between parental criticism and the probability of NSSI was no longer significant ( $B_{P(NSSI)} = 0.02$ ,  $SEB = 0.03$ ,  $ns$ , 95% CI =  $-0.03, 0.07$ ). In this model, the indirect path through parental alienation ( $B_{Alienation} = 0.69$ ,  $SEB = 0.04$ ,  $p < .001$ ;  $B_{Alienation \rightarrow P(NSSI)} = 0.15$ ,  $SEB = 0.02$ ,  $p < .001$ ) accounted for much of the direct relation between parental criticism and an increased probability of NSSI.

Among boys in the West Coast sample, perceived parental criticism was associated both with an increased probability of NSSI ( $B_{P(NSSI)} = 0.08$ ,  $SEB = 0.03$ ,  $p < .05$ , 95% CI =  $0.02, 0.13$ ) and with greater repetition of NSSI once initiated ( $B_{Frequency} = 0.07$ ,  $SEB = 0.02$ ,  $p < .01$ , 95% CI =  $0.04, 0.11$ ). In the mediated model (see Figure 1, bottom), neither the direct path from parental criticism to the probability of any NSSI ( $B_{P(NSSI)} = 0.00$ ,  $SEB = 0.03$ ,  $ns$ , 95% CI =  $-0.06, 0.07$ ) nor the direct path from parental criticism to the frequency of NSSI ( $B_{Frequency} = 0.04$ ,  $SEB = 0.02$ ,  $ns$ , 95% CI =  $-0.01, 0.08$ ) was significantly different from zero. As among girls, the indirect path between parental criticism and an increased probability of NSSI through parental alienation ( $B_{Alienation} = 0.61$ ,  $SEB = 0.05$ ,  $p < .001$ ;  $B_{Alienation \rightarrow P(NSSI)} = 0.12$ ,  $SEB = 0.03$ ,  $p < .001$ ) accounted for much of the direct relation between parental criticism and the probability of NSSI obtained in the initial model. Similarly, the

indirect path between parental alienation and the frequency of NSSI ( $B_{Alienation} = 0.61$ ,  $SEB = 0.05$ ,  $p < .001$ ;  $B_{Alienation \rightarrow Frequency} = 0.07$ ,  $SEB = 0.03$ ,  $p < .05$ ) accounted for a proportion of the direct relation between parental criticism and the repetition of NSSI found in the initial model.

Similar to results for the cross-sectional models obtained in the West Coast sample, perceived parental criticism in Grades 6–8 increased the likelihood of being a self-injurer 6 years later among girls in the East Coast sample ( $B_{P(NSSI)} = 0.13$ ,  $SEB = 0.07$ ,  $p < .05$ , 95% CI =  $0.01, 0.26$ ) but was not related to the frequency of girls' NSSI once initiated ( $B_{Frequency} = 0.04$ ,  $SEB = 0.05$ ,  $ns$ ). When parental alienation in Grades 9–11 was added to the baseline model (see Figure 2), the direct path between perceived parental criticism in middle school and the probability of NSSI in 12th grade dropped to nonsignificance ( $B_{P(NSSI)} = 0.08$ ,  $SEB = 0.08$ , 95% CI =  $-0.08, 0.25$ ).

Among boys, perceived parental criticism in middle school increased the likelihood of being an injurer 6 years later, though only marginally ( $B_{P(NSSI)} = 0.14$ ,  $SEB = 0.08$ ,  $p < .10$ ), and was not related to the frequency of boys' NSSI once initiated ( $B_{Frequency} = 0.04$ ,  $SEB = 0.04$ ,  $ns$ ). Because these initial effects did not reach standard levels of statistical significance, mediated models were not examined among boys in the East Coast sample.

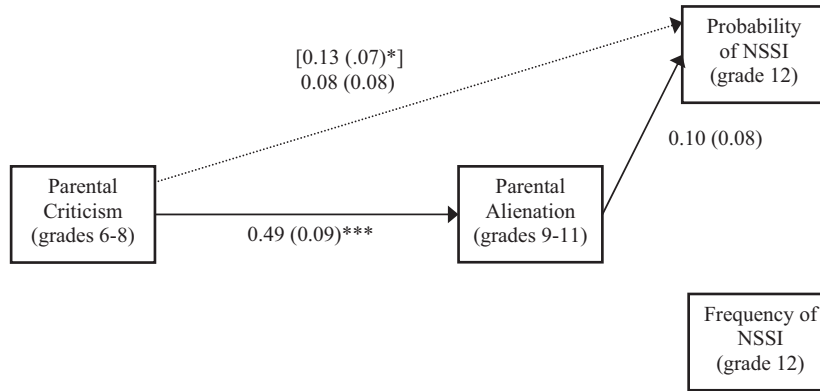


Figure 2. Zero-inflated Poisson path analysis predicting the impact of parental criticism on the probability and frequency of NSSI via alienation for female participants ( $n = 111$ ) in the East Coast sample. Coefficients reflect unstandardized point estimates, with standard errors of the estimate in parentheses. Coefficients prior to mediation are in brackets. NSSI = nonsuicidal self-injury. \* $p < .05$ . \*\*\* $p < .001$ .

*Delinquent behavior.* Among girls in the West Coast sample, the level of perceived parental criticism was significantly related to increased rule-breaking behavior ( $B_{Rule} = 0.29, SEB = 0.05, p < .001, 95\% CI = 0.19, 0.37$ ). When parental alienation was added to the baseline model (see Figure 3, top), the direct relation between parental criticism and rule-breaking behavior dropped to nonsignificance ( $B_{Rule} = 0.07, SEB = 0.06, 95\% CI = -0.05, .019$ ) as a result of the indirect path through parental alienation ( $B_{Alienation} = 0.68, SEB = 0.04, p < .001; B_{Alienation \rightarrow Rule} = 0.32, SEB = 0.06, p < .001$ ).

Among boys in the West Coast sample, the level of perceived parental criticism was significantly related to increased rule-breaking behavior ( $B_{Rule} = 0.24, SEB = 0.06, p < .001, 95\% CI = 0.12, 0.36$ ). When parental alienation was added to the baseline

model (see Figure 3, bottom), the direct relation between parental criticism and rule-breaking behavior dropped to nonsignificance ( $B_{Rule} = 0.02, SEB = 0.07, 95\% CI = -0.12, 0.15$ ). The indirect path through parental alienation ( $B_{Alienation} = 0.60, SEB = 0.05, p < .001; B_{Alienation \rightarrow Rule} = 0.36, SEB = 0.05, p < .001$ ) accounted for much of the direct relation between parental criticism and increased rule-breaking behavior among boys.

As in the cross-sectional models obtained in the West Coast sample, perceived parental criticism in Grades 6–8 contributed to increased rule-breaking behavior 6 years later among girls in the East Coast sample ( $B_{Rule} = 0.23, SEB = 0.07, p < .001, 95\% CI = 0.09, 0.38$ ). Unlike in the West Coast sample, however, when parental alienation in Grades 9–11 was added to the baseline model (see Figure 4, top), the direct path between parental criti-

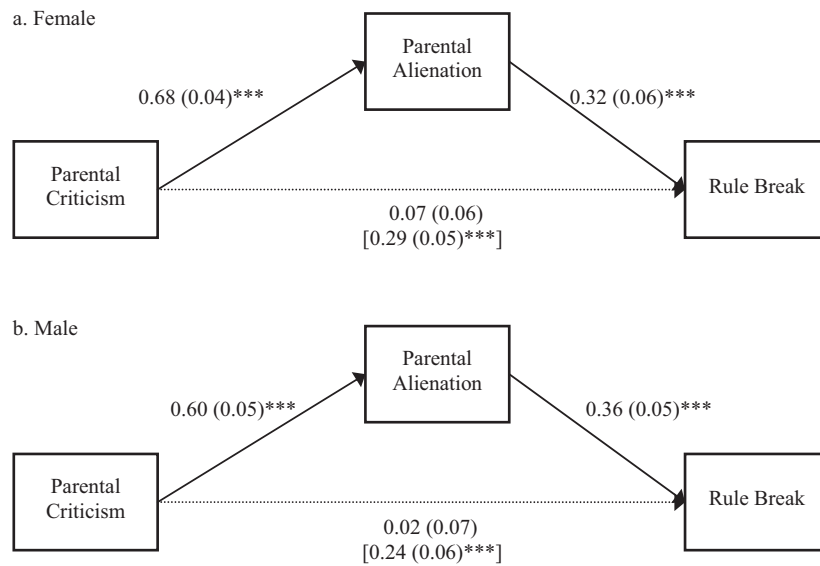


Figure 3. Path analysis predicting the impact of parental criticism on rule-breaking behavior via alienation for female participants ( $n = 514$ ; top) and for male participants ( $n = 464$ ; bottom) in the West Coast sample. Coefficients reflect unstandardized point estimates, with standard errors of the estimate in parentheses. Coefficients prior to mediation are in brackets. \*\*\* $p < .001$ .

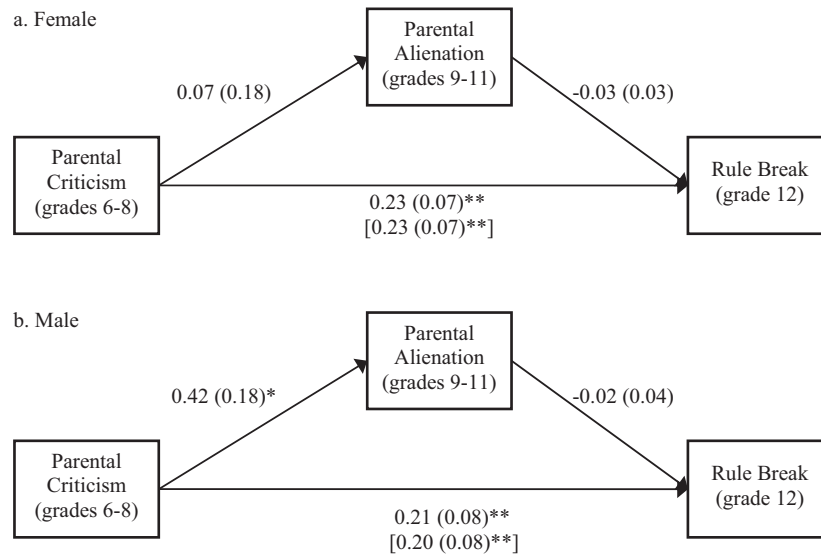


Figure 4. Path analysis predicting the impact of parental criticism on rule-breaking behavior via alienation for female participants ( $n = 123$ ; top) and for male participants ( $n = 111$ ; bottom) in the East Coast sample. Coefficients reflect unstandardized point estimates, with standard errors of the estimate in parentheses. Coefficients prior to mediation are in brackets. \* $p < .05$ . \*\* $p < .01$ .

cism in middle school and rule-breaking behavior in 12th grade remained significant ( $B_{\text{Rule}} = 0.23$ ,  $SEB = 0.07$ ,  $p < .01$ , 95% CI = 0.09, 0.38). The pathways making up the indirect effect through parental alienation were not significant ( $B_{\text{Alienation}} = 0.07$ ,  $SEB = 0.18$ ;  $B_{\text{Alienation} \rightarrow \text{Rule}} = -0.03$ ,  $SEB = 0.03$ ).

A similar pattern was found among boys in the East Coast sample, with perceived parental criticism in middle school contributing to increased rule-breaking behavior 6 years later ( $B_{\text{Rule}} = 0.20$ ,  $SEB = 0.08$ ,  $p < .01$ , 95% CI = 0.05, 0.35). When parental alienation in Grades 9–11 was added to the baseline model (see Figure 4, bottom), the direct path between perceived parental criticism in middle school and rule-breaking behavior in 12th grade remained significant ( $B_{\text{Rule}} = 0.21$ ,  $SEB = 0.08$ ,  $p < .01$ , 95% CI = 0.06, 0.36). This result follows from the pathways making up the indirect effect through parental alienation being weak or nonsignificant ( $B_{\text{Alienation}} = .42$ ,  $SEB = 0.18$ ,  $p < .05$ ;  $B_{\text{Alienation} \rightarrow \text{Rule}} = -0.02$ ,  $SEB = 0.04$ ,  $ns$ ).

## Discussion

### The Phenomenology of NSSI Among “Privileged” Youths

NSSI emerged as a prominent and recurrent phenomenon among the 1,300 children of highly educated, white-collar professionals examined here. Nearly a third of these adolescents reported engaging in NSSI during the previous year, with approximately three quarters of injurers endorsing recurrent episodes of NSSI. These rates are higher than those observed in most other school settings (Laye-Gindhu & Schonert-Reichl, 2005; Muehlenkamp & Guttierrez, 2004; Ross & Heath, 2002) and may reflect one or more factors. First, heightened media attention to NSSI in recent years may have contributed to increased rates of NSSI and/or to youths' comfort with reporting it. Second, the FASM, which was used to measure NSSI in this study, captures a wider range of self-injury

methods than do other measures of NSSI (e.g., body picking, skin scraping, and self-biting), which renders it highly sensitive but perhaps overly inclusive. Finally, rates of NSSI may, in fact, be elevated among upper-middle-class, suburban youths, perhaps as a function of increased pressure to contain their emotions and achieve at superior levels (Luthar & Becker, 2002).

Rates of NSSI were especially pronounced among the West Coast participants, which may qualify the generalizability of these findings. As mentioned previously, the current study was invited by school leaders in this suburban community following a series of self-destructive behaviors among local adolescents during the preceding year. It is impossible to ascertain if or how these community events may have influenced adolescents' NSSI as reported here, but they certainly warrant cautious interpretation of these high endorsement rates. Beyond community experience effects, however, much of the observed difference in NSSI rates between the West and East Coast samples may follow from the unique design features of these studies. The West Coast students were assured that their survey responses would remain anonymous, whereas the East Coast students were advised that their responses were connected with their identity and that the research team was required to report instances of significant concern for a student's safety. Thus, youths in the East Coast sample may have been more reluctant to disclose NSSI than were their West Coast counterparts. The comparable rates of delinquent behavior reported in the West and East Coast samples suggest that student reports of NSSI may be especially sensitive to data collection procedures. Despite concerns about the generalizability of these findings, the data clearly suggest that all is not well among these purportedly “privileged” and protected youths.

Beyond sample effects, gender emerged as a salient influence on rates and methods of NSSI. Although reports of NSSI were elevated among girls, the boys in these samples endorsed significant



levels of NSSI. These findings replicate data from other community samples, which suggest that gender differences in rates of NSSI are more modest than previously thought (Garrison et al., 1993; Gratz et al., 2002; Tyler et al., 2003). These data point to the need for increased research and clinical attention to NSSI among boys, particularly given current evidence that gender may moderate self-injurious pathways. Similarly, there is a need for greater consideration of ethnic differentials in NSSI, given the suggestion here and elsewhere that some groups may be at disproportionately high or low risk for NSSI (Gratz, 2006; Lipschitz et al., 1999; Marshall & Yazdani, 1999; Nada-Raja et al., 2004).

### *Parental Criticism, Alienation, and NSSI*

Beyond the descriptive level, the present findings generally support the proposed motivational pathway from parental criticism to NSSI via negative relationship representations (i.e., parental alienation). Perceived parental criticism statistically predicted NSSI in both the cross-sectional and the longitudinal samples. Moreover, adolescents' reported sense of alienation toward parents emerged as a salient process explaining these relations. In the West Coast sample, parental alienation accounted for much of the relation between perceived parental criticism and the initiation of NSSI among both girls and boys, as well as for the frequency of NSSI among boys. Longitudinal patterns in the East Coast sample provided preliminary support for the directionality of this motivational pathway. Discrepant patterns in the West and East Coast samples may reflect regional variations, distinct developmental patterns and processes, and/or unstable parameter estimates due to the small size of the East Coast sample. Although there is a need for replication studies to confirm these directional interpretations, the data support the assertion that critical parenting may contribute to negative representations of others, thereby decreasing youths' motivation to turn to others in times of duress and increasing the likelihood of NSSI as a self- and body-based coping strategy.

However, the specificity of this motivational pathway to NSSI was not supported in this study. Significant paths from perceived parental criticism to delinquent behavior via parental alienation revealed that these are important processes for understanding both self- and other-directed distress and aggression. Perceived parental criticism was related to rule-breaking behavior among girls and boys, and parental alienation played a mediating role in these relations in the West Coast sample. As with NSSI, these patterns were less consistent in the longitudinal East Coast sample, but there was preliminary support for their directionality.

Overall, the present findings are consistent with the extant literature on the role of expressed emotion, particularly parental criticism, on rates and patterns of clinical dysfunction among youths (Asarnow, Tompson, Woo, & Cantwell, 2001; McCarty et al., 2004; Wedig & Nock, 2007), as well as with recent work demonstrating the contribution of alienation to youth maladaptation (O'Donnell, Schwab-Stone, & Ruchkin, 2006; Sankey & Huon, 1999). However, this study examined a single developmental pathway, and its limited statistical power precluded the consideration of protective and/or vulnerability processes that may moderate (or mediate) these relations. For example, many of the youths who reported parental criticism in this study may have experienced overt forms of maltreatment as well. Future research must investigate other processes that influence pathways from

adverse caregiving experiences to specific forms of psychopathology. Moreover, issues of specificity remain to be clarified with respect to factors that influence pathways toward different kinds of outcomes (e.g., NSSI vs. delinquency), as well as to those factors that may underlie a specific outcome in various developmental contexts (e.g., NSSI in adolescence vs. adulthood).

### *Strengths and Limitations*

Notwithstanding the unique and complementary strengths of these cross-sectional and longitudinal, process-oriented analyses, these findings should be considered in the context of the unique features of this investigation. As noted above, this study evaluated only one developmental pathway from critical parenting to NSSI. Furthermore, although the use of youth self-reports in this study was informed by a wealth of literature pointing to the value of adolescent self-reports in studies of parent-adolescent interaction quality (De Ross, Marrinan, Schattner, & Gullone, 1999), such data have limitations, particularly when self-reports are used as the sole method of data collection (Schwartz, 1999). The mono-method, single-informant research design in this investigation may introduce concerns about shared method variance, despite the removal of shared variance across predictors in these multivariate analyses. These findings await replication in future studies using multiple methods (e.g., family observation) and informants (e.g., parents, teachers).

Our data offer a valuable view into the lives of upper-middle-class, suburban youths, but the unique features of the communities may constrain the generalizability of the present findings to other settings. For example, the measure of perceived parental criticism used here is closely connected to broader constructs related to perfectionistic tendencies and parental expectations. Thus, the present findings may reflect the undue influence of parental pressure in a context of high-achievement orientation, rather than (or in addition to) critical parenting per se. Alternatively, as with most school-based samples, these findings may be biased toward health, as more maladaptive adolescents may have refused to participate, dropped out of high school, or been enrolled in an alternative educational milieu at the time of data collection.

As discussed previously, the present findings may reflect features unique to the measure of NSSI in this study. Although the FASM has been employed in several empirical studies to date (Guertin et al., 2001; Nock & Prinstein, 2004, 2005), it is in the early stages of psychometric evaluation and validation. Moreover, this study did not include the functional portion of the FASM, which may have compromised its reliability and validity. In addition to being unable to examine functional aspects of NSSI in these samples, it is important to note, we were not able to verify that the self-injurers in this sample met the full criteria for NSSI, because we did not ask about suicidal intent.

Finally, the limited statistical power of the longitudinal analyses in this investigation constrained our ability to issue firm statements about the temporal patterning of the obtained results. Similarly, we were not able to ascertain whether patterns of NSSI differed as a function of maternal versus paternal criticism and/or of a youth's perceived alienation from mother, father, or both parents (Luthar & Latendresse, 2005). The limited size of the East Coast sample in combination with the sophistication and computational demands of the current analyses required to account for the distributional

properties of the NSSI outcome may have occluded meaningful patterns in the data. Nevertheless, we believe that ZIP regression models offer an important analytic option in future studies of NSSI.

The pattern of NSSI observed here is typical of that seen in other community settings in which the preponderance of participants deny NSSI, yielding scores of zero, and a subset of respondents endorse various rates of NSSI. Researchers have long struggled to work with these kinds of nonnormal distributions; typically, they impose categorical cutoffs to dichotomize NSSI as absent or present or to trichotomize it as absent, present, or recurrent (Low et al., 2000; Whitlock et al., 2006; Yates et al., in press). However, categorical approaches may obscure meaningful distinctions in levels of NSSI, and they often rely on arbitrary frequency cutoffs. ZIP regression models offer a computationally demanding yet appropriate alternative to traditional analytic approaches. With this modeling paradigm, it is possible to hypothesize different precursors, mechanisms, and consequences regarding the initiation of NSSI versus its maintenance, escalation, or desistance over time. Thus, ZIP modeling provides a powerful tool to inform intervention efforts, as it can identify personal, social, ecological, and/or physiological forces that increase the relative resilience or fragility of individuals with regard to the initiation and/or maintenance of specific behaviors, such as a NSSI.

### Clinical Implications

Clinical guidelines for practice related to NSSI have emerged over the past 5–10 years (Evans, 2000; Muehlenkamp, 2006). Building on the cognitive–behavioral work of Linehan and others (e.g., Linehan, Armstrong, Suarez, Allmon, & Heard, 1991), these approaches tend to emphasize the individual as the clinical focus. However, this investigation highlights the relevance of subtle family dynamics as salient influences on development and as promising targets for therapeutic intervention. These data suggest that incorporating the broader family system into the treatment of adolescent injurers through family therapy or concurrent parent education may provide incremental utility to more traditional treatments.

Beyond attending to the parent–adolescent relationship, the present findings suggest that treatments that adopt a critical- or shame-based approach to practice may inadvertently reinforce a heretofore unrecognized force underlying NSSI. Parents, teachers, and clinicians often localize NSSI within the adolescent, as they fail to recognize that NSSI follows from multivariate transactions between the adolescent and her or his environments. Thus, applied work with self-injuring youths must incorporate psychoeducation to help parents and other stakeholders recognize the multifaceted psychosocial systems, including NSSI, that influence adolescent behavior. Moreover, strength-based approaches to treatment will empower caregivers to effect positive changes in their families and communities to support youths. Just as the family or community environment may instantiate vulnerabilities to NSSI, so too might these systems buffer or prevent such pathways. Research that clarifies processes that promote resistance to, or desistance from, pathological pathways toward NSSI will inform efforts to develop strength- and competence-based approaches to practice (Yates & Masten, 2004).

Still, even the best services will do little to help self-injurers if they are not utilized. It is rare for those who self-injure to seek psychological services (Whitlock et al., 2006), and this is likely to be especially true in adolescence, when youths have few resources to seek services independently. This reticence to seek services, coupled with the pernicious and pervasive tendency for clinicians, school administrators, policymakers, and parents to overlook signs of distress among high-achieving, high-income youths, is a recipe for disaster (Luthar, 2003). The present findings join a broader cadre of evidence that distress and pathology are thriving within seemingly pristine and protected communities. Moreover, the driving forces underlying adolescent NSSI among upper-middle-class, suburban youths (and likely other youths) extend beyond the individual to include the family system and, perhaps, broader systems of influence (e.g., peers, media). In closing, we echo prior calls to offer multifaceted services targeting these “privileged” yet pained youths, their families, and their communities (Luthar, 2003).

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