

How Can We Stop Our Children from Hurting Themselves? Stages of Change, Motivational Interviewing, and Exposure Therapy Applications for Non-suicidal Self-Injury in Children and Adolescents

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Abstract

Non-suicidal self-injury (NSSI) in children and adolescents is a major public health problem. Fortunately, we can apply functional analysis, in conjunction with empirically validated NSSI assessment measurements, to precisely evaluate the biopsychosocial risk factors and reinforcements that contextualize NSSI. Empirically validated behavioral treatment for NSSI is also available. However, motivating youth to seek help and participate in treatment for NSSI remains problematic. This paper suggests application of Prochuska and DiClemente's (1982) Transtheoretical Model of Change, in conjunction with motivational interviewing and exposure-with-response-prevention (ER/P) therapy, to motivate youth to seek treatment, and to remediate NSSI risk factors and behaviors.

Keywords : non-suicidal self-injury; NSSI; children and adolescents; stages of change; motivational interviewing; exposure therapy

“Whoever studies the behavior of human beings cannot escape the conclusion that we must reckon with an enemy within the lines. It becomes increasingly evident that some of the destruction which curses the earth is self-destruction. . .” (Menninger, 1938, p. 4).

The psychoanalyst Karl Menninger made some rather grim observations in *Man Against Himself* as he was explicating Freud's concept of *thanatos* or ‘death instinct.’ Relative to the converse idea of *eros*, the ‘life instinct,’ Menninger drew morbid conclusions about the mechanisms that he believed comprised dialectic in human development. He saw an inescapable paradox: on the one hand, the individual's essential motivation for autonomy, pride, and companionship, and on the other, the compulsion to self-inflict physical injury in reaction to unresolved shame, doubt, guilt and alienation.

Menninger was commenting on what most researchers and clinicians regard today as deliberate, non-suicidal self-injury (NSSI). His remarks were compelling, and in hindsight, even prognostic. NSSI has become increasingly prevalent among children and adolescents (Kamen, 2009). The incidence of youth self-injury has risen in our schools and homes, affecting all socioeconomic classes. Further still, self-harming children may be experiencing any number of psychiatric disorders - from major depressive disorder, to obsessive-compulsive disorder, to bulimia and anorexia, to alcohol and substance abuse (see Nock, Joiner, Gordon, Lloyd-Richardson, & Prinstein, M, 2006; Lofthouse, Muehlenkamp, & Adler, 2009). Studies also show that professionals who work with youth who self-injure find it to be one of the most challenging of psychological and behavioral issues (Nixon and Heath, 2009). Mental health professionals, pediatricians, school counselors and teachers, and youth workers have all conveyed that they feel ill-equipped to help these children. Consequently, some researchers are convinced that the problem of NSSI is woefully understudied and misunderstood (Prinstein, 2008).

The fundamental premise of this paper, however, is that we need not be so discouraged. Pathological self-injury has been clinically studied for over 85 years (see Doctors, 1981), and applied behavior analysts have been validating operant conditioning models of NSSI for over 30 years (see Miltenberger, 2005). So, we can affirm with empirical confidence that NSSI is a complex of learned responses that are reinforced in the context of psychobiological and environmental events. We can also remediate NSSI through the precision of functional analysis and behavioral interventions directly linked to that analysis (e.g., see Miller, Rathus, & Linnehan, 2007).

Behavioral-environmental explanatory models that examine the antecedent conditions, complex topography and reinforcement systems of NSSI have the strongest empirical validation, relative to psychoanalytic and general biopsychosocial theories (Messer and Fremouw, 2007). Validated assessment and treatment protocols have allowed us to target NSSI behaviors and their functions so that we can help those youth who engage in NSSI (e.g., Nixon and Cloutier, 2005). By the same token we know which theories of self-injury to rule-out due to unverified (and un-verifiable) theory, case study methodology and anecdotal evidence (e.g., Dalden, 1990; McAndrew and Warne, 2005; Williams, 2005; Suyemoto and MacDonald, 1995; Zila and Kiselica, 2001).

With NSSI, we are dealing with a complex and dangerous mental health problem; however, we do not have an “inescapable paradox” on our hands. Rather, we are in a good position, conceptually and empirically, to evolve the behavioral analysis, assessment process, and treatment of NSSI. Research on the etiology and treatment of NSSI integrates knowledge from neurobiological, cognitive-behavioral, operant conditioning, and socioemotional principles and theories (Nixon, Aulakh, Townsend, & Atherton, 2009). In this vein, this paper has several goals:

1. To functionally analyze NSSI, and to explore its complex behavioral topography and psychological etiology;
2. To focus on assessment and treatment procedures which have followed from the increased precision of NSSI functional analysis, and that have already been empirically validated for use with various affective, mood, behavioral, and substance use disorders; and
3. To invigorate the research, assessment and treatment of NSSI in children and adolescents by offering innovative ideas to motivate our youth to seek help for NSSI.

The clinical interventions that we have for NSSI are only effective if they are sought. Therefore, this paper proposes application of Prochaska and DiClemente’s Transtheoretical Model of Change (1982), in conjunction with motivational interviewing, and exposure-with-response-prevention techniques. It is suggested that these interventions can mitigate NSSI addictive and obsessive-compulsive features, which obstruct children from seeking help and overcoming the impairments that lead them to NSSI.

NSSI Clinical Research Status

Clinical research of deliberate self-injury has been a cornerstone subject for applied behavior analysts since Carr (1977) delineated an operant conditioning model to study the complex of behaviors and reinforcements that drive self-injurious behavior. Today, clinical researchers appreciate that deliberate self-harm is not necessarily suicidal behavior (e.g., Favazza and Rosenthal, 1993; Gratz, 2001; Muehlenkamp and Gutierrez, 2004), and that it is distinct from stereotypic, repetitive self-mutilation attributable to congenital, neurological and developmental disorders that impair cognition and volition (Favazza, 1996), as seen in Table 1.

Self-injurious behaviors are dangerous and perplexing because numerous forms of self-injury have been identified, and each appears to have its own psychological correlates and psychological functions (Prinstein, 2008). The behaviors may involve suicidal intention and threat, or be restricted to self-mutilation that has no suicidal intent, i.e., be classified as NSSI. Differentiating between non-suicidal, non-deliberate, and suicidal behaviors has been critical to appropriately identify, conceptualize, and effectively treat these issues (Lofthouse, Muehlenkamp, & Adler, 2009; Messer and Fremouw, 2007).

Table 1. Evolution of the NSSI Concept

Menninger (1935, 1938)	Focal/Attenuated Suicide : included self-mutilation in neurotics, psychotics, the organically injured, and members of religious sects
Hendin (1950)	Attempted Suicide : included self-assault in hospitalized patients
Schmidt, O'Neal, & Robbins (1954)	Suicide attempts : included broad range of self-destructive behaviors
Stengel (1964)	Suicide vs. attempted suicide : included broad range of self-destructive behaviors
Graff & Mallin (1967); Grunebaum & Klerman (1967); Nelson & Grunebaum (1971); Rosenthal, Rinzler, Walsh, & Klausner (1972)	“Wrist cutting syndrome;” wrist slashing/wrist cutting occurring in inpatient populations
Pao (1969)	“Delicate self-cutting syndrome” : self-cutting behavior in an inpatient psychiatric setting
Cohen (1969)	Solicitation, self-assault : Broad range of self-destructive acts presenting at an outpatient mental health clinic
Kreitman, Philip, Greer, & Bagley (1969)	Parasuicide : Self-poisoning and other forms of self-injury
Clendenin & Murphy (1971); Weissman (1975)Carr (1977)	Wrist cutters, suicide attempters : wrist cutting per police reports and as a medical complex. Comparison of cutters and ‘other suicide attempters’ Self-injurious behavior : behaviorally and/or medically-based self-injury and/or self-mutilation that is nonsuicidal, which is contingent upon automatic and social reinforcements
Favazza, 1987; Pattison & Kahan, 1983, Morgan et al, 1979	“The Deliberate Self-Harm Syndrome” : Non-fatal episodes of self-harm referred to collectively as problems of self-poisoning and self-injury... “Non-fatal deliberate self-harm”: a form of behavior in which actual self-destruction is not clearly intended. The general meaning of self-harm is suited to cover the wide variety of methods used, e.g., drug overdose, self-poisoning with non-ingestants; the use of other chemicals, such as gases; lacerations and other forms of physical injury.
Favazza, 1996	Pathological self-mutilation (PSM), Type 1: Major , involving infrequent and rare self-injurious behavior that occur without warning, and require immediate medical attention, as they are attributable to serious mental illness (e.g., schizophrenia; drug-induced psychosis), including eyeball enucleation, self-amputation of appendages; genitalia mutilation; PSM, Type 2: Stereotypic , which are unplanned, repetitive, do not involve emotional responses or preceding psychological distress, and most commonly associated with neurological illness, such as Lesch-Nyon Syndrome, de Lange syndrome, Rett’s syndrome, neuroanthosis, acute psychosis, and schizophrenia; or attributable to developmental disabilities, such as head-banging in autistic persons or individuals with mental retardation;
Nock, Joiner, Gordon, Lloyd-Richardson, & Prinstein, 2006	PSM, Type 3, Superficial to moderate, category 1: compulsive , repetitive and ritualistic behavior for tension relief; category 2: episodic , less frequent than compulsive, but aimed for similar tension relief; and category 3: repetitive , involving intense pre-occupation with self-mutilation Self-injurious behavior, non-suicidal self-injury type : Self-injurious behavior is a broad class of behaviors in which an individual directly and deliberately causes harm to herself or himself. Such behavior can include non-suicidal self-injury (NSSI) -- direct, deliberate destruction of one's own body tissue in the absence of intent to die
Nixon and Heath, 2009	Nonsuicidal self-injury (NSSI) deliberate self-harm without suicidal intention, which causes tissue damage, and which is not socially sanctioned, attributable to one’s cultural values, or intended for public display

Due to this complexity, several issues remain focal points to NSSI research and intervention:

1. NSSI is a major public health concern for our youth (Nixon and Heath, 2009), and it can manifest itself in multiple ways (see Lloyd-Richardson, Nock & Prinstein, 2009);
2. NSSI runs parallel to, and creates risk for, the distinct act of suicide, as both behaviors covary with the individual's motivations, suicidal intentions, and psychosocial risk factors (see Gutierrez and Osman, 2008; Fairbairn, 1995; Lofthouse, Muehlenkamp, & Adler, 2009);
3. NSSI in general can be assessed and treated according to its phenotype, psychological mechanisms, and genotype (see Nixon and Heath, 2009; Messer and Fremouw, 2007); and
4. NSSI may be studied, assessed and treated as a behavioral pathology via functional analysis (Lloyd-Richardson et al., 2009). The strongest empirical support has been shown for a behavioral/environmental model of NSSI, which has components of affect regulation, interpersonal dynamics, and depersonalization (see Messer and Fremouw, 2007).

NSSI Epidemiology

NSSI has become epidemic for children and adolescents around the world (c.f., Hawton, Rodham, Evan, & Weatherall, 2002; Heath, Schaub, Holly, & Nixon, 2009). Borosky and colleagues (2009), collecting data over the course of three separate study years from the National Longitudinal Study of Adolescent Health, and the reports of 20,000 youth, grades 7 through 12, found that 15% believed they had a 50/50 chance of living to the age of 35 years. Those who engaged in risky behaviors in the first year of the study – from illicit drug use to self-injurious behaviors - were more likely to believe they would die young.

Nixon and colleagues (2009) revealed from a population-based longitudinal survey of 568 youth aged 14 to 21 years, that 29.0% engaged in deliberate self-injury, without suicidal intention, at least once in their lifetime; 33.3%, two to three times in their lifetime; and 37.6%, three or more times. From this same study, it was found that self-injuries such as cutting, scratching, and hitting were the most common forms of NSSI (83.2%), followed by the abuse of prescription and over-the counter drugs, then illicit drugs, and finally other forms of self-injury, with a mean age of onset of 15.2 years.

Heath and colleagues (2009) point out that researchers worldwide agree that NSSI age of onset is typically between 13 and 15 years, but that some studies have found that as much as 25% of youth have started to engage in deliberate self-injury before the age of 12 (Nixon, Cloutier, & Jansson, 2008). Overall, 15% to 20% of adolescents in the community admit to engaging in NSSI at least once; in clinical settings, more females than males have engaged in NSSI, and more girls than boys are treated for flagrant NSSI problems in the hospital, such as cutting. Moreover, no gender difference in NSSI prevalence has been seen in community samples, although more boys than girls are said to engage in self-hitting forms of NSSI.

Whether NSSI incidence is on the rise is questionable, as more youth are seeking help now than in previous generations. Apparent increases in deliberate self-injury may be an artifact of the increases in delivery of inpatient and outpatient mental healthcare services to youth (Nixon et al., 2009). However, Lloyd-Richardson and colleagues (2007) found the prevalence to be as high as 46.5% in community samples of adolescents, when cutting was included as a deliberate form of self-injury. When NSSI included deliberate carving, burning, self-tattooing, scraping, and skin abrading to the point of bleeding, the prevalence was as high as 27.7% in the same sample.

NSSI Functional Analysis

The extant literature demonstrates strongest empirical support for a behavioral/environmental model that accounts for NSSI antecedent conditions, behavioral topography, and reinforcement systems (Messer and Fremouw, 2007). Lloyd-Richardson and colleagues (2009) have presented a four-factor model of NSSI (NSSI-FFM) to aid in its functional analysis, while clinicians such as Nixon and Cloutier (2005) have provided NSSI assessment tools to account for the methods and functions of the problem (see Cloutier and Humphreys, 2009 for overview of NSSI measurements). Collectively, the heuristic of NSSI-FFM and face valid measurements of self-injury measurement, like the Ottawa Self-Injury Inventory (OSI; Nixon and Cloutier, 2005), address the NSSI phenotype and its operant functions with precision. They do well in assessing the complexity of NSSI behavioral forms and reinforcement contingencies, as well as the risk and protective factors that moderate the psychosocial conditions correlated with NSSI (see Nixon, Cloutier, & Jansson, 2008).

1. NSSI-FFM overview. NSSI-FFM integrates well with biobehavioral and socioemotional theory about NSSI (Nock and Prinstein, 2005). NSSI-FFM also capitalizes on the theory that NSSI's functional purpose is to regulate affect, the degree to which one associates or dissociates from others, and one's sense of individuation and separation, i.e., boundaries from others (Chapman, Gratz, & Brown, 2006; Suyemoto, 1998). NSSI is thus conceived of as a behavior contingent upon autonomic and social reinforcement systems.

As the heuristic of NSSI-FFM suggests, NSSI consists of a broad class of over-determined behaviors, i.e., behaviors that can carry multiple functions, simultaneously, within the same individual (Suyemoto, 1998). For such reasons, in their presentation of NSSI-FFM as an operant conditioning assessment model, Lloyd-Richardson and colleagues explicitly advised:

“The goal of the clinician is to examine the antecedents and consequences of a behavior to understand and treat it. It is from this tradition that *functional analyses* or *behavioral analyses*, which are used in several different forms of behavioral therapies, were derived (p. 31).

In NSSI-FFM, automatic positive reinforcement indicates the occurrence of a deliberate non-suicidal behavior that produces a consequence, typically some form of self-initiated tactile/kinesthetic stimulation, which strengthens the NSSI behavior. Since the consequence of stimulation is not delivered by the environment but by oneself, it is considered automatic reinforcement (see Miltenberger, 2005; Carr, 1977).

Self-stimulation which occurs simultaneously to or immediately following NSSI behavior is generally believed to be the physiological and/or neurobiological stimulation, which strengthens the persistence of the NSSI behavior. The release of endorphins following compulsive cutting, scratching, skin-picking or hair-pulling would be an example of automatic positive reinforcement, because it creates a desirable physiological state for the individual who engages in NSSI. For such reasons, neurobiological explanations of NSSI indicate that when NSSI is repeated by an individual, it can be assumed to activate endogenous reward neuro-circuitry. The release of neurotransmitters, such as dopamine and serotonin, and a cascade of neurobiological events make NSSI not only positively reinforcing, but physiologically addictive (Osuch and Payne, 2009).

By contrast, automatic negative reinforcement of NSSI would be the termination of aversive self-stimulation, which strengthens the NSSI behavior. Termination of negative emotional/cognitive discomfort, autonomic arousal, i.e., that which reduces or eliminates physiological tension attributable to state anxiety, would constitute NSSI automatic negative reinforcement.

In parallel, positive and negative social reinforcement strengthens the NSSI behavior, either by producing desirable socioemotional/interpersonal consequences or by reducing or terminating undesirable

socioemotional/interpersonal consequences. The child who habitually cuts because it brings the attention and sympathy of family and friends, has achieved social positive reinforcement for NSSI. The child who cuts to escape the criticism of family or friends, and who reports, “I want my parents/friends to stop being angry with me,” has achieved social negative reinforcement for NSSI.

2. *NSSI measurement*. Empirically validated structured clinical interviews and self-report measurements of NSSI in youth have been developed to coincide with NSSI functional analysis (see Cloutier and Humphreys, 2009). The Ottawa Self-Injury Inventory (OSI; Nixon and Cloutier, 2005) is one example. It is a self-report questionnaire about NSSI in adolescents that examines deliberate self-injurious method; frequency; rationale; context; addictive properties; the effectiveness of the behavior at regulating negative affect; and the motivation for change.

The clinician can assess the behavioral topography of NSSI for a given individual, via the OSI clinical form (OSI-C) that assesses the physical, bodily location of NSSI, and the specific self-injurious methods used. The form concerning NSSI functions, (OSI-F) can then be used to evaluate the reinforcement systems of the NSSI behaviors assessed on the OSI-C. Together, the OSI-C and OSI-F index NSSI reinforcements concerning affect regulation, dissociative experience, suicidal ideation, interpersonal boundaries (concerning one’s sense of autonomy, self-concept and body image), and interpersonal influence (concerning relationships with family and friends).

Although the OSI was developed independently from NSSI-FFM, its clinical application to this model is immediately apparent, on several fronts. The clinician can gather information about NSSI behavioral topography, and link that topography to the automatic and/or social contingencies, including the protective and risk factors, that reinforce NSSI. Secondly, the OSI can be used to triage which of the over-determined NSSI behaviors should be immediately entered into treatment planning.

The OSI was designed as a platform for individually tailored NSSI intervention, as it queries the specific reasons for starting and continuing to self-injure (Cloutier and Humphreys, 2009). The OSI yields both quantitative measures about NSSI reasoning, using a Likert-scale, 5-point endorsement format (i.e., 0= never a reason; 2=sometimes a reason; 4=always a reason) and a dichotomous (yes/no) format. The OSI also yields qualitative data, through open-ended NSSI questions. With 27 items in total, and a 20-minute administration time, OSI test-retest reliability for a 7- to 14-day testing period has been demonstrated for the questioning on NSSI motive (correlations ranging from 0.52 to 0.74).

We know from practitioners that triaging and treatment planning are among the most significant obstacles to overcome in remediating NSSI (Lofthouse, Muehlenkamp, & Adler, 2009). Therefore, empirically validated measurement of NSSI motive, now possible through the OSI, has proven invaluable. It contributes greatly to NSSI screening, basic assessment, and specialized behavioral and psychological assessment, which are essential for NSSI triage and treatment planning in children and adolescents (Heath and Nixon, 2009).

NSSI Clinical Intervention

NSSI researchers and practitioners are mainly concerned that NSSI be treated on a case-by-case basis. Suyemoto (1998) asserted:

“The most difficult tasks in attempting to understand any pathological behavior is discerning why this *particular* behavior, at this *particular* time, serves this *particular* function, for this *particular* patient; there are a myriad of other behaviors, both functional and dysfunctional, that can serve to fulfill any single intrapsychic or interpersonal need (p. 537).”

NSSI is a perplexing, over-determined behavior (Suyemoto, 1998), laden with a myriad of risk factors (Klonsky and Glenn, 2009). Empirically validated clinical treatments specific for NSSI are also limited (Nixon, Aulakh, Townsend, & Atherton, 2009).

In practice, we realize that youth who engage in NSSI may benefit from cognitive-behavioral approaches for the treatment of children and adolescents with major depression, obsessive compulsive disorder, and social anxiety, and for youth who engage in suicidal behavior and substance abuse (Nixon et al., 2009). Dialectal behavior therapy (DBT; Linnehan et al., 1991; Miller, Rathus, & Linnehan, 1997) for example, is seen as one efficacious approach for working with youth who engage in NSSI (Nixon, et al., 2009). DBT combines behavioral, cognitive, and supportive interventions, and consists of behavioral skills training, contingency management, cognitive modification, and exposure to emotional cues. As this integrative approach addresses the issues of emotional dysregulation and poor self-concept, the most prominent emotional and psychosocial features of NSSI, DBT has become a mainstay treatment for NSSI for parasuicidal adolescents. It has helped to reduce life-threatening behaviors and behaviors that reduce quality of life, while lowering the odds of inpatient hospitalization.

Despite the success of such therapy, however, we know that the timing and motivation for therapy is critical. When youth perceive that an intervention is imposed, without choice, or with unrealistic expectations that are not understood or personally meaningful (e.g., a clinician's instruction that a youth must immediately stop engaging in cutting), it is likely to have limited or no success (Nixon, Aulakh, Townsend, & Atherton, 2009). Rigidly imposing clinical advice to a youth who engages in NSSI can also make matters worse. The clinician that seeks instantaneous change, such as by requiring a child to endorse a no-harm contract, may only end up suppressing the NSSI, as the self-injurious youth may lose faith in counseling and reject the opportunity to develop alternative coping skills (see Walsh, 2006).

Indeed, most children who self-injure typically do not seek help, or they may be reluctant to disclose their concerns to a professional (see Nixon, Cloutier, & Jansson, 2008; Whitlock, Eckenrode, & Silverman, 2006). We realize, too, that NSSI involves an addictive feature (Favazza, 1996; Osuch and Payne, 2008) that may compete with treatment motivation and impede the remediation of self-injury. Motivational interviewing (MI) is therefore an advisable tactic to help youth to stop engaging in NSSI (see Nixon et al., 2009). At this time, however, empirical validation of MI in the treatment of NSSI is scarce.

So, the ultimate questions remain: How do we match empirically validated models and assessment of NSSI with empirically validated treatment? Further still, how do we motivate our children to seek help so that they do not turn to NSSI as a coping method? The answer, simply stated, is to engage the youth in a given case in a process of crisis stabilization, motivation for change, and counter-conditioning of the NSSI behaviors. Ongoing case conceptualization, clinical triaging, motivational interviewing, and exposure with response prevention constitute the direct NSSI interventions. A three-pronged approach to this NSSI intervention is as follows.

1. NSSI risk factor reduction and protective factor enhancement: The first phase of NSSI treatment begins with identification of the very factors that obstruct it. The clinician must identify and address, on a case-by-case basis, those factors that impede the youth's desire to get professional help.
2. Identification of the psychiatric conditions that are affecting a child in a given case, and remediation of NSSI as a correlative symptom of those conditions. Ongoing case conceptualization, which includes the functional analysis of NSSI will lay the groundwork for direct NSSI remediation. If suicidal ideations or behaviors are present, or if any specific reinforcements are identified as factors that elevate the risk of NSSI, they must be triaged and addressed on an urgent/emergent basis.

3. Clinical triage and treatment of comorbid psychiatric conditions, in tandem with direct remediation of NSSI. Motivational interviewing and behavioral counter-conditioning, namely using exposure with response prevention, is viewed here as the most efficient method for NSSI remediation.

NSSI risk and protective factor assessment

Risk and protective factors that correlate with motivation for NSSI treatment are known in the extant literature, and they can be discovered on an idiosyncratic basis with a given patient via the NSSI-FFM scheme and accompanying NSSI measurements. The literature tells us that children who engage in NSSI ordinarily turn to no one for help (Nixon, Cloutier, & Jansson, 2008). We have learned that these children do not seek professional help; rather, they tend to rely on themselves and/or commiserate with friends who engage in NSSI, due to a social modeling or contagion effect. Alternatively, NSSI youth tend to emulate what they have read or viewed within the media, or what they have reacted to, with respect to their own family.

We realize as well that NSSI risk factors can be insidious because of obstructions to NSSI protective factors that counter the basic motivation for therapy. For example, researchers explain that barriers to NSSI treatment-seeking behavior include: 1. The child's belief that the behavior is not problematic; 2. fear of disclosing the behavior due to shame or guilt; 3. lack of resources for getting help; 4. lack of knowledge about where to get help; and 5. familial discord (Klonsky and Glenn, 2009).

It behooves clinicians to stand ready to intervene with children who exhibit NSSI, and to be aware of those factors that elevate their NSSI risk, especially factors that deter them from seeking help. Making use of assessment measurements like the OSI, and others, like the Deliberate Self-Harm Inventory (DSHI; Gratz, 2001) and the Reasons for Living-Adolescent (RFL-A; Guittierez and Oman, 2008), and applying the assessment findings to the NSSI-FFM rubric is the approach recommended here.

The objective should be to learn as much as we can as clinicians about the automatic and social contingencies, particularly the risk factors that positively and negatively reinforce NSSI. Knowing the reinforcement mechanisms of NSSI, we can then contend with the treatment motivation of a given individual. The logic of treatment planning here is also intended to be a modular, distillation approach that resonates with recently advised case conceptualization tactics for children and adolescents (see Chorpita, Daleiden, & Weisz, 2005).

NSSI comorbidity assessment

Once risk and protective factors are triaged, we can then address the psychiatric comorbidity of NSSI. Psychiatric comorbidity, broadly speaking, involves the co-occurrence of distinct psychiatric conditions (Kaplan and Feinstin, 1974). Most clinicians agree that such co-occurrence is not random, but rather, indicative of correlative symptoms, psychological mechanisms, psychosocial conditions, genetic etiology, and/or risk factors (see Rudden et al., 2003; Tyrer, Gunderson, Lyons, & Tohen, 1997). The co-occurrence of multiple issues typically complicates case conceptualization and treatment planning. Nevertheless, when working with children we must contend with this issue, because the comorbidity of childhood psychiatric disorders is more the rule than the exception (see Ollendick et al., 2008).

Fortunately, we have learned much about how to effectively treat children who are diagnosed with multiple psychiatric conditions. In clinical research, we have come to recognize that psychiatric comorbidity should be regarded as a moderator variable that influences the strength and outcome of a particular treatment (Ollendick et al., 2008). In professional practice, we have learned that stronger case conceptualization and individually tailored treatment planning are possible when the issues that underlie comorbidity are deliberately assessed. The clinician who recognizes the presence of comorbidity in a

given case, and who critically evaluates its features, becomes well informed “for whom” and “under what conditions” specific treatments work (Kraemer, Wilson, Fairburn, & Agras, 2006).

These issues pertain to NSSI because deliberate self-injury often presents as a comorbid feature, psychological correlate, and/or risk factor of various childhood psychiatric disorders. Substance abuse, obsessive-compulsive-disorder, and depression are the most frequently correlated psychiatric conditions of NSSI (Lofthouse, Muehlenkamp, & Adler, 2009). It stands to reason, then, that upon completion of NSSI functional analysis in a given case, general psychiatric assessment and differential diagnosis processes should occur. As a correlate, NSSI may be recognized as a moderator of the psychiatric treatment of other disorders. By integrating NSSI into treatment planning of correlative psychiatric disorders, we can offer an empirically validated, individually-tailored treatment approach.

This integrative method of NSSI treatment planning is commensurate with comorbidity research and practice guidelines. Clinical researchers have been imploring practitioners to embed into their treatment plans assessment of clinical symptom/phenotype, risk factor analysis, psychological mechanism analysis, and etiological analysis. This will assist in understanding, in a given case, why there is co-occurrence of psychiatric diagnoses and symptom clusters (see Tyrer et al., 1997). Given the over-determinism of NSSI behaviors, and the known correlates of NSSI with other childhood disorders, this integrative approach to comorbidity assessment seems prudent for the treatment of NSSI.

Lofthouse and colleagues (2009) suggest that because of the co-occurrence of NSSI with other psychiatric disorders, and because NSSI may covary with suicidal intention, it is imperative to initiate and sustain case conceptualization of the individual who exhibits NSSI, throughout the course of treatment. In other words, NSSI treatment is a fluid and iterative process of conceptualization, triage and intervention. Where suicidality is present, it must first be remediated, and only then, can NSSI behaviors be targeted for treatment. NSSI treatment requires treating the diagnosed conditions and symptoms that co-occur with NSSI behaviors, and eventually the NSSI behaviors specifically (Lofthouse, Muehlenkamp, & Adler, 2009). A myriad of combinations of symptoms, comorbid diagnoses, and NSSI reinforcement systems is possible. Therefore, clinicians should examine evidence-based practices for the treatment of each diagnosed condition correlated with NSSI, while continually monitoring and mitigating NSSI risk factors.

NSSI-directive treatment

Direct treatment of NSSI behavior presumes that NSSI has been triaged as the most pressing of all clinical issues in a given case. Direct NSSI treatment presumes that suicidality has been remediated and that crisis stabilization has been achieved. With these presumptions, the first direct step in NSSI treatment is to motivate the individual to make changes. The second step is to remediate the NSSI behaviors. A coordinated, two-step approach is advised here:

1. Coordination of therapeutic motivation tactics, relative to Prochaska and DiClemente's transtheoretical model (TTM) of change (1982), alongside motivational interviewing tactics, to contend with the obsessive-compulsive and psychobiological addictive properties of NSSI; and
2. Application of exposure with response prevention (ER/P) cognitive-behavioral techniques, to contend with the obsessive-compulsive features of NSSI.

TTM with Motivational Interviewing

TTM has been applied to numerous behavioral and addictive disorders (Prochaska, 2007; Prochaska et al., 1994; Prochaska, DiClemente, & Norcross, 1992), and found to be empirically

effective, as in the case of smoking cessation. As a five-stage process, TTM considers individuals' motivational readiness or progress towards modifying the problem behavior:

1. Precontemplation, wherein individuals are avoidant and defensive about making any change to their behavior; the need for change is not recognized;
2. Contemplation, wherein individuals are seriously, consciously deliberating about changing their problem behavior; the actual decision to change is underway, but not as yet reached;
3. Preparation, wherein individuals have decided to take steps to be educated about the problem behavior, and to engage in self-re-evaluation about the problem behavior;
4. Action, wherein self-re-evaluation continues to transpire, as the individuals are now consciously committed to self-liberation, by making behavioral changes that involve stimulus control, counter-conditioning, and reinforcement management; i.e., they are doing something to change;
5. Maintenance/ Relapse-Prevention, wherein, an active program includes: ongoing psychological education, re-evaluation, and reinforcement management of the problem behavior and prevention of demoralization and regression to earlier stages of change.

As applied to NSSI, and to the features of NSSI-FFM, this paper proposes that specific techniques of motivational interviewing (MI) be employed to contend with the NSSI addictive features (Nixon et al., 2009).

MI has proven particularly useful for individuals who are ambivalent in their desire for change, but nonetheless, are crossing from the precontemplative to contemplative phases of motivation. In particular, MI has been shown to work especially for patients in the contemplative stage of change, by helping them to explore their ambivalence and to develop intrinsic motivation to change (Miller and Rollnick, 2002). MI is typically viewed as a directive, client-centered counseling style that enhances motivation for change by helping individuals clarify and resolve ambivalence about behavior change. Consequently, on the part of the therapist, MI involves:

1. Expression of empathy, including Rogerian humanistic notions of acceptance, warmth, openness, personal value, and understanding.
2. Therapeutic reflective listening, which includes paraphrasing individuals' statements, and reflecting on the emotional content of their concerns, as opposed to an interpretation of individuals' statements.
3. Summarization, so that individuals can hear what they have conveyed and to transition to new topics.

MI is about motivating individuals by guiding them through their ambivalence, and strengthening their commitment to change. Applying notions of cognitive dissonance, MI also helps to communicate to individuals the discrepancy between their present behavior and broader goals for change.

As applied to NSSI treatment, this paper proposes a heuristic approach, utilizing a mnemonic (acronym-based) format that is commensurate with the TTM stages of change and MI objectives. Using the acronym sequence "REVIVE!!-VALUE-READY-SET-GO!," this approach is intended to coordinate the most essential MI objectives with the TTM stages of change, as shown in Table 2. As shown, it could be used as a guidepost for NSSI treatment motivation, which researchers indicate is the number one risk factor obstructing children and adolescents from curbing deliberate self-injury (see Nixon, Cloutier, & Jansson, 2008). If motivation is instilled in them, it can also be a highly valuable protective factor against NSSI.

Table 2. NSSI Treatment Guidepost: Coordination of MI with TTM Stages of Change

Acronym	MI Objective	TTM PHASE
REVIVE!!	EMPATHIZE	PRECONTEMPLATION
Recognize		Validate the patient's experiences
Entrust		Acknowledge the patient's control of the NSSI decision
Voice		In a simple, direct statement, give your professional opinion on the benefits of addressing NSSI
Investigate		Explore potential concerns
Vindicate		Acknowledge possible feelings of being pressured
Empathize		Validate that the patient is not ready stop NSSI
!		Restate your position that the decision to stop NSSI is up to the patient
!!		Encourage reframing of current state of change <i>as the potential beginning of a change – rather than a decision to never change.</i>
VALUE!	REFLECTIVE LISTENING	CONTEMPLATION
Value		Validate the patient's experience
Address		Acknowledge the patient's control of the NSSI decision
Lead		Clarify the patient's perceptions of the pros and cons of NSSI recovery
Understand		Encourage further self-exploration
Engage		Restate your position that the NSSI recovery is up to the patient
!		Leave the door open for moving to preparation
READY	AMBIVALENCE MOVEMENT	PREPARATION
Reinforce		Praise the decision to change behavior
Energize		Prioritize behavior change opportunities
Alter		Restate your position that the decision to recover from NSSI is up to the patient
Dance		Encourage small, initial steps
Yin-Yang		Assist the patient in identifying social supports
SET	DISSONANCE CORRECTION	ACTION
Solve		Identify problems
Evolve		Resolve problems
Teach		Teach coping and problem-solving skills by breaking down components
GO!	GUIDANCE	MAINTENANCE & RELAPSE
Guide		Review potential solutions

Exposure with Response Prevention

As the therapist proceeds along the TTM-MI motivational continuum, application of exposure with response prevention (ER/P) is advised. ER/P has been empirically validated as a cognitive-

behavioral treatment for obsessive-compulsive disorder (OCD) in children (Bolton & Perrin, 2008). As NSSI behaviors often include the characteristic features of OCD, research has supported the application of ER/P to NSSI treatment (Nixon et al., 2009).

Counter-conditioning and extinction are the therapeutic mechanisms of ER/P. Applied to NSSI, ER/P is cognitive-behavioral in its delivery; it requires the individual who exhibits NSSI to be mentally exposed to the psychosocial conditions (the triggers) that elicit self-injurious behaviors. Upon exposure to these triggers, the NSSI behaviors are prevented and replaced with alternative problem-solving approaches (e.g., relaxation exercises; journaling). The NSSI reinforcements that the individual has identified through functional analysis are carefully monitored and prevented, which enables NSSI extinction.

From a tactical perspective, it is relevant that both TTM-MI and ER/P are based on principles of counter-conditioning and extinction. TTM-MI motivates change and encourages morale for therapy because it extinguishes treatment phobia and avoidance. ER/P, analogously, counter-conditions the aversion and avoidance of the psychosocial conditions that elicit NSSI. Through mental exposure, and NSSI response prevention and replacement, ER/P aims to extinguish negatively reinforced NSSI behaviors. The child who has a reported history of compulsively scratching his/her legs to the point of bleeding, in order “to release frustration,” “to stop having thoughts of suicide” or “to stop a boyfriend/girlfriend from being angry” is motivated through TTM-MI and ER/P to become assertive. The child may be encouraged to identify his/her feelings of anxiety, experience of rejection, and ruminative thoughts of suicide. This child may then be encouraged to assertively engage in progressive relaxation exercises, journaling, and problem-solving discussion, instead of defaulting to self-effacing thoughts and NSSI behaviors.

Stated simply, TTM-MI and ER/P serve as complements to one other in the treatment of NSSI. TTM-MI is the behavioral ignition for NSSI remediation; ER/P is the behavioral modification engine. Together, based on functional analysis data, they expose the child to the psychosocial conditions (triggers) of NSSI, counter-condition aversion to those triggers, and then impede the NSSI reinforcements that drive the NSSI behaviors. The complement of TTM-MI and ER/P for the remediation of NSSI is a modular treatment approach because it involves functional analysis, counter-conditioning and the targeted extinction of specific behavioral problems. It is an approach that clinicians have strongly advised in recent years for the remediation of childhood psychopathology marked by diagnostic comorbidity (see Chorpita, Daleiden, & Weisz, 2005).

Treatment Outcome Evaluation

The remediation of NSSI may proceed, and eventually conclude, on the basis of treatment outcome evaluation. NSSI extinction requires ongoing assessment and triage of NSSI risk factors, triggers, self-injurious behaviors, and reinforcements. It is suggested that NSSI functional analysis be periodically conducted upon graduation to each stage of change along TTM-MI chain, and as any new ER/P intervention is introduced to a child. Outcome evaluation may employ specific measurements of NSSI (e.g., Nixon and Cloutier, 2005), as well as measurements of NSSI protective and risk factors (e.g., the RFL-A; Gutierrez and Osman, 2008). Re-evaluation of NSSI correlates and comorbid conditions (e.g., through the Children’s Depression Inventory, Kovacs, 1980; Minnesota-Multiphasic Personality Inventory-Adolescent, Butcher et al., 1992), is also essential to treatment outcome tracking.

NSSI outcome assessment should be conceptualized as an iterative process that involves continual monitoring of therapeutic motivation; crisis stabilization; risk factor deterrence; protective factor enhancement; direct remediation of NSSI behaviors; and treatment plan updating. Empirically validated measurements of NSSI and specific psychiatric conditions can be made at each phase of TTM-MI and ER/P intervention to ensure the effectiveness of NSSI remediation.

Conclusions and Clinical Research Directions

We have learned much as researchers and clinicians about the conceptualization, assessment and treatment of NSSI. We now have empirically validated techniques to functionally analyze NSSI, and specific methods to motivate and prevent NSSI in our youth. Recognizing that NSSI is correlated with many childhood disorders, we are prepared to triage NSSI treatment in conjunction with treatments of other childhood psychiatric conditions.

Suggestions outlined in this paper that we coordinate NSSI-FFM functional analysis with treatment modalities like TTM, MI, and ER/P may also provide for a more carefully distilled, yet compassionately motivated approach to NSSI treatment. The intent of this proposal is to motivate children to seek the treatment for NSSI, since most youth with NSSI are not eager for NSSI intervention. The other goal behind the proposal is that a motivational approach will help NSSI treatment better meet the unique needs of a given child. It is the kind of case-specific NSSI treatment approach that clinicians have sought for years (e.g., Suyemoto, 1998).

The approach outlined in this paper would require its own empirical validation. We would need to verify the efficacy of coordinating ER/P, TTM and MI tactics in NSSI treatment. Clinical research approaches that involve Randomized Clinical Trials (RCTs) would be advised, especially as RCTS are typically used to validate treatments for children with psychiatric comorbidity (see Ollendick et al, 2008).

To develop effective treatment interventions, we also have to further understand what factors are both increasing and decreasing the base rates of the targeted behavior. NSSI risk and protective factor research (e.g., Klonsky and Glenn, 2009) should be an ongoing effort. Furthermore, the proposal for NSSI treatment in this paper presumes that deliberate self-injury is reinforcement-driven. We should not overlook whether and to what extent punitive drives also motivate NSSI (Nixon and Heath, 2009). To this end, we may need to further research operant learning principles (Dreyer and Renner, 1971), personality substrates (McWilliams, 1994) and socioemotional conditions (Suyemoto and MacDonald, 1995) that impact the development and maintenance of NSSI (Suyemoto and MacDonald, 1995).

For example, research has indicated that children with abuse and neglect histories are vulnerable to emotional dysregulation and poor self-concept which, in turn, promulgate the risk factors for NSSI (see Miller, Rathus, & Linnehan, 2007). Looking at the psychosocial conditions of our society, recognizing those risk factors seems paramount. According to the U.S. Department of Health and Human Services (DHHS, 2008), millions of cases of child abuse and neglect (CAN) are reported and investigated each year. In the 2006 Federal fiscal year (FFY), child protective services nationwide estimated 3,573,000 CAN reports from families and child protective services. There were 905,000 children confirmed CAN cases, while victimization rates have increased annually throughout this decade. Compared to FFY 2004, in FFY 2005, there were 18,000 more CAN investigations and 8,000 more substantiated CAN case. An additional 5000 CAN cases and 1,530 CAN fatalities were confirmed in 2006. Thus, we appreciate that the sociological factors associated with the epidemic increase in NSSI, are themselves, epidemic. They should be accounted for in further NSSI clinical research.

Notwithstanding these issues, this paper will conclude as it began: we need not be discouraged. As long as we can continue to identify the psychosocial conditions and motivating factors related to NSSI, via frameworks like NSSI-FFM, and measurements such as the OSI and RFL-A, we stand empirically equipped to understand NSSI in our youth. By increasing our understanding of the psychiatric correlates of NSSI (see Lofthouse, Muehlenkamp, & Adler, 2009), we increase our ability to identify and implement empirically and ethically sound techniques to remediate NSSI.

Our appreciation and understanding of the underpinnings of NSSI has grown tremendously since Menninger first levied his concerns. We should capitalize on refining our conceptual and empirical

mastery of this growing epidemic. There is always more to learn but for now, we have validated approaches with real-world clinical application and utility to effectively intervene and mitigate the risk of NSSI in our youth.

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