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The developmental psychopathology of self-injurious behavior: Compensatory regulation in posttraumatic adaptation

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Abstract

This article utilizes a developmental psychopathology framework to explicate one pathway, originating in childhood traumatic experience, toward the development of self-injurious behavior (SIB). The descriptive psychopathology of SIB is summarized first, followed by an overview of theoretical interpretations of SIB within psychoanalytic, neo-analytic, behavioral, and biological paradigms. Building on these empirical and theoretical foundations, a developmental psychopathology framework is used to model the development of SIB in the aftermath of childhood traumatic experience, particularly maltreatment. In this model, maltreatment undermines positive adaptation at motivational, attitudinal, instrumental, emotional, and/or relational levels of competence. In turn, vulnerabilities in the child's adaptive resources necessitate the application of alternative regulatory and relational strategies, such as self-injury, to the negotiation of contemporaneous and prospective developmental issues. The article concludes with a discussion of the empirical and clinical implications of a developmental understanding of SIB as a compensatory regulatory strategy in posttraumatic adaptation.

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We turn to the body because it cannot be denied. We get old, we die, we disintegrate into dust, but our living bodies are proof of our here-and-now existence in a world that is too often numb and confusing. (Hewitt, 1997, pp. 20–21)

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1. Introduction

There is a significant and growing body of empirical research on self-injurious behavior (SIB; see Feldman, 1988; Lester, 1972; Winchel & Stanley, 1991, for reviews). To date, however, the literature on SIB remains predominantly descriptive. There is a pressing need for a unifying theoretical framework to organize the extant data on SIB and to guide future research. Developmental psychopathology provides a conceptual framework for understanding SIB. In particular, the organizational theory of development (Cicchetti & Schneider-Rosen, 1986; Cicchetti & Sroufe, 1978; Sroufe, 1990b; Sroufe & Rutter, 1984) can contribute to a developmental understanding of the widely observed association between childhood trauma and SIB. Although self-injury manifests itself across an array of populations and a broad continuum of behaviors, the relation between childhood trauma and self-injury is particularly robust (Low, Jones, MacLeod, Power, & Duggan, 2000; van der Kolk, Perry, & Herman, 1991; Wiederman, Sansone, & Sansone, 1999).

This article reviews the empirical and theoretical literature on self-injury and introduces a developmental psychopathology model of SIB in the aftermath of childhood traumatic experience, particularly maltreatment. Section 2 provides an overview of the varied contexts within which SIB occurs and of issues pertaining to the classification and definition of pathological SIB. Section 3 reviews epidemiological and empirical research on the descriptive psychopathology of SIB. Section 4 summarizes diverse theoretical interpretations of SIB within psychoanalytic, neo-analytic, behavioral, and biological paradigms. Section 5 provides an overview of the developmental psychopathology perspective, as conceptualized within the organizational theory of development.

Section 6 explicates the role of childhood trauma in development with respect to its negative impact on multiple levels of competence (i.e., motivational, attitudinal, instrumental, emotional, and relational; see Sroufe, Egeland, & Carlson, 1999, for discussion). A developmental model clarifies how childhood traumatic experiences can instantiate vulnerabilities across core aspects of adaptive functioning. In turn, these vulnerabilities in adaptive resources predispose the individual to turn toward self-injury as a compensatory regulatory and relational strategy that enables the negotiation of future developmental issues. The article concludes with a discussion of empirical and clinical implications of a developmental psychopathology perspective on SIB to inform future research and intervention efforts.

2. Classification and definition

Favazza (1987/1996) was among the first scholars to articulate a meaningful distinction between SIB occurring in a ritualized or group context and pathological SIB. Rituals involving SIB (e.g., adolescent rites of passage) maintain the stability of the community and its social order. Although the modern body modifier engages in SIB (e.g., piercing, tattooing, branding) to mark her/himself as different from the mainstream culture (Myers, 1992; Sanders, 1989; Vale & Juno, 1989), modern body modifications, like ritualized self-injuries, are usually planned, decorative, and socially contextualized in a way that pathological SIB is not (Hewitt, 1997). The major difference between ritualized or group body modifications and pathological self-injury is the sociocultural and intrapsychic context: “one is a shared act of pride [or defiance]; the other a secretive act steeped in shame” (Gasperoni, 1998, p. 78).

2.1. *Classifying SIB*

Clinically significant, pathological SIB is deviant within the broader culture and lacks culturally shared meaning, although it may carry substantial individual meaning (Favazza, 1998). Menninger (1935, 1938) was the first to identify SIB as a meaningful action at the level of the individual. He categorized acts of pathological SIB along several dimensions, including the extent and form of psychological or physiological dysfunction caused by the injury, the meaning of the self-injury within a given cultural context, and the intrapsychic determinants of the behavior. Despite Menninger's early classification efforts, however, pathological SIB received relatively little attention until the late 1970s.

In 1979, Ross and McKay introduced a behavioral–descriptive approach to classification that emphasized the importance of distinguishing between direct SIB (e.g., cutting, biting, abrading, severing, inserting, burning, hitting, constricting) and indirect SIB (e.g., overeating, substance abuse, refusing medical treatment). In 1983, Pattison and Kahan expanded this classification scheme to include three dimensions of self-injury: direct–indirect, lethal–nonlethal, and repetitive–nonrepetitive. Classification efforts did not substantially improve upon Pattison and Kahan's system until Favazza and Rosenthal introduced their taxonomy for SIB in 1990.

Favazza's approach to classifying self-injury is the most comprehensive and widely accepted system to date (see Favazza & Simeon, 1995, for a review). The most recent edition of this taxonomy proposes four categories of self-injury: (1) stereotypic, (2) major, (3) compulsive, and (4) impulsive (Simeon & Favazza, 2001). *Stereotypic SIB* is characteristic of persons with pervasive developmental disorders and disabilities (e.g., autism, Rhetts's syndrome, Lesch–Nyhan syndrome, mental retardation, Cornelia de Lange syndrome). It is typically performed independently of the social context (e.g., in the presence of onlookers), is devoid of affective content (e.g., feeling, meaning, thought), and has a repetitive, rhythmic, driven quality. *Major SIB* includes dramatic and striking examples of mutilation (e.g., autocastration, self-enucleation) that result in permanent and severe tissue damage. Major self-injury usually occurs as an isolated event during a psychotic episode. *Compulsive SIB* subsumes repetitive or ritualistic behaviors that occur many times daily (e.g., hair pulling, nail biting, scratching). It is usually categorized as an impulse control disorder in contemporary psychiatric nosology (e.g., trichotillomania). *Impulsive SIB* may be episodic or repetitive. Episodic SIB involves intermittent self-injurious events (e.g., cutting, burning, self-hitting) that typically precipitate tension release and mood elevation. Over time, impulsive episodic SIB may become repetitive, taking on an addiction-like quality for the individual as s/he becomes increasingly preoccupied with SIB. This article focuses on the developmental psychopathology of impulsive SIB, in both episodic and repetitive forms, because it typifies SIB that occurs independently of pervasive developmental disorders or disabilities. However, it is likely that these developmental processes are involved in other kinds of SIB, and self-destructive behaviors in general (e.g., eating disorders, sexual risk taking, substance abuse), to varying degrees.

2.2. *Defining SIB*

Defining SIB presents a challenge because it subsumes a broad continuum of behaviors that appear across numerous clinical and nonclinical populations (see Putnam & Stein, 1985, for a review). Indeed, the plethora of labels assigned to this class of behaviors reflects the ongoing

confusion and uncertainty about its definition. SIBs have been labeled self-mutilation, autoaggression, symbolic wounding, self-attack, self-inflicted violence, self-abuse, focal suicide, attempted suicide, suicidation, suicidal gestures, parasuicide, antisuicide, wrist-cutting syndrome, wrist slashing, deliberate self-cutting syndrome, self-assault, carving, indirect self-destructive behavior, and deliberate self-harm (see Hyman, 1999; Ross & McKay, 1979; Simeon & Favazza, 2001, for reviews). The use of the term self-injury in this article reflects a desire to recognize all methods of direct self-injury, and to refrain from making assumptions about the intent or value of the behavior.

Many conceptualizations of pathological SIB have blurred the distinction between self-injury, suicide, and attempted suicide. Menninger (1938), for example, described self-injury as a “focal suicide” in which suicidal impulses are displaced onto a part of the body that represents the whole person. In 1977, Kreitman introduced the term *parasuicide*, which forged a strong and enduring association between these two classes of behavior. Interpretations of SIB as a derivation of suicide remain prominent, but they are being gradually supplanted by a recognition that SIB may reflect a psychic compromise that prevents or delays suicide, hence the term “antisuicide” (Ross & McKay, 1979; Simpson, 1975, 1980). Although many researchers still confound self-injury with suicidal behavior (e.g., Barnes, 1985; Campbell & Hale, 1991; Green, 1978; Haw, Hawton, Houston, & Townsend, 2001), contemporary research has distinguished SIB from suicidal behavior along several dimensions, including intent, mode of injury and its lethality, chronicity, and age of onset (Brown, Comtois, & Linehan, 2002; Gardner & Cowdry, 1985; Motz, 2001; Pattison & Kahan, 1983; Sabo, Gunderson, Najavits, Chauncey, & Kisiel, 1995; Stone, 1987).

Despite these distinctions, SIB and suicide are at times related. Persons who self-injure are significantly more likely to suicide (Walsh & Rosen, 1988), and suicidal ideation has been found in 28–41% of self-injury cases (Gardner & Cowdry, 1985; Jones, Congin, Stevenson, Straus, & Frei, 1979; Pattison & Kahan, 1983). Still, upward of 85% of self-injurious events are undertaken with the primary goal of releasing tension, rather than of ending life (Gardner & Gardner, 1975; Jones et al., 1979).

Similar definitional issues arise with respect to the distinction between SIB and masochism, particularly sadomasochism in sexual contexts. To the extent that sadism involves taking pleasure in another’s pain, and masochism entails the derivation of satisfaction from subjecting oneself to harm, SIB may include elements of both with the individual acting as both sadist and masochist in the same instance. However, both sadism and masochism describe relations between suffering and satisfaction in an interpersonal context, whereas impulsive SIB usually occurs in isolation from other individuals (Baral, Kora, Yuksel, & Sezgin, 1998; Gasperoni, 1998; Pao, 1969). Thus, the “distinction also should be made between masochistic behavior, which involves another person provoked to inflict physical or moral pain on the subject, and self-cutting [or self-injury more broadly], an affair with minimal interpersonal involvement” (Siomopoulos, 1974, p. 89).

In sum, contemporary definitions of pathological SIB include the specification that the destruction or alteration of body tissue occurs in the absence of conscious suicidal intent (Favazza, 1998; Motz, 2001; Walsh & Rosen, 1988). Although some definitions emphasize the deliberateness of self-injurious acts (i.e., “deliberate” self-harm; Morgan, 1979), intentionality is not specified in the definition of SIB presented here because these injuries may not be “intentional” when they occur in an altered state of consciousness (i.e., dissociation). For clarity, and in lieu of a better term, impulsive SIB is used to describe the category of behavior that is the focus of this article. However, it is important to recognize that SIB may be the product of considerable planning and foresight.

Moreover, the extent to which the deliberateness and impulsiveness of SIB vary across different contexts may be meaningful and remains to be explored. In this article, SIB refers to *self-inflicted, direct, socially unacceptable* destruction or alteration of body tissue that occurs in the *absence of* conscious suicidal intent or pervasive developmental disorder. Thus, the current definition of SIB does not include acts of self-starvation, self-poisoning, substance abuse, refusal of medical treatment, excessive risk taking, or other forms of indirect self-harm, nor does it include the kinds of stereotypic SIB that characterize populations with pervasive developmental disorders and delays.

3. Descriptive psychopathology

3.1. Phenomenology

Descriptive studies indicate that self-injurious episodes are usually preceded by a perceived loss or threat of loss. This threat of loss elicits mounting anxiety and tension that the person is unable to verbalize. Experiences of dissociation and/or depersonalization often precede the urge to self-injure, which may or may not be resisted. The act of self-injury is typically carried out in the absence of pain, and is usually followed by tension relief and a temporary return to normalcy until the cycle begins again (Darche, 1990; Feldman, 1988; Liebenluft, Gardner, & Cowdry, 1987; Pao, 1969; Rosenthal, Rinzler, Walsh, & Klausner, 1972; Simpson, 1975; Walsh & Rosen, 1988; Winchel & Stanley, 1991).

Although individuals tend to adopt a preferred method of injury, most employ several modalities over time (Briere & Gil, 1998). In a questionnaire-based study of 250 self-identified, self-injurers, 78% of the respondents, 96% of whom were women, reported using multiple methods of self-harm (Favazza & Conteiro, 1988). Among the respondents in this study, cutting was the most frequently reported method of direct injury (72%), followed by burning (35%), self-hitting (30%), and interference with wound healing (22%). There is no research that specifically examines the phenomenology of SIB among males.

3.2. Prevalence

Rates of impulsive SIB appear to be increasing across both clinical and community populations (Boyce, Oakley-Browne, & Hatcher, 2001; Walsh & Rosen, 1988), yet its actual prevalence remains difficult to ascertain. Prior studies have been either overinclusive or underinclusive in defining SIB (see Walsh & Rosen, 1988, for discussion), with some including drug overdoses, self-poisonings, and suicide attempts (e.g., Boyce et al., 2001; Myers, 1982; Whitehead, Johnson, & Ferrence, 1973), and others defining SIB in terms of specific behaviors such as wrist-cutting (e.g., Pao, 1969; Wiessman, 1975).

Early reports by Favazza and Conteiro (1988) estimated the prevalence of SIB in the general population to be about 750 per 100,000 persons annually, although they noted that the prevalence is likely higher (~ 1800 per 100,000) among persons aged 15–35. In a recent study, Briere and Gil (1998) found that 4% of a general population sample of 927 survey respondents and 21% of a clinical sample of 321 patients (inpatient and outpatient) reported SIB. Even more striking prevalence rates of 12% and 14% have been obtained in college and high school samples, respectively (Favazza, DeRosear, & Conterio, 1989; Ross & Heath, 2002). The lifetime prevalence of impulsive SIB in the general

population is approximately 10–15%, with about 5–10% of individuals engaging in repeated episodes of SIB. As discussed below, however, it is important to recognize that the incidence of impulsive SIB varies across different populations.

3.3. *Sociodemographics: Gender, age, race, and class*

One of the most consistent findings in the literature on SIB is that women are 1.5–3 times more likely to self-injure than men (Favazza, 1999; Robinson & Duffy, 1989; Shea & Shea, 1991). These findings should be interpreted cautiously, however, because the extant literature derives primarily from psychiatric samples, where women tend to be overrepresented. Recent data, using various samples, reveal less pronounced gender differences (Briere & Gil, 1998; Callias & Carpenter, 1994; Pattison & Kahan, 1983). There is minimal research on SIB in male populations, and virtually no research on males who self-injure outside of incarcerated samples (Bach-y-Rita, 1974; Chowanec, Josephson, Coleman, & Davis, 1991; Zweig-Frank, Paris, & Guzder, 1994a).

The prevalence of SIB also varies across different age groups, peaking during late adolescence and early adulthood. Clery (2000) found that 21% of 363 referrals to an adolescent psychiatric inpatient unit between 1997 and 1999 involved adolescents who used violence against their own bodies without intending to kill themselves. Other researchers have observed rates as high as 40–60% among adolescent populations (Darche, 1990; DiClemente, Ponton, & Hartley, 1991). Rates of SIB tend to decline in middle adulthood in both clinical and community samples (Briere & Gil, 1998), although recent research indicates that rates of SIB remain prominent in later adulthood as well (Sansone, Gaither, & Songer, 2002). Pathological impulsive SIB is rarely expressed before puberty. Self-injurious episodes typically have their onset in adolescence (e.g., 12–14) and recur to varying degrees for a period of years before diminishing in middle adulthood (Favazza, 1999; Favazza & Conteiro, 1988; Pao, 1969). There is some evidence that SIB may emerge in the course of two distinct pathways, a severe pathway that begins in early childhood and persists throughout adulthood, and a less enduring pathway that begins in late adolescence and ages out in young adulthood (Dubo, Zanzarini, & Lewis, 1997; Nixon, Cloutier, & Aggarwal, 2002).

Whether or not race and socioeconomic status influence SIB has yet to be examined empirically. One hypothesis is that self-injury, like other forms of somatic pathology (e.g., eating disorders, pain disorders), is overrepresented among Caucasian individuals, particularly in upper- and middle-class economic brackets, but there has been no research on these relations to date. Although a few studies report higher rates of self-injury among Caucasian individuals (Jones, 1986; Ross & Heath, 2002; Shea & Shea, 1991; Turell & Armsworth, 2000), others reveal significant levels of self-injury in nonincarcerated, minority samples (Babiker & Arnold, 1997; Lipschitz et al., 1999; Marshall & Yazdani, 1999). Additional research using diverse samples is required to understand the complex relations among sociodemographic variables, particularly race and class, and self-injury.

3.4. *Comorbidity with psychiatric disorders*

SIB is usually conceptualized as an associated feature of another disorder in which self-destructive behavior is prominent (e.g., alcohol and drug abuse, eating disorders, personality disorders; see Tantam & Whittaker, 1993, for a review). In addition to populations with personality disorders or psychoses, rates of SIB are significant among adolescents (Clery, 2000; Darche, 1990), patients with

eating disorders (Alderman, 1997; Dulit, Fyer, Leon, Brodsky, & Frances, 1994; Favaro & Santonastaso, 1988, 1998; Favazza et al., 1989), and persons with posttraumatic stress disorder (PTSD; Kisiel & Lyons, 2001; Zlotnick, Mattia, & Zimmerman, 1999). The nonspecific association between SIB and psychiatric disorders has prompted some researchers and clinicians to suggest that SIB warrants a distinct diagnostic classification (e.g., Favazza, 1998). Alternatively, these relations may suggest that SIB is a nonspecific symptom of distress, rather than a specific disorder.

3.4.1. *Personality disorder*

Historically, SIB has been associated with Axis II disorders, particularly borderline personality disorder (BPD; e.g., Dubo et al., 1997; Dulit et al., 1994; Gardner & Cowdry, 1985; Schaffer, Carroll, & Abramowitz, 1982; Shearer, 1994). In 1969, Pao summarily stated that people who self-injure superficially (as compared to those who engage in major self-injury, who are typically psychotic) “should be categorically diagnosed as severe borderline states” (p. 196). In 1983, Pattison and Kahan asserted that the “early onset injurer,” defined as one who begins self-injuring prior to age 30, is almost always character disordered. Evidence of an association between BPD and SIB contributed to inclusion of “recurrent suicidal behavior, gestures, or threats, or self-mutilating behavior” as one of the nine core criteria comprising the BPD diagnostic classification in the current *Diagnostic and Statistical Manual of Mental Disorders* (American Psychiatric Association [APA], 2000, p. 710). Despite overwhelming support for the association between BPD and SIB, however, recent findings indicate that observed relations between SIB and BPD are probably exaggerated because SIB is a key criterion for the diagnosis of BPD (see Favazza, 1998, for a discussion).

3.4.2. *Dissociative disorder*

The role of dissociation is receiving more emphasis in a variety of psychiatric disorders and symptoms (Michelson & Ray, 1996), particularly SIB (Chu, 1991; Chu & Dill, 1990; Coons & Milstein, 1990; Low et al., 2000). Associations between SIB and PTSD, as well as between SIB and dissociative disorders are well established (Shearer, 1994; Zlotnick et al., 1999; Zlotnick, Shea, & Pearlstein, 1996). People who self-injure exhibit more dissociative symptoms than noninjurers (Briere & Gil, 1998; Kisiel & Lyons, 2001; Low et al., 2000; Zlotnick et al., 1996, 1999; Zweig-Frank, Paris, & Guzder, 1994b), and dissociative symptom levels strongly predict SIB (Brodsky, Clotire, & Dulit, 1995). Nevertheless, associations among trauma, dissociation, and SIB are complex. For example, some data suggest that the relation between dissociation and SIB holds only for particular methods of injury (e.g., cutting; van der Kolk et al., 1991). Still other findings indicate that dissociation is not related to SIB when abuse history is controlled (Zweig-Frank et al., 1994b). Several models of the interrelations among trauma, dissociation, and SIB are discussed in the final section of this article.

3.4.3. *SIB as a diagnostic entity*

Although SIB rarely occurs in isolation from other symptoms, and is typically viewed in terms of the particular disorder within which it is embedded (e.g., BPD, PTSD, dissociative disorders), recent efforts to secure a separate diagnostic classification for SIB warrant mention. Favazza (1998; Favazza & Rosenthal, 1993) is a persuasive advocate for a separate Axis I disorder of impulse control to account for the unique properties of a “repetitive self-harm syndrome.” As detailed previously, Favazza (1999) argues that, at some point in the progression of this putative disorder, episodic

impulsive SIB transforms into a repetitive syndrome, which is characterized by the individual's inability to control the frequency, and often the severity, of nonsuicidal, self-injurious actions. Although research has provided some support for Favazza's assertion (see [Tantam & Whittaker, 1993](#)), the alternative interpretation of SIB as a nonspecific symptom of psychological distress remains to be evaluated empirically. Currently, SIB is rarely considered a distinct diagnostic entity. When SIB is specified diagnostically, it is usually subsumed under the global category of "disorders of impulse control, not otherwise specified" ([APA, 2000](#)).

3.5. *Motivations and meanings*

Despite numerous anecdotal and qualitative reports on SIB, there are few empirical studies exploring individuals' motivations for engaging in SIB (see [Briere & Gil, 1998](#); [Favazza & Conteiro, 1989](#); [Osuch, Noll, & Putnam, 1999](#); [Wilkins & Coid, 1991](#), for notable exceptions). People report many reasons for engaging in SIB, including releasing tension, discharging anger toward the self and/or others, decreasing dissociative symptoms (especially depersonalization and numbing), self-medicating or self-soothing, establishing self-other boundaries, communicating distress, manipulating the interpersonal environment, and relieving feelings of alienation, isolation, and anguish ([Briere & Gil, 1998](#); [Simeon & Favazza, 2001](#)). [Osuch et al. \(1999\)](#) identified six motivational factors underlying SIB: (1) affect modulation (e.g., to decrease anger or fear, to punish oneself, to regain a sense of reality); (2) desolation (e.g., to keep bad memories away, to stop feeling empty); (3) punitive duality (e.g., to punish oneself for feeling good or for telling secrets, to obey command hallucinations); (4) influencing others (e.g., to express anger or seek revenge toward others, to show others how hurt one is); (5) magical control (e.g., to protect important people, to prevent one from hurting others); and (6) self-stimulation (e.g., to provide excitement or a "high," to diminish feelings of sexual arousal). The resultant Self-Injury Motivation Scale is the only available empirical assessment of motivational factors in SIB. However, it is important to recognize that the "motivations" of persons who self-injure may, in fact, represent post hoc behavioral attributions. SIB may not be "motivated;" rather, the injurer may use the language of motivation to rationalize her/his behavior. Still, the motivations (or rationales) reported by persons who self-injure appear meaningful.

The most parsimonious way to categorize motivations for SIB is to classify them as either interpersonal or intrapersonal in nature ([Guralnik & Simeon, 2001](#); [Podvoll, 1969](#)). *Interpersonal* motivations characterize SIB that aims to alter one or more features of the interpersonal environment, and *intrapersonal* motivations are involved when SIB is utilized as a regulatory strategy to quell intrapsychic distress. Ultimately, whether serving inter- or intrapersonal regulation, SIB carries the individual from one state of being into another, be that a physical or psychological state. Historically, the psychiatric literature has emphasized interpersonal motivations and meanings of SIB, particularly in relation to BPD. However, researchers and clinicians are becoming more cognizant of the intrapersonal regulatory functions of SIB. One hypothesis is that interpersonal motivations typify individuals with personality disorders, while intrapersonal motivations are more characteristic of SIB in the aftermath of traumatic experience. The considerable overlap between these two populations ([Herman, Perry, & van der Kolk, 1989](#); [Herman & van der Kolk, 1987](#); [Landecker, 1992](#); [Zanarini, Gunderson, & Marino, 1989](#)) may account for the finding that many persons who self-injure report both inter- and intrapersonal motivations across self-injurious episodes.

3.6. Etiology

Strong associations among trauma, dissociation, and SIB have prompted researchers to explore the relation between childhood trauma and SIB. The most common childhood experiential factors examined in the literature on SIB are parental loss or deprivation, chronic illness or major surgery, sexual or physical abuse, and emotional neglect (Briere & Gil, 1998; Favazza, 1999). The extant literature supports the assertion that some categories of SIB (i.e., those occurring among persons *without* psychotic or pervasive developmental disorders) are frequently associated with traumatic experience prior to the onset of puberty (van der Kolk et al., 1991).

The role of parental loss and deprivation is central to most theoretical accounts of psychopathology. Early experiences of deprivation in the caregiving milieu are associated with the emergence of self-destructive and self-stimulating behaviors among nonhuman primates (e.g., huddling, self-clasping, self-sucking, self-biting; Harlow, 1964; Harlow & Harlow, 1971; Kraemer, Schmidt, & Ebert, 1997; Mason & Sponholz, 1963; Mineka & Suomi, 1978; Sackett, 1965). For example, Cross and Harlow (1965) observed that macaque monkeys who were reared in isolation displayed sucking and chewing behaviors long after typical developmental ages and were equally likely to respond to external threat with self-directed aggression as with outward attack.

Similarly, research has consistently demonstrated that the loss of a parent or significant other in childhood is a significant predictor of SIB among humans (Asch, 1971; Carroll, Schaffer, Spensley, & Abramowitz, 1980; Friedman, Glasser, Laufer, Laufer, & Whol, 1972; Graff & Mallin, 1967; Kafka, 1969; Pao, 1969; Rosenthal et al., 1972; Simpson, 1975; van der Kolk et al., 1991; Walsh & Rosen, 1988). However, the mechanism(s) by which early deprivation contributes to later SIB remains to be determined. One hypothesis is that parental deprivation stymies the acquisition of adaptive regulatory skills in early development and predisposes the child to turn toward alternative regulatory strategies, such as SIB, in later development.

Early experiences that foster an association between pain and nurturance constitute another avenue toward SIB (Anzieu, 1989; Krueger, 1989). For example, frequent surgeries or serious illness in early life may merge nurturance with pain, a fusion that is recapitulated in the act of self-injury. In support of this hypothesis, Rosenthal et al. (1972) observed a modest relation between serious illness and/or major surgery in childhood and SIB in adolescence. However, although overrepresented among self-injuring individuals, chronic illness or surgery in childhood, in and of itself, does not appear to account for SIB.

Abuse and neglect in childhood are related to later self-injury in both clinical and community samples (Green, 1978; Low et al., 2000; Schaffer et al., 1982; Wiederman et al., 1999). Up to 79% of self-injurers retrospectively report a history of child abuse or neglect (Favazza & Conteiro, 1989; van der Kolk et al., 1991; Yaryura-Tobias, Neziroglu, & Kaplan, 1995). Preliminary prospective findings using longitudinal data replicate significant associations between early childhood maltreatment and adolescent SIB (Yates & Carlson, 2003). Recent advances in trauma research have prompted analyses of the relation between specific types of abuse or neglect and SIB. For example, some studies find different strengths of positive correlation between SIB and either physical abuse, sexual abuse, or neglect (Lipschitz et al., 1999; Wiederman et al., 1999). The strongest associations are between SIB and a history of sexual abuse (van der Kolk et al., 1991; Yates & Carlson, 2003).

The majority of the literature on the etiology of SIB has focused on the widely observed relation between sexual abuse and SIB (Crowe & Bunclark, 2000; Darche, 1990; Herman, 1992; Kinzl &

Biebl, 1992; Lipschitz et al., 1999; Zlotnick et al., 1996; see Zweig-Frank et al., 1994b, for a notable exception). This association is particularly pronounced in cases of intrafamilial abuse, especially parent–child incest (Gross, 1979; Grunebaum & Klerman, 1967; Simpson & Porter, 1981). Percentages of incest survivors who engage in SIB range from 17% (Babiker & Arnold, 1997; Briere & Zaidi, 1989) to 25% (Albach & Everaerd, 1992) to 58% (de Young, 1982).

Compared to sexual abuse, relatively little research has examined the role of physical abuse in the etiology of SIB. In an interesting study, Green (1978) found significantly higher rates of self-destructive behavior (i.e., self-mutilation, suicide attempts) among 59 physically abused children (ages 5–13) relative to two control groups (30 neglect cases and 30 controls). Forty-one percent of the physically abused children exhibited self-destructive behavior (including SIB and suicide attempts) versus 17% of the neglected children, and 7% of the controls. Although some studies find a relation between physical abuse and SIB (e.g., Carroll et al., 1980; van der Kolk et al., 1991; Wiederman et al., 1999), additional research is needed to explore this association in more detail.

Retrospective studies of parental deprivation and loss suggest that experiences of emotional neglect in childhood may contribute to later SIB. In a study of 71 adolescent inpatients, Lipschitz et al. (1999) found that emotional neglect was more strongly related to self-injurious outcomes than was either physical abuse or physical neglect. Although emotional neglect is associated with later SIB, observed relations are not as strong as those between sexual abuse and SIB (Dubo et al., 1997; Lipschitz et al., 1999). Green (1978) suggests that this may be because neglect tends to be uniformly distributed across all children in a family, whereas abusive experiences, particularly those of a sexual nature, tend to involve more scapegoating and targeting.

As with other maladaptive outcomes, the association between SIB and trauma is strongest in cases where there has been an extended period of abuse, perpetrated by a person known to the victim, and, in the case of sexual abuse, involving the use of force or penetration (see Cole & Putnam, 1992, for a review; Russell, 1986). Moreover, abuse in which the victim is vulnerable to feelings of self-blame (e.g., sexual abuse, particularly incest) may be uniquely associated with SIB (Shapiro, 1987). In a recent review of the literature on abuse and self-harm, Santa Mina and Gallop (1998) concluded that, although the strength of the relation between abuse and self-injury varies considerably across studies, “there is something specific about abuse when its nature is sexual and physically invasive that increases the risk [for self-harm]” (p. 799).

Several factors may account for the unique relation between child sexual abuse and SIB. First sexual abuse readily evokes dissociative defenses and posttraumatic symptoms, which, in turn, motivate and/or enable tension-reducing behaviors such as self-injury (Briere & Gil, 1998). Second, sexual abuse localizes trauma squarely in the domain of the body, which later serves as the target of self-harm. Third, intrafamilial sexual abuse is often accompanied by parental neglect or collusion that prevents the kinds of compensatory parenting experiences that may ameliorate the detrimental effects of other kinds of maltreatment.

As with other experiential risk factors (i.e., parental loss/deprivation, chronic illness/surgery), the processes that mediate observed associations between child maltreatment and self-injury remain to be determined. Dissociation, neurobiological reorganization, and affective dysregulation are among the processes that may underlie the association between maltreatment and SIB, but these relations require further empirical exploration.

4. Theoretical conceptualizations

This article introduces a developmental model of the relation between trauma and SIB that is grounded within the integrative framework of developmental psychopathology (Cicchetti, 1984; Rutter, 1996; Sroufe & Rutter, 1984). This section provides an overview of theoretical interpretations of SIB, particularly as it relates to childhood traumatic experience, within current psychological and biological paradigms. The developmental psychopathology perspective and its guiding principles, as they are conceptualized within the organizational theory of development, are introduced at the close of this section. Just as the preceding section provides the empirical foundation for a developmental psychopathology model of SIB, this section provides its theoretical foundation.

4.1. *Psychoanalytic perspectives on SIB*

The psychoanalytic perspective provided the first developmental interpretation of the influence of traumatic experience on human development. In Freud's (1926) later writings, he articulated a traumagenic model in which a traumatic event, characterized by the experience of helplessness, precipitates intense anxiety (i.e., "signal anxiety") that mobilizes the ego to avoid future encounters with potentially retraumatizing stimuli. This model provided a theoretical explanation of Freud's (1920) earlier concept of the *repetition compulsion*, which refers to the human motivation to avoid retraumatization at any cost, even if it means imposing aggression and suffering on the self. In this way, Freud suggested that traumatic experience can render the individual hypersensitive to potential cues of impending trauma. This hypersensitivity evokes a dysphoric and highly mobilizing state of anxiety that compels the individual to act immediately. In this perspective, SIB is viewed as a defense that is evoked by signal anxiety in an effort to avoid retraumatization.

Klein (1976) expanded upon Freud's concept of the repetition compulsion in his description of *reversal of voice*. In Klein's view, repeating experience enhances one's sense of control and facilitates experiential integration by reducing the imposed or alienating qualities of the original event. Thus, SIB may reflect the reversal of traumatic victimization into self-generated persecution with the aim of gaining both a sense of mastery over the initial experience, as well as a capacity to integrate it.

Psychoanalytic theory also drew attention to the importance of levels of consciousness in the processing of experience. Writing during the same period as Freud, and on the periphery of the psychoanalytic tradition, Janet (1889) proposed that intense affective stimulation renders an event traumatic because defenses, such as dissociation, prevent its integration with cognition. Janet believed that adaptation in the context of prior trauma requires the formation of a personal narrative through verbal exchanges with oneself and with others. Dissociation, he argued, interferes with the formation of a personal narrative because it necessitates a "narrowing of consciousness" such that traumatic events cannot be associated and integrated with other experiences (Mollon, 1996; van der Hart & Horst, 1989). Interpreted in this way, an analytic account of self-injury might posit that early trauma results in a predisposition toward intense anxiety and defensive processes to control it (i.e., dissociation). In turn, these render the individual more reliant on somatic representations of experience (i.e., SIB) because symbolic adaptive strategies have been stymied (see Fonagy, Steele, Moran, Steele, & Higgitt, 1991; Fonagy & Target, 1995, 1997, for more discussion).

4.2. *Neo-analytic perspectives on SIB*

Contemporary adaptations of psychoanalysis (i.e., object relations, attachment, and psychosomatic theories) posit that, rather than inner drives and conflicts, internalized experiences of early relationships shape subsequent adaptation. Broadly stated, neo-analytic theorists emphasize the role of the caregiver as an emotional and behavioral regulator for the child. Disruptions in this dyadic regulation contribute to later psychopathology by undermining the child's development of key adaptive skills (e.g., the capacity to regulate emotion and behavior). Neo-analytic theories vary, however, with respect to the particular features of early relationships that they emphasize, and the mechanism(s) proposed to account for relations between the quality of early caregiving and later adaptation.

4.2.1. *The object relations perspective*

In the object relations perspective, SIB is viewed as a maladaptive strategy for self-preservation that is necessitated by the demands and shortcomings of the early caregiving relationship. In the context of an inadequate parental "holding" environment, the object relationist argues, the child may fail to develop a coherent and genuine sense of self (Winnicott, 1965, 1971). In this view, trauma (i.e., the caregiver's failure to provide adequate nurturance and protection) necessitates the premature maturation of the "false" self, which protects the "true" self by preventing its spontaneous and creative expression.

Departing from a Jungian perspective, Kalsched (1996) provides a compelling case for how and why trauma leads to SIB as a way to prevent or forestall retraumatization. In discussing the inward response of the psyche to overwhelming life events, Kalsched argues that trauma evokes dissociative defenses that form the core of a "dyadic self-care structure." This structure consists of the regressed infantile part of the ego on the one hand, and the precocious caretaking part of the ego on the other. Similar to Winnicott's "false" self, the caretaking part of the self-care system strives to protect the regressed self at all costs, going so far as to traumatize the inner world of the psyche to avoid retraumatization in the outer world if necessary. Thus, while Winnicott conceived of the "false" self as the caretaker and protector of the "true" self, Kalsched expands this concept to recognize that this precocious side of the self-care system may become persecutory in the service of self-preservation. In sum, the object relations paradigm conceptualizes self-injury as a behavioral strategy mobilized by the "false" self, the precociously developed outgrowth of traumatic experience, in a desperate effort to protect the inner core of personality, the "true" self, from harm.

4.2.2. *The attachment perspective*

Attachment theory holds that the organization of the infant-caregiver relationship gives rise to self-organization over the course of the first 2 years (Sroufe, 1989b). Repeated interactions in the attachment relationship scaffold the child's emergent sense of self, expectations of others, and, ultimately, her/his capacity to engage in reciprocal and empathic relationships. In addition, patterns of dyadic interaction and regulation in early development entrain excitatory and inhibitory processes in the brain that underlie the child's capacity for arousal modulation. Thus, regulatory patterns originating in the dyadic caregiving relationship strongly influence the child's emergent competence across multiple levels of adaptation (Main & Solomon, 1990; Sroufe, 1995).

In the context of the attachment relationship, the child internalizes a sense of the caregiving other as reliable or unreliable, as protective or threatening, and a complementary perception of the self as deserving or undeserving of care, as effective or inept at eliciting adequate nurturance, support, and

protection. These internalized representations form the basis of working models of the self, of others, and of the self-with-others that guide future behavior and shape subsequent experiences in the interpersonal milieu (Bowlby, 1969/1982). The securely attached child will develop positive expectations of both the self and others with respect to eliciting nurturance and obtaining comfort. In contrast, the insecurely attached child will likely develop negative relational expectations that her/his efforts to elicit care will be rebuffed (i.e., avoidant), that her/his need for comfort cannot be gratified (i.e., resistant), or that summoning a caregiver will be frightening (i.e., disorganized; Ainsworth, Blehar, Waters, & Wall, 1978; Hesse & Main, 2000).

The attachment system mobilizes the child to flee from threat and toward an attachment figure for protection and comfort (Bowlby, 1969/1982). Thus, in the face of a frightening caregiver, the child is confronted with “a biologically channeled paradox: the simultaneous needs to approach, and take flight from, the parent” (Hesse & Main, 2000, p. 1118). Maltreated infants experience “fright without solution” in their caregiving environment, which contributes to a collapse in attentional and behavioral strategies for coping with distress (Hesse & Main, 1999; Main & Solomon, 1990). Maltreated infants are at especially high risk for developing a disorganized attachment (Carlson, Cicchetti, Barnett, & Braunwald, 1989). The behavioral manifestations of this breakdown in attachment organization (i.e., stilling, freezing, contradictory, or incomplete behaviors) bare a striking phenotypic resemblance to later manifestations of dissociative defensive patterns (Liotti, 1999; Main & Morgan, 1996). Liotti (1992) suggests that disorganized attachment in infancy may render the child more vulnerable to dissociative defenses in the face of subsequent trauma. In support of this assertion, Carlson (1998) found that disorganized attachment in infancy predicted dissociative behaviors and experiences from middle childhood to adolescence (see also Ogawa, Sroufe, Weinfield, Carlson, & Egeland, 1997).

In sum, attachment theory yields two distinct hypotheses pertinent to SIB. First, insecure attachment may render the child more vulnerable to SIB in later development because the child adopts negative expectations of the self, of others, and of the self in relation to others. These negative expectations isolate the child from the social world and its supports, particularly in the immediate aftermath of stressful or traumatic events. Second, disorganized attachment may be one mechanism by which traumatic experience in the caregiving environment is translated into adaptational vulnerabilities, such as dissociation, that contribute to later SIB (Carlson, 1998; Liotti, 1992, 1999; Ogawa et al., 1997).

4.2.3. The psychosomatic perspective

Psychosomatic theorists contend that the first and primary developmental challenge that the child encounters “is the formation of a stable, integrated, cohesive mental representation of one’s body—a core body image: what is inside, what is outside, and clear, distinct boundaries between the two” (Krueger, 1989, p. 101; see also Anzieu, 1989). In this view, the emergent distinction between self and nonself, which later becomes self versus others, originates in the bodily distinction between what is within and what is outside of oneself. Untoward features of the caregiving environment (e.g., intrusive caregiving, empathic unavailability) disrupt the child’s development of a cohesive body self.

Psychosomatic theorists hypothesize that persons who lack a cohesive body representation must rely on external referents of their boundaries, identity, and worth. In this paradigm, SIB is interpreted as an attempt to resolve body-based conflict that results from poorly defined self–other boundaries (Cohen & Mills, 1999). SIB illustrates that “just as the psychological ego can turn against itself, becoming self-

critical and self-depriving [e.g., Kalsched, 1996], so the body ego may turn on itself destructively either in conscious, or ‘accidental,’ self-harm” (Attias & Goodwin, 1999, p. 157).

4.3. Behavioral perspectives on SIB

Behavioral hypotheses dominate the literature on SIB among populations with pervasive developmental disorders or delays (e.g., autism, mental retardation; see Mace, Vollmer, Progar, & Mace, 1998, for a review). There are two core learning theories that have been applied to the study and treatment of SIB: Bandura’s (1973) social learning perspective, which focuses on observational learning and modeling as primary mechanisms of behavioral acquisition (see also Bandura & Walters, 1963) and Skinner’s (1953) operant perspective, which emphasizes the importance of patterns of reinforcement in shaping and maintaining behavior. The most popular behavioral hypothesis combines these two perspectives. In this view, SIB *emerges* out of modeling and vicarious learning experiences, but is *maintained* by reinforcement contingencies (Suyemoto, 1998).

Bandura’s (1973) social learning hypothesis emphasizes the roles of modeling, imitation, and vicarious learning, in understanding the onset of SIB. In this view, individuals may learn about SIB and its “benefits” by observing the behavior of influential others in peer, familial, or broader cultural settings (e.g., media). Social learning processes may contribute to the individual’s initiation of SIB, which is then reinforced by both external and internal contingencies. Social learning theory is particularly relevant to understanding social contagion issues in self-injury, which are discussed in the final section of the article.

Skinner’s (1953) operant perspective suggests that SIB is maintained by reinforcement contingencies. In the case of *negative reinforcement*, Skinner asserted that persons might “expose themselves to aversive stimulation [e.g., SIB] if, by doing so, they avoid even more aversive consequences” (cited in Sandler, 1964, p. 201). Animal studies provide strong support for this hypothesis. In an unpublished study by Sandler and Quagliano (summarized in Baumeister & Rollings, 1985), monkeys who were trained to depress a lever to avoid a shock continued to press the lever even when the lever pressing was later paired with a shock. These data demonstrate the strength of SIB in the service of receiving the lesser of two aversive stimuli. Applying a similar interpretation to self-injury among humans, Favazza and Contei (1989) suggest that dissociation, with its attendant feelings of fragmentation and depersonalization, may be more aversive than SIB, which may function to terminate a dissociative episode (see also Millon & Davis, 1998).

In the *positive reinforcement* paradigm, engagement in SIB leads to the acquisition of a desirable outcome. This secondary gain hypothesis posits that the act of self-injury may elicit a desired reward in the form of attention, sympathy, or favored status. Altering positive reinforcement contingencies surrounding SIB is a popular and effective treatment approach, particularly when interpersonal motivations appear to underlie SIB (Walsh & Rosen, 1988). However, SIB is also influenced by intrapsychic reinforcement contingencies, such as tension reduction and self-stimulation, which may be more resistant to traditional behavioral treatment approaches (Faye, 1995).

4.4. Biological perspectives on SIB

Recent gains in the fields of neuroscience, physiology, and endocrinology have the potential to make significant contributions to our understanding of the relation between trauma and SIB. Extreme stress

elicits multiple neurochemical responses, including the release of cortisol, epinephrine, norepinephrine, vasopressin, oxytocin, and endogenous opioids (De Bellis, Baum, et al., 1999; De Bellis, Keshavan, et al., 1999; Gunnar, 2000; Schore, 2002; Siegel, 1999; van der Kolk, 1994). Several of these neurochemical systems have been implicated in self-injury (see Schroeder, Oster-Granite, & Thompson, 2002, for a review). However, most research on the neurobiology of SIB has examined stereotypic SIB in populations with pervasive developmental disorders or delays. The applicability of these data to traumatized populations remains to be determined. In particular, the contribution of noradrenergic and dopaminergic systems to SIB in traumatized and psychiatric populations remains largely unexplored. In contrast, the serotonergic and opioid systems are consistently implicated in the initiation and maintenance of SIB in both developmentally disordered and psychiatric populations.

4.4.1. *The serotonin hypothesis*

Research has demonstrated associations among decreased serotonergic function and increased impulsivity, aggression, suicidality, and, more recently, SIB (Kraemer et al., 1997; Spont, 1992). Simeon et al. (1992) conducted a study comparing self-injurious patients with personality disorders to personality disordered, noninjuring controls on measures of serotonergic function, aggression, impulsiveness, and other psychopathology variables. Serotonergic function did not differ between the two groups. However, *within* the self-injuring group, SIB and impulsiveness correlated negatively with imipramine binding. These data suggest that self-injury is associated with lower levels of presynaptic serotonin release, but it is unclear whether serotonergic dysfunction contributes to the severity of SIB, rather than to its presence or absence. It is notable that Simeon et al. did find an absolute difference in serotonin levels between injuring and noninjuring patients when they eliminated all the participants who had histories of suicide attempts from the study. The available research suggests that the relation between serotonergic function and SIB is complex, likely involves other systems, and requires further empirical evaluation (Coccaro, Kavoussi, & Cooper, 1997; Kraemer et al., 1997; Tiefenbacher, Novak, Jorgensen, & Meyer, 2000).

4.4.2. *The endogenous opioid hypothesis*

The endogenous opioid system (EOS) has been implicated in both the etiology and maintenance of SIB (see Konicki & Shulz, 1989; Symons, 2002, for reviews). Attention turned to the EOS as data increasingly indicated that, regardless of mode of injury, impulsive SIB is often accompanied by partial or complete analgesia during the act of injury (Liebenluft et al., 1987; Novotny, 1972; Rosenthal et al., 1972; Ross & McKay, 1979; Roy, 1978). Bohus et al. (2000) examined the relation between subjective distress and analgesia during a self-injurious event among 12 females with BPD who were evaluated under two conditions: one of self-reported calm and one of self-reported distress associated with a desire to self-injure. BPD patients who reported analgesia during self-injury episodes demonstrated lower levels of pain sensitivity than controls (19 healthy, noninjuring women). Furthermore, this reduction in pain sensitivity was significantly greater when the individual was in a state of self-described distress than when calm, although both conditions were associated with greater pain tolerance than the control participants. Interestingly, the BPD-calm group demonstrated greater pain tolerance than the controls, despite reporting equivalent levels of distress and dissociative symptoms. These data support a role for stress-induced analgesia, but they also indicate that analgesia may reflect, at least in part, a neurosensory reorganization in the EOS, perhaps resulting from early experience (Grossman & Siever, 2001).

There are two prominent hypotheses regarding the involvement of the EOS in SIB (see Grossman & Siever, 2001, for a review). The *addiction hypothesis* posits that the EOS is repetitively stimulated through recurrent, impulsive SIB producing a positively reinforcing elevation in mood. Over time, the individual becomes increasingly tolerant to the mood-elevating influence of SIB-induced opioid release, and it becomes necessary to engage in more frequent and/or more severe SIB to achieve the desired mood-altering outcome. The *pain hypothesis* posits that individuals who engage in SIB have an altered EOS, either congenitally or because of experience-based neurochemical alterations in early development, that mediates reduced pain sensitivity (see van der Kolk, 1989, for further discussion). Empirical studies of the role of the EOS in SIB are ongoing and have yielded mixed results (see Russ, Roth, Kakuma, Harrison, & Hull, 1994; Russ et al., 1992).

4.5. Summary

Diverse theoretical paradigms have considered the relation between trauma and SIB. Initially, scholarly writings on SIB were predominantly psychoanalytic, emphasizing intrapsychic drives and conflicts. It was not until the 1960s and 1970s, that psychoanalytic interpretations of SIB were supplanted by a growing recognition among neo-analytic theorists of the contribution of early relational experiences in the caregiving environment to psychopathology. Object relations and attachment theorists, with their focus on the role of internalized representations of self, others, and self–other relationships in development, introduced an appreciation for the influence of the quality of the early caregiving environment on development. More recently, psychosomatic theory has provided a new perspective on the influences of bodily representations on developmental adaptation. Alongside the psychoanalytic and neo-analytic traditions, behavioral and biological theories have yielded several informative hypotheses about SIB, particularly among populations with pervasive developmental disorders and delays. Developmental psychopathology provides a framework within which these diverse theoretical accounts of SIB can be integrated.

5. Developmental psychopathology

Developmental psychopathology has established itself as a powerful perspective for exploring adaptation, maladaptation, and the interactions between them (e.g., Cicchetti & Toth, 1997; Rutter, 1996; Sameroff, 2000; Sroufe & Rutter, 1984). Broadly stated, the foundation of the developmental psychopathology perspective is an appreciation for the way knowledge in one domain (e.g., typical development or biology) can further that in another (e.g., atypical development or psychosocial experience; Burack, 1997; Cicchetti, 1990b, 1993; Sroufe, 1990a; Sroufe & Rutter, 1984). This recognition enables developmental psychopathology to establish connections among traditionally disparate fields of inquiry (Cicchetti & Toth, 1995). Despite its integrative nature, however, the developmental psychopathology perspective rests on several core assumptions about patterns of adaptation across time and contexts; these assumptions are articulated within the organizational theory of development (Cicchetti & Cohen, 1995; Sroufe, 1979; Sroufe & Rutter, 1984).

5.1. *The organizational model*

The organizational theory of development defines adaptation with respect to the quality of integration within and among the biological and behavioral systems of the individual (Cicchetti, 1990a). Positive adaptation occurs when the integration of biological, socioemotional, cognitive, and representational capacities promotes the flexible negotiation of both contemporaneous and future developmental issues. Maladaptation (i.e., psychopathology) occurs when a deviation from normal patterns of adaptation compromises subsequent development (Cicchetti, 1993; Egeland, Carlson, & Sroufe, 1993; Sroufe, 1989a, 1989b; Waters & Sroufe, 1983). Just as positive adaptation is probabilistically associated with the subsequent successful negotiation of salient developmental issues, maladaptation is associated with later deficits in the ability to negotiate these issues (Cicchetti & Schneider-Rosen, 1986; Sroufe, 1997). In this way, the quality of individual adaptation represents the shared influence of both contemporaneous experience and development up to that point (Sroufe & Fleeson, 1986). Moreover, because the relations among successive adaptations are probabilistic, rather than deterministic, the organizational model also accommodates individual differences in patterns of adaptation over time. Thus, a single developmental starting point may yield divergent outcomes (i.e., multifinality), and different patterns of early adaptation may converge on a single developmental endpoint (i.e., equifinality; see Cicchetti & Rogosch, 1996, for a discussion).

As applied to the study of trauma, the organizational theory of development recognizes that the individual's experience, interpretation, and recovery from trauma may vary as a function of her/his developmental status at the time of the traumatic event (Eth & Pynoos, 1985). For example, van der Kolk et al. (1991) found that abuse in adolescence was associated with suicide attempts and anorexia, but not with SIB, which was associated with maltreatment in early childhood. However, the organizational theory of development does more than reify well-established developmental patterns (i.e., early trauma affects development differently than later trauma) because it explains how and why these patterns occur.

Theoretically, traumatic experience will effect the greatest developmental change at periods of major reorganization and integration among the biological and behavioral systems of the individual. The timing of trauma is important, both with respect to chronology, but also relative to the integrative position of the individual. For example, when compared to a typical 8-year-old, a newborn is apt to appear relatively impervious to some overwhelming experiences (e.g., natural disasters) and relatively vulnerable to others (e.g., loss of a parent). Similarly, one might predict that maltreatment will be especially detrimental to a child who is in the initial phase of constructing her/his worldview, relative to a child who has already developed a stable sense of the world and its workings. In this way, the organizational model moves beyond broad generalizations and platitudes to offer specific hypotheses about when and why particular developmental phenomena occur. Because the organizational theory can account for global developmental patterns and pathways, as well as individual differences within them, it provides a valuable lens through which hypotheses about the developmental psychopathology of SIB may come into focus.

5.2. *Applying developmental theory to SIB*

The developmental psychopathology perspective, as conceptualized in the organizational theory, is particularly well suited to the study of SIB for several reasons. First, SIB ranges along a continuum from normal behavior (e.g., nail biting) to psychopathology (e.g., impulsive SIB). Understanding the developmental processes that contribute to an individual's placement along this continuum requires a

theory that appreciates the integral connection between normal and disordered developmental pathways. Second, the organizational theory is particularly useful for conceptualizing disorder as it relates to changes in developmental status over time. Within this framework, for example, researchers can address the question of why SIB becomes increasingly prominent during adolescence and diminishes in frequency during adulthood. Third, the integrative nature of developmental psychopathology and the flexibility of its organizational theory enable the use of extant theoretical interpretations to inform testable hypotheses about SIB within an overarching conceptual framework. Finally, the organizational theory of development encourages researchers to focus on the meaning and function of behavior over time, rather than exclusively on form. In this way, a developmental psychopathology model can explain how and why the developmental origins of SIB lie in non-self-injurious patterns of adaptation. Recognizing the coherence of development, and allowing for equifinality and multifinality among developmental pathways, the developmental psychopathologist can account for unique processes that underlie the development of SIB, as well as the fact that many individuals do not manifest SIB despite experiential risk.

6. A developmental analysis

In the organizational theory of development, psychopathology is conceptualized as developmental deviation from otherwise normative developmental processes and pathways (Sroufe, 1989a). Therefore, the developmental model of the relation between trauma and SIB presented herein focuses on the negative impact of trauma on levels of competence that typify normative development. This model emphasizes trauma-induced deficits in adaptive functioning that contribute to the emergence of SIB as a compensatory strategy for relational and regulatory adaptation. Specifying the kinds of adaptational vulnerabilities that arise from trauma will shed light on the functional and adaptational significance of SIB in the aftermath of traumatic experience. In this model, SIB emerges from trauma-induced disruptions in adaptive skill development as a compensatory strategy for regulatory and relational adaptation. Thus, SIB fulfills an adaptive function for the developmentally vulnerable individual.

6.1. Five levels of adaptation

Adopting an organizational theory of development, Sroufe, Egeland, and Carlson (1999) identified five core levels of competence that contribute to the successful negotiation of developmental issues. These levels do not represent discrete domains of adaptation. Rather, they capture key themes or dimensions of competence that interact and transact to form the foundation of the individual's subsequent adaptive functioning.

First, at the *motivational* level, the competent child holds positive expectations about relationships with others that motivate her/him to seek out interpersonal connections in the future. The child feels that s/he can rely on others, and derives pleasure from companionship and connectedness with social partners. Second, *attitudinal* competence forms the foundation of self-esteem and self-worth. The competent child views her/himself as worthy of, and effective in eliciting, the care and responsiveness of important others. Third, at the instrumental level, positive adaptation is predicated on specific skills that enable the successful negotiation of salient developmental issues. The instrumentally competent child can elicit and engage the support necessary for successful adaptation. Fourth, the competent child

possesses a strong *emotional* base that enables flexible and effective arousal modulation, impulse control, and adaptation to the demands of the environment. Finally, at the *relational* level of competence, the child possesses capacities to apprehend the rules of social reciprocity, and establish and maintain genuine empathic connections with others. In addition to other resources, self–other boundaries strongly influence the child’s relational competence because the formation of reciprocal and empathic relationships requires a clear understanding of where the self ends and another begins.

6.2. A traumagenic hypothesis

Over the past 20 years, empirical and theoretical understanding of the effects of childhood trauma in various developmental domains (e.g., biology, cognition, self-development, and attachment) has grown considerably. The bulk of this research examines the developmental sequelae of child maltreatment (see Cicchetti & Toth, 1995, for a review). Maltreatment negatively influences normative developmental processes, including the emerging sense of self (e.g., self–other distinctions, body image, personal narrative, and self-representation), affect regulation and impulse control (e.g., aggression against self and/or others, dissociation, and memory), and relational patterns (e.g., distrust, rejection sensitivity, distancing, and isolation; see Browne & Finkelhor, 1986a, 1986b; Cole & Putnam, 1992; Mollon, 1996; van der Kolk & Fislser, 1994, for reviews). Thus, maltreatment, and childhood trauma more broadly, has the capacity to undermine positive adaptation at each level of competence.

The developmental pathway from early traumatic experience to SIB presented here draws on the empirical and theoretical literature reviewed in the preceding sections, and the principles of developmental psychopathology, as articulated in the organizational theory of development. In this model (see Fig. 1),

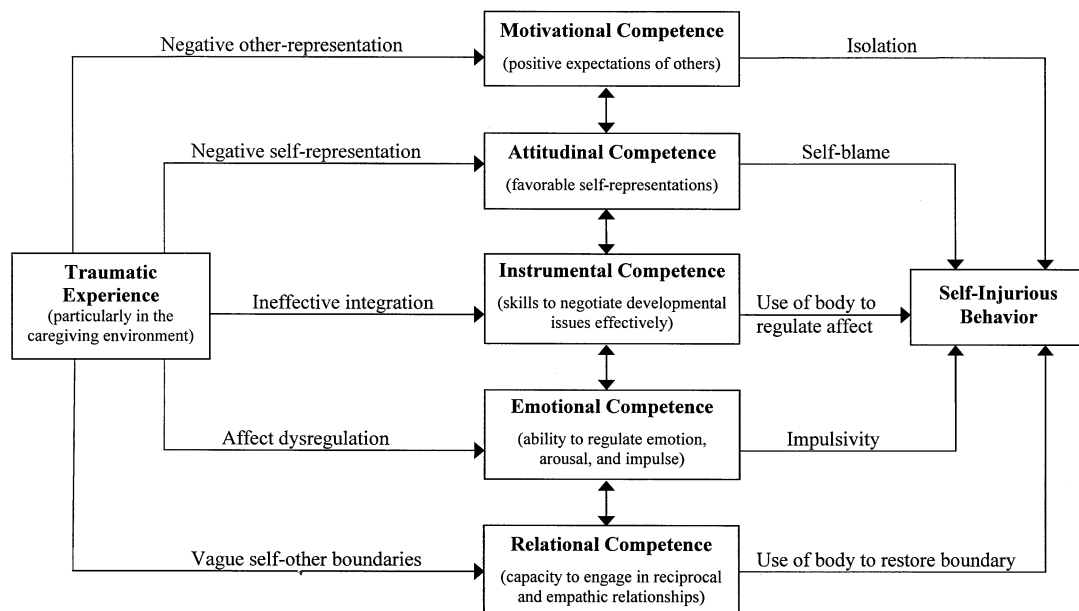


Fig. 1. Schematic representation of a developmental model of the relation between childhood trauma and self-injurious behavior.

traumatic experience in early childhood, particularly in the context of the caregiving relationship, compromises the quality of the individual's adaptation at motivational, attitudinal, instrumental, emotional, and/or relational levels of competence. In turn, these vulnerabilities in adaptive functioning contribute to SIB, which acts as a compensatory regulatory and relational strategy to facilitate the individual's negotiation of developmental challenges despite prior adaptational vulnerabilities.

6.3. The motivational base

Experiences in the primary caregiving relationship contribute to relational expectations that guide future behavior (Bowlby, 1969/1982; Sroufe & Fleeson, 1986). In the context of a warm and responsive caregiving environment, the child develops positive expectations of others and of her/himself in relation to others. In contrast, an intrusive, hostile, or rejecting caregiving environment fosters negative self and other representations (Fonagy, Target, & Gergely, 2000; Sroufe, 1989b, 1990b). In the case of maltreatment, for example, the child expects that important others will be unavailable and/or ineffective soothing agents during times of distress; therefore, s/he will likely behave in ways that preclude relational experiences that might otherwise engender alternative attitudes and expectations (e.g., wariness, manipulation, aggression, withdrawal; Crittenden, 1990).

When abuse is perpetrated against a child by a primary caregiver, good and bad become fused into one relationship, one experience (Levenkron, 1998). Over time, pain and the body–self become the most reliable and trustworthy relationship in the individual's grasp. Thus, maltreatment may render the child vulnerable to using the body, particularly abuse of the body, as a tool for reducing her/his sense of isolation and achieving an illusion of connectedness. Moreover, the child's negative expectations of future relationships render this representational schema impervious to modification via restorative relationships. SIB may compensate for deficits at the motivational level of competence by providing a sense of connectedness following the negative impact of maltreatment on the individual's relational expectations, and/or a sense of nurturance and soothing to the self in lieu of more meaningful and enriching interpersonal connections.

6.4. The attitudinal base

“At the core of ourselves is the representation of how we were seen” by caregivers (Fonagy et al., 2000 p. 109; see also Sroufe & Fleeson, 1986). In the context of a warm and supportive caregiving relationship, the child will develop a sense of her/himself as potent, worthy, and capable of eliciting care and nurturance. This child will manifest attitudinal competence; s/he will likely be resourceful, independent, curious, and confident in subsequent negotiations with environmental challenges (Sroufe, 1989b). In contrast, a history of rebuffing or insensitive care undermines the child's emergent attitudes toward the self, and, by extension, her/his adaptive functioning (Sroufe, 1990b).

The abused child cannot externalize the toxic components of the maltreating caregiver without sacrificing her/his developmental need to view the parent as a source of protection and safety (Westen, 1994). Thus, to preserve a semblance of safety and security in the caregiving relationship, and by extension in the self, the maltreated child may internalize a sense of self-hatred and contempt to protect her/his idealized, and developmentally necessary, image of the caregiver (Levenkron, 1998). Klein (1976) clarified this reversal in his observation that “wishing to destroy the restraint, but appreciating the danger of doing so, the [maltreated] child comes to turn his vengeance on that part of the self—the

impulse—that provoked the restraint” (p. 288). In the case of SIB, the impulses against which the child directs this “vengeance” may include dependence, comfort seeking, or vulnerability in general. Over time, the abused child learns to regard her/himself with hostility and criticism; s/he internalizes a negative self-image as defective, unlovable, and loathsome (Chu, 1999; Fischer & Ayoub, 1994; Green, 1978).

Empirical research has demonstrated that maltreated children exhibit more problems at the attitudinal level of competence than their nonmaltreated peers (Nash, Hulsely, Sexton, Harralson, & Lambert, 1993). For example, Schneider-Rosen and Cicchetti (1984, 1991) observed that maltreated toddlers were more likely to exhibit negative affect in response to viewing their reflection in a mirror than their nonmaltreated peers, who tended to exhibit positive affect. Maltreated individuals report lower levels of self-esteem and self-worth in both childhood (Egeland, Sroufe, & Erikson, 1983) and adulthood (Armsworth, Stronck, & Carlson, 1999). As viewed at the attitudinal level of competence, self-injury may reflect a physical manifestation of the individual’s negative self-representations, which may have their developmental origins in child maltreatment. In support of this assertion, research has demonstrated a robust association between negative attitudes about the self (i.e., self-hatred, self-alienation, and self-derogation) and SIB (Friedman et al., 1972; Kaplan & Pokorny, 1969).

6.5. *The instrumental base*

Within a developmental perspective, it is important to identify specific instrumental skills that appear uniquely deficient among persons who self-injure. The preceding literature review indicates that self-injury in traumatized populations is associated with deficits in the capacity to symbolize and mentalize affective experience (i.e., to integrate affective experience into higher order cognition). Indeed, the quintessential feature of trauma is that it “overwhelms and defeats our capacity to organize it” (Laub & Auerhahn, 1993, p. 288).

As a sense of self develops, the typically developing child acquires increasing capacities for representation and symbolization through language, play, and fantasy (Sroufe, 1990b; Stern, 1985). These symbolic processes provide new avenues for managing affective experience. Among these avenues, language is particularly salient because it enables the creation of a personal narrative. “By verbalizing, one connects an experience with the self and in this respect makes it manageable; connecting the experience to words makes it possible to work it over in reflective consciousness and thereby help the accommodative process” (Klein, 1976, p. 269, *original italics*). In trauma, the individual encounters a “speechless terror” that cannot be metabolized through symbolic representation in language because the trauma is processed in a largely nonverbal, often preverbal, domain of experience (Kafka, 1969; van der Kolk, 1994).

Research consistently finds deficits in affective processing among maltreated youth. For example, Beeghly and Cicchetti (1994) found that, in comparison to their nonmaltreated peers, maltreated toddlers used fewer words to describe internal states and showed less variation in their attributional focus. Similar deficits in symbolic capacities have been observed in the play behavior of maltreated children (Allessandri, 1991). Children with a history of maltreatment are also less able to accurately recognize emotional displays than their nonmaltreated peers (Camras, Grow, & Ribordy, 1983), even when intellectual factors (i.e., verbal competence) are controlled (Barahal, Waterman, & Martin, 1981). Specifically, maltreated children tend to identify more facial displays as angry, rather than other negative emotions (e.g., sadness), relative to their nonmaltreated peers (Camras, Sachs-Alter, &

Ribordy, 1996). Together, these data suggest that maltreatment compromises the child's adaptation at the instrumental level of competence by thwarting cohesive integration between affect and higher order cognition.

Maltreatment also undermines the child's capacity to reflect upon the affective state of others, and by extension, of the self. In a maltreating environment, recognizing the mental state of one's parent requires acknowledging the parent's cruel and dangerous attitudes toward the self (Fonagy & Target, 1997). Moreover, there is often little coherence and logic in the parent's behavior from which the child could infer mental state because maltreating parents often misrepresent the motivation for their abusive behaviors (e.g., "it is for your own good;" Fonagy et al., 2000).

The maltreated child who lacks an adequate instrumental base for the integration and mentalization of affective experience is prone to act, rather than reflect, upon affect. Therefore, maltreated children are apt to turn to behavioral outlets (e.g., SIB) to express their affective experience (van der Kolk & Fisler, 1994). In this way, "aggression directed against the body, may be closely linked to failures of mentalization, as the lack of capacity to think about mental states may force individuals to manage thoughts, beliefs and desires in the physical domain" (Fonagy & Target, 1997, p. 487). SIB may be a compensatory strategy that enables the processing of affective experience in lieu of alternative symbolic capabilities. As Woodruff (1999) observed of one self-injurer, "instead of a name appearing where a thing was—the process of symbolization—a thing (her wound) replaced a name" (p. 701). In support of this hypothesis, descriptive studies of self-injuring populations demonstrate a strong association between alexithymia and SIB (Simeon & Favazza, 2001; Zlotnick et al., 1996). As a result of trauma, thoughts and images become disconnected from affect and the individual enters a state of "disaffectation," becoming alexithymic, incapable of representing affect in language, of integrating affect with cognition (McDougall, 1989). People who self-injure may use the body to symbolize affective experience because they lack the instrumental competence to process affective material cognitively via self-reflection and mentalization (Aron, 1998; see Fonagy et al., 1991; Fonagy & Target, 1997, for discussion).

6.6. *The emotional base*

Emotional competence is positively associated with the transition to school (Shields et al., 2001), peer competence (Rubin, Coplan, Fox, & Calkins, 1995; Sroufe et al., 1999), and prosocial behavior (Eisenberg & Fabes, 1998). Affect regulation influences the quality of the individual's behavioral self-regulation and impulse control, which, in turn, contributes to her/his capacity to negotiate developmental challenges (Sroufe, Schork, Motti, Lawroski, & LaFreniere, 1984). In this way, affect is both regulated and regulating. Healthy affective development occurs in the context of a sensitive and responsive caregiving relationship that promotes increasing differentiation, symbolization (i.e., desomatization), integration, and regulation of emotional stimuli (Krystal, 1988). Trauma in the early caregiving environment compromises the child's emergent affect regulation and arousal modulation capacities. Kohut (1977) described the deleterious consequences of insensitive caregiving (either neglecting or overly stimulating) in the following way:

The end-result in all these instances is either a lack of normal tension-regulating structure (a weakness in the ability to tame affects—to curb anxiety) or the acquisition of faulty structures (the propensity toward active intensification of affect—toward developing states of panic). (p. 89)

Maltreatment is associated with emotion regulation problems (Cicchetti & Toth, 1995). In a high-risk poverty sample, Egeland et al. (1983) found that maltreated toddlers exhibited lower levels of persistence and enthusiasm, and higher levels of inattention and negative affect in problem-solving situations relative to their nonmaltreated peers. Using the same longitudinal sample, Erickson, Egeland, and Pianta (1989) observed that maltreated toddlers were more angry, frustrated, and noncompliant during a teaching task than were nonmaltreated toddlers. Similar affect regulation deficits have been observed during the school-age years with teachers describing maltreated children as more out-of-control, affectively labile, and aggressive than their nonmaltreated peers (Shields & Cicchetti, 1998).

Maltreatment may instantiate a developmental deviation in affective development that thwarts emotional competence and necessitates maladaptive compensatory regulation strategies such as SIB. First, maltreatment renders the child hyperresponsive to emotional stimuli, particularly those that signal threat or danger, such that s/he is more likely to experience marked shifts in arousal levels than her/his nonmaltreated peers (Cummings, Pellegrini, Notarius, & Cummings, 1989; Eisenberg et al., 1997). Second, a history of insensitive caregiving, whether by acts of omission (i.e., neglect) or commission (i.e., abuse), weakens the child's foundation of emotional competence such that s/he is less able to self-soothe in response to arousal fluctuations. Together, a propensity toward intense emotional activation coupled with deficits in the capacity to self-regulate and self-soothe contribute to SIB, which may modulate arousal in distressing or arousing environments (Gallop, 2002).

6.7. *The relational base*

Maltreatment compromises relational competence by distorting the child's emergent sense of self–other boundaries. The process of differentiation between self and others begins in earnest during the second year of life and is greatly influenced by the quality of the infant's relationship with her/his primary caregiver (Schneider-Rosen & Cicchetti, 1984). Maltreatment blurs the emergent distinction between the self and others, rendering the child dependent on external sources of stimulation for the establishment and maintenance of self–other boundaries (Armstrong et al., 1999; Boudewyn & Huser Liem, 1995; Connors, 1996a; Pattison & Kahan, 1983). The child who is unable to differentiate between where the self ends (both physically and psychologically) and another begins will have difficulty forming reciprocal and mutually empathic connections with others. In this view, SIB may function to negotiate the psychological boundaries between self and others at the relational level of adaptation (Krueger, 1989; Zila & Kiselica, 2001).

Maltreated children consistently exhibit poor relational competence in their social interactions. In peer relationships, they are often intrusive, aggressive, and insensitive to social cues and rules (Alessandri, 1991; see Mueller & Silverman, 1989, for a review). Maltreated children also exhibit deficits in empathy, even responding with aggression when another child is showing distress (Troy & Sroufe, 1987; see also Sroufe, 1983). In a study of the relation between attachment status and the quality of peer interactions, Kestenbaum, Farber, and Sroufe (1989) found that children who were securely attached in infancy exhibited greater levels of empathy toward their peers in preschool than did preschoolers with a history of insecure attachment. Together, these data support Sroufe and Fleeson's (1986) hypothesis that children apprehend the principles of caregiving in the context of their own care-receiving.

Whether through aggression or withdrawal, the maltreated child protects her/himself from genuine engagement in social relationships. One explanation for this pattern is that the maltreated child with

poorly developed self–other boundaries may view empathy, reciprocity, and other aspects of relational competence as frightening because they introduce the possibility of fusion with the social other and a resultant loss of self. Individuals who are insecure about what is self versus not-self may self-injure in an attempt “to set a marker at the edge of the self so that they can experience a limit and not become fragmented in a diffuse unnameable scatter” (Muller, 1996, cited in Tillman, 1999, p. 713). In this view, SIB and “the receipt of pain establishes or reestablishes a boundary—an experience of existing as a bounded, contained entity” (Krueger, 1989, p. 58), which renders relational exchanges more tolerable and accessible.

6.8. *Summary*

A developmental psychopathology model of SIB suggests that, as in typical development, individuals who self-injure strive to achieve a bounded sense of self with a coherent personal narrative. However, in the context of traumatizing childhood experience, particularly maltreatment, these individuals may not develop adaptive self and other expectations, effective tools for the perception, interpretation, and integration of experience, competent arousal modulation strategies, and/or the capacity to engage in fulfilling and meaningful relationships with social partners. This model posits that SIB is a compensatory regulatory and relational strategy that aims to achieve connectedness, self-preservation, symbolization, affect regulation, and/or self–other boundary differentiation despite vulnerabilities at the motivational, attitudinal, instrumental, emotional, and/or relational levels of competence.

7. **Conclusions and implications**

This article is the first known attempt to synthesize the array of empirical and theoretical writings on SIB into a cohesive account of its development within a trauma paradigm. In the aftermath of traumatic experience, SIB may emerge as a compensatory regulatory and relational strategy that is necessitated by trauma-induced vulnerabilities in motivational, attitudinal, instrumental, emotional, and/or relational levels of adaptation. Maltreated children continue to rely on primitive coping skills (e.g., isolation, aggression, somatization) and defenses (e.g., dissociation, intropunition) to negotiate developmental challenges long after typically developing children have abandoned such defenses in favor of more adaptive regulatory and relational strategies. Ongoing reliance on these rigid coping skills and defenses results in a progressive narrowing of possibility as the maltreated child becomes increasingly isolated from putative restorative relationships and opportunities. Over time, self-injury emerges as an effective tool for achieving connectedness, maintaining and protecting the integrity of the self, and processing and regulating affective experience. As conceptualized within a developmental psychopathology framework, the implications of this traumagenic pathway toward SIB are manifold.

7.1. *Empirical implications*

The organizational theory of development captures the key elements of a developmental psychopathology perspective, and provides a theoretical framework to clarify developmental pathways toward SIB in the aftermath of traumatic experience. The organizational theory of development focuses on

patterns of adaptation over time, rather than on isolated aspects of manifest behavior. For example, adopting an organizational view, assessments of competence across various levels of adaptation in early childhood would be expected to predict more strongly to later SIB than would observational data of headbanging in infancy. In this way, a developmental psychopathology framework advances beyond the utility of static, linear models of development, which typify the extant literature, to encourage and inform process-oriented approaches to understanding SIB.

7.1.1. A research agenda

Most of the extant research on SIB employs small, nonprobability, cross-sectional samples drawn from institutional settings (e.g., prisons or hospitals), using retrospective, single-informant methods. Future research must employ longitudinal, prospective research designs because they provide critical information about adaptational and causal patterns over time. In addition, the use of multiple methods and informants will avoid the confounds associated with shared method variance and retrospective reporting bias that characterize the current literature (see [Brewin, Andrews, & Gotlib, 1993](#); [Sternberg, Lamb, & Dawud-Noursi, 1998](#), for discussion). Finally, more research on SIB within community samples is needed to ascertain the generalizability of findings from clinical and incarcerated samples to the general population. Studies of the relation between traumatic experience and SIB typically fail to distinguish among various categories of trauma, such as physical or sexual abuse, physical or emotional neglect, and acute or chronic trauma exposure ([van der Kolk & Fiesler, 1994](#); see [Briere & Runtz, 1990](#), for an exception). In addition, risk factors correlated with traumatic events, such as child maltreatment (e.g., poverty, parental substance use, life stress), are rarely controlled to ascertain the unique contribution of traumatic experience to SIB ([Browne & Finkelhor, 1986b](#); [Nash et al., 1993](#); [Santa Mina & Gallop, 1998](#); see [Gratz, Conrad, & Roemer, 2002](#), for an exception using retrospective reporting). A developmental psychopathology perspective recognizes that arousal interacts with the nature of the stimulus as well as its context ([Sroufe, 1979](#)); therefore, it is not only traumatic experience, but also the nature of the context within which it occurs, that shapes the developmental pathway toward (or away from) SIB. Future research should examine contextual factors (i.e., risk and protective influences) that moderate the relation between childhood traumatic experience and SIB.

7.1.2. Do different kinds of SIB emerge from distinct developmental pathways or have unique correlates?

The organizational theory of development emphasizes developmental pathways and deviations over time. Departing from an appreciation for the divergent pathways by which individuals may develop following trauma, and a recognition that some pathways may converge toward SIB, this model affords an opportunity for researchers to address several interesting questions. First, descriptive studies of SIB indicate that its phenomenology may vary as function of the individual's preferred mode of injury. Differences between indirect and direct forms of self-injury are well established ([Jones et al., 1979](#); [Simpson, 1975](#)). However, [van der Kolk et al. \(1991\)](#) observed unique associations between specific modes of direct SIB and etiologic factors. For example, disruptions in parental care were related to self-cutting, but were not associated with either suicide attempts, or other forms of SIB (e.g., self-hitting or burning). In addition, dissociative experiences were associated with self-cutting, but not with other types of SIB. Thus, developmental pathways and contemporaneous correlates may vary across different methods of SIB.

A second dimension along which self-injurious events may meaningfully vary is the presence or absence of analgesia during the injurious event (Kemperman, Russ, & Shearin, 1997). Russ, Shearin and Clarkin (1993) found that women with BPD ($n=13$) who reported an absence of pain during SIB exhibited greater levels of anxiety, depression, dissociation, impulsiveness, and trauma symptoms than women with BPD ($n=14$) who experienced pain-sensitivity during episodes of SIB. The absence of pain during episodes of SIB is likely mediated by both psychological (e.g., dissociation) and physiological mechanisms (e.g., elevations in endogenous opioids; Darche, 1990). Thus, the exact nature of the interplay between physiological and psychological factors in differences observed as a function of pain sensitivity among persons who self-injure remains to be determined.

Third, research suggests that the presence or absence of dissociation during self-injurious events may be meaningful. For example, Levenkron (1998) distinguishes between nondissociative and dissociative SIB. Nondissociative SIB, he suggests, is precipitated by a pervasive and intense self-loathing typically seen in families where the child must care for the parent. In this context, anger cannot be expressed toward others and is instead turned back onto the self. The goal of nondissociative SIB is not numbness, but the feeling of pain. In contrast, Levenkron proposes that dissociative SIB stems from a childhood history of exposure to parental cruelty, alienation, and isolation, which contributes to the use of SIB to prevent mental disintegration and disconnection. Future research should examine Levenkron's hypothesis and test for specific pathways among developmental antecedents, dissociation, and SIB.

Finally, evidence suggests that the motivation and meaning of SIB may vary predictably across different populations. In a comprehensive study of the motivations for SIB among 100 psychiatric inpatients, Osuch et al. (1999) found that self-reported motivations and meanings of SIB varied systematically across diagnostic populations. For example, punitive motivations (e.g., to remind myself that I deserve to be hurt or punished) were uniquely associated with cutting behaviors, dissociative amnesia, and depression (Favazza, 1987/1996). Motivational factors may differentiate among groups of injurers, but further research is needed. Earlier in this article, for example, I suggested that interpersonal motivations may be salient in self-injury that is associated with personality disorders, whereas intrapersonal factors may be more prominent in self-injury that is associated with posttraumatic adaptation.

7.1.3. What is the nature of the relation among maltreatment, dissociation, and SIB?

Associations among maltreatment, dissociation, and SIB are well established (Brodsky et al., 1995; Lowe et al., 2000). However, the specific patterns and pathways of relation among these phenomena remain to be determined. One hypothesis is that dissociation and SIB may be different coping responses following child abuse (Wise, 1989; Zlotnick et al., 1996). In this view, the relation between dissociation and SIB is an artifact of their shared association with maltreatment. In support of this model, Zweig-Frank et al. (1994b) found that dissociation and SIB were not related when abuse history was controlled. A second hypothesis is that dissociation may mediate the relation between abusive experiences in childhood and mental health outcomes. Kiesel and Lyons (2001) conducted a study to evaluate the role of dissociative defenses in the relation between childhood abuse and self-harming mental health outcomes among 114 ten- to eighteen-year-olds in residential treatment. Analyses indicated that dissociation partially mediated the relation between child sexual abuse and a variety of mental health outcomes, including SIB. Additional support for this model derives from Brodsky et al. (1995) who found that abuse history, depression, and level of psychopathology did not

correlate with SIB when the level of dissociation was controlled. A developmental psychopathology perspective provides a conceptual framework within which these different models may be articulated and evaluated empirically.

7.1.4. Is SIB related to the nature of the posttraumatic reaction?

Posttraumatic stress reactions range along a continuum from hypo- to hyperarousal (i.e., from withdrawal and numbing to hypervigilance; van der Kolk, 1994a). The propensity for self-injury in the aftermath of traumatic experience may vary as a function of the individual's placement along this continuum. Goodwin and Attias (1999) describe two patterns of symptomatology following traumatic experience. In the first pattern, individuals focus on physical pain of unknown origin to the exclusion of emotional pain. These "type I" individuals search for a diagnosis, but remain blind to the connection between their bodily pain and the psychic wounds of their traumatic experience(s). In the second pattern, individuals present with a cursory understanding that they are operating at a less-than-optimal level of emotional well-being. Although they have some awareness of their trauma history, "type II" individuals tend to minimize the severity and impact of the trauma on their development. These individuals typically cope by dissociating themselves from both the traumatic experience and their traumatized body. Thus, in type I responses, "painful sensations are retained, but their meaning is lost; in type II, dissociative flight distances the traumatized self both from the pained body and its painful childhood circumstances" (Goodwin & Attias, 1999, p. 234). Because the type II coping strategy necessitates a punitive and repressive stance toward the individual's real bodily experience (Terr, 1990), one might expect that it would be more strongly associated with SIB than the type I trauma response. Future research should examine whether the nature of the posttraumatic stress reaction moderates the relation between traumatic experience and self-injury.

7.1.5. What may account for epidemiological and developmental patterns in SIB?

In a recent study of SIB in the United Kingdom, Boyce et al. (2001) found a 28% increase in the number of self-injuring patients between the periods of 1985–1986 and 1994–1995. However, like most epidemiological studies, this research confounded suicide attempts with SIB. Still, evidence overwhelmingly indicates that the incidence of impulsive SIB is increasing, particularly among adolescent populations. This fact generates two interesting questions for future research.

First, *what may account for the rising rate of SIB?* There is growing empirical support for the role of social contagion in SIB as reflected by the tendency for self-injury to follow epidemic-like patterns in institutional settings such as schools, hospitals, and prisons (Mathews, 1968; Ross & McKay, 1979). Walsh and Rosen (1985) studied adolescents from a group of community-based programs to determine patterns of specific symptoms over time. Of the examined symptoms (i.e., aggression, suicidal talk, substance abuse, hospitalization, and self-injury), only self-injury demonstrated significant clustering in time across participants. As discussed previously, Bandura's (1973; Bandura & Walters, 1963) social learning theory offers one explanation for how the observation of others' self-injury and its consequences (e.g., improved affect, attention) may lower individuals' resistance to engaging in self-injury. In support of this hypothesis, Rosen and Walsh (1989) found that adolescents imitated the SIB of influential group leaders. Thus, observed increases in SIB may reflect heightened awareness of the behavior, particularly among influential figures such as movie stars and sports figures. However, it is important for researchers to examine the unique correlates of SIB that is associated with social contagion versus SIB that is associated with other initiating factors.

Second, *what factors account for the unique association between SIB and adolescence?* A developmental psychopathology perspective is particularly informative when patterns of disorder demonstrate a robust relation with specific age periods. Using this model, researchers may find it productive to examine the salient developmental issues of adolescence to determine why this period is associated with the onset of SIB (Suyemoto, 1998). Key developmental issues in adolescence include (a) separation/individuation, (b) autonomy and self-definition (e.g., sexual, social, political, vocational identity definition), and (c) affect regulation in the face of marked physiological and relational maturation, including the initiation of romantic relationships. The developmental issues that come to the fore during adolescence call upon skills and resources that are strongly affected by a prior history of trauma. For example, issues of autonomy are prominent throughout development, beginning in the toddler period, but the processes by which the individual initiates, coordinates, and governs her/his behavior are particularly salient during adolescence (Ryan, Kuhl, & Deci, 1997). Given the vulnerabilities in self-organization and self–other distinctions instantiated by childhood trauma, particularly maltreatment, external sources of regulation and self-definition, such as SIB, may become more prominent during adolescence because it is a time when the individual is called upon to define her/himself and her/his self–other boundaries.

7.1.6. What factors account for gender differences in SIB?

The gendering of SIB is an ongoing focus of research interest because it lends itself to exploring sociocultural constructions of behavior and psychopathology (e.g., Baral et al., 1998; Marshall & Yazdani, 1999; Shaw, 2002). Despite consistent evidence of gender differences, however, researchers have not yet examined the meaning of SIB in the lives of women and men. The gendering of SIB is complex with deep roots in psychoanalytic and sociological theory (Hewitt, 1997; Siomopoulos, 1974; Solomon & Farrand, 1996). For example, in an effort to explain the overrepresentation of women among self-injurers, Clery (2000) emphasizes the role of gendered socialization experiences (see also Blume, 1986). He argues that men learn to direct their conflicts externally while women learn to turn their anger inward. In this way, male aggression tends to be criminalized and female aggression tends to be psychiatrized (see also Bach-y-Rita, 1974; Graff & Mallin, 1967). In a similar vein, Frost (1995) suggests that male acts of self-injury may be more readily viewed as “accidental” than those enacted by women, which further skews the evidence on gender differences in SIB.

In addition to socialization factors, the preponderance of women among self-injurers likely reflects the disproportionate influence of sexual violence in the lives of women. Data indicating that male sexual assault survivors evidence significant rates of SIB (Boudewyn & Huser Liem, 1995; Briere, Evans, Runtz, & Wall, 1988; Cabe, 1999), although the sexual victimization of boys typically occurs outside of the caregiving environment (Tong, Oates, & McDowell, 1987), further supports this assertion. On a related theme, it would be interesting to examine whether the same processes mediate observed associations between maltreatment and SIB for males and females. One might expect that the same core regulatory and relational vulnerabilities underlie SIB in both genders. However, in addition to these vulnerabilities, women may encounter other contributing factors (e.g., social pressures to conform to an idealized body image) that increase their risk for body-based compensatory strategies (e.g., SIB, eating disorders).

7.1.7. What factors account for resilience despite experiential risk?

From a developmental psychopathology perspective, it is of equal interest to examine those individuals who do not manifest SIB despite equivalent experiential risk as it is to determine the

developmental compromises that contribute to SIB (Burack, 1997). This perspective encourages researchers to focus on the continuum of risk-taking behavior rather than on incidents of pathological SIB in isolation. For example, although many abuse survivors do not engage in SIB, other risk-taking behaviors (e.g., promiscuity, reckless behavior, substance abuse) are prominent in this population. Still, a significant portion of trauma survivors does not engage in high-risk behaviors. The developmental psychopathology framework recognizes that identifying protective factors and processes that mediate positive outcomes despite experiential risk will further our understanding of the developmental processes that render individuals vulnerable to later SIB.

7.2. Clinical implications

A developmental understanding of SIB as a compensatory strategy in posttraumatic adaptation provides clinicians who work with persons who self-injure with a new conceptual framework to supplement and contextualize current treatment paradigms (see Connors, 1996b; Feldman, 1988; Guralnik & Simeon, 2001; Lion & Conn, 1982; Luiselli, Matson, & Singh, 1992; Walsh & Rosen, 1988, for reviews). The markedly negative counter-transference elicited by acts of self-injury and their general resistance to treatment are well documented (Feldman, 1988; Guralnik & Simeon, 2001). This negative response to SIB has fueled a multitude of treatment paradigms that endeavor to eliminate the behavior, but place comparatively little emphasis on understanding its developmental origin(s) and adaptational function(s). In isolation, behavioral interventions may succeed in achieving a reduction in SIB. However, in the absence of effective regulatory strategies, the individual may turn away from SIB and toward equally destructive methods of inter- and intrapersonal arousal modulation (e.g., eating disorders, excessive risk taking, externalized aggression).

The developmental model presented here encourages providers to view acts of self-injury as one of many adaptational compromises the individual has made in the service of surviving despite experiential adversity. Rather than eradicating the behavior itself, this model suggests that it may be more effective to direct treatment efforts toward ameliorating the adaptational vulnerabilities that underlie the behavior. In this view, competence-based treatment that endeavors to build adaptive skills in place of motivational, attitudinal, instrumental, emotional, and/or relational vulnerabilities will reduce the individual's reliance on SIB as a compensatory adaptive strategy.

Masud Khan (1974) anticipated the overarching implication of a developmental psychopathology approach to the treatment of SIB when he observed:

What one has to negotiate some sort of alliance with is the patient's practice of self-cure, which is rigidly established by the time he reaches us. To treat this practice of self-cure merely as a resistance is to fail to acknowledge its true value for the person of the patient. . . What, however, is most difficult to resolve and cure is the patient's practice of self-cure. To cure a cure is the paradox that faces us in these patients. (cited in Kalsched, 1996, p. 115)

A developmental psychopathology model of the relation between childhood trauma and SIB explicates how self-injury may function as a "self-cure," one that compensates for trauma-induced adaptational vulnerabilities. Effective treatment will explore the function and meaning of SIB in light of the individual's developmental history and contemporaneous experience. With this appreciation,

the clinician can identify the kinds of adaptational vulnerabilities and compromises that led the individual to rely on self-injury as an effective, albeit maladaptive, compensatory strategy for behavioral and emotional regulation in the aftermath of traumatic experience. Once identified, clinical interventions that strengthen specific adaptive skills (e.g., arousal modulation, interpersonal support networks, and positive self and other representations) will reduce the individual's dependence on SIB as a compensatory regulatory and relational strategy in posttraumatic adaptation. Skill-based treatment models, such as Linehan's dialectical behavior therapy (1993), constitute progress toward this end. However, new therapeutic strategies may profitably integrate extant behaviorally oriented treatment methods with psychodynamic techniques to foster a greater understanding within the individual of the meaning of SIB, as well as to develop her/his adaptive skills to negotiate emotionally and behaviorally dysregulating experience.

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