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## Characteristics of Self-Injury in Young Adolescents

### Findings from Cross-Sectional and Longitudinal Studies in Swedish Schools

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# Characteristics of Self-Injury in Young Adolescents

*Findings from Cross-Sectional and Longitudinal Studies in Swedish Schools*

**Dissertation for the degree of  
Doctor of Philosophy in Psychology**

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Academic dissertation which, by due permission of the Faculty of Social Sciences at Lund University, will be publicly defended on September 28, 2012, at 13:15 in Edens hörsal, Paradisgatan 5H, Lund.

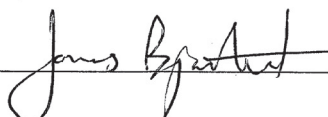


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<p>Abstract</p> <p>Self-injury in adolescents (e.g. when individuals cut, burn, hit or otherwise deliberately cause themselves direct injury), has gained recognition as a potentially important mental health problem during the past decade. Relatively little has been known about the scope and characteristics of this behavior in Swedish adolescents.</p> <p>This thesis consists of three studies that in different ways explore the characteristics of self-injury among adolescents in the general community. In Study 1 a convenience sample of 202 adolescents responded to a battery of self-report questionnaires on self-injury and a number of related factors at two different occasions. At these times 36.5 % and 40.2 % respectively reported to have deliberately engaged in self-injurious behaviors. Self-injury also showed robust relationships with general psychopathology, an absence of positive feelings to parents, and a ruminative style of emotion regulation. These latter two factors were also predictors of self-injury, independently of general psychopathology. Additionally, in girls, results also indicated a relationship between self-injury and symptoms of eating disorder and negative body esteem. Study 2 used a longitudinal survey design with a 1-year interval to further investigate self-injury in a community sample of 1052 adolescents. The battery of self-report questionnaires on self-injury and related factors was again employed, and both conventional statistical methods and hierarchical cluster analysis were used to analyze the results. Results indicated that 41.5 % and 42.9 % respectively had engaged in self-injury, as reported at the two occasions of data collection. The cluster analyses identified eight different subgroups of self-injuring adolescents (in each gender) based on patterns of self-injury. In both boys and girls a fairly large proportion (about 60 %) of self-injuring adolescents were found in a subgroup reporting low-frequency self-injury only, and little psychological difficulties. The analysis also identified a small subgroup of both girls and boys (about 5 % of self-injuring girls and 3 % of self-injuring boys) reporting frequent self-injury and multiple self-injury methods, as well as often reporting pronounced forms of both externalizing and internalizing psychopathology. A third subgroup of interest was found in girls (consisting of about 10 % of self-injuring girls) who showed a pattern of cutting behaviors as their main form of self-injury, primarily related to internalizing forms of psychopathology. Additionally, the cluster analyses identified subgroups within each gender, which were characterized by different patterns of self-injury, associated with varying degrees and forms of psychopathology. Overall, the subgroups of self-injuring girls were both more stable over time and associated with more psychological problems. Study 3 analyzed data collected through interviews with both self-injuring adolescents (n = 66) and a group of their non-injuring peers (n = 31) from the sample used in Study 2. Around 2/3 of the adolescents that were asked were willing to engage in an interview and also reported positively about it afterwards. Interviewing adolescents about self-injury gave varying amounts of additional information not covered in the questionnaires. Only about 1 in 5 of those who reported self-injury in a questionnaire acknowledged currently engaging in self-injury when interviewed. In about half of the cases, adolescents did not share any information about self-injury at all in the interview; others still reported having ceased to engage in such behavior. Further, in only about 1 of 4 cases where sufficient information was presented to the interviewer to allow for an assessment of the severity of the behavior, was the problem assessed as serious. The rates of self-injury were also compared approximately one year after the interview between those adolescents who were interviewed and a matched control group. Results did not indicate that being interviewed about one's situation affected the tendency to self-injure.</p> <p>Taken together, these studies demonstrate that among young Swedish adolescents in the general community, a large proportion indicate having engaged in some form of self-injury. Even though self-injury in these studies appears to be clearly related to other psychological difficulties, only in a minority of the cases does this appear to be a serious problem. The findings highlight that self-injury in adolescents may have different clinical and developmental implications for different individuals. School based interventions may be warranted to address self-injury in the general community, and addressing self-injury in this setting may provide important information about individuals' self-injurious behaviors, and also provide a setting where support and care can be conveyed. However, such procedures need to be further developed in order to be sufficiently attractive for adolescents.</p>	
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# Characteristics of Self-Injury in Young Adolescents

Findings from Cross-Sectional and Longitudinal Studies in  
Swedish Schools



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Jonas Bjärhed



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# Abstract

Self-injury in adolescents (e.g. when individuals cut, burn, hit or otherwise deliberately cause themselves direct injury), has gained recognition as a potentially important mental health problem during the past decade. Relatively little has been known about the scope and characteristics of this behavior in Swedish adolescents.

This thesis consists of three studies that in different ways explore the characteristics of self-injury among adolescents in the general community. In Study 1 a convenience sample of 202 adolescents responded to a battery of self-report questionnaires on self-injury and a number of related factors at two different occasions. At these times 36.5 % and 40.2 % respectively reported to have deliberately engaged in self-injurious behaviors. Self-injury also showed robust relationships with general psychopathology, an absence of positive feelings to parents, and a ruminative style of emotion regulation. These latter two factors were also predictors of self-injury, independently of general psychopathology. Additionally, in girls, results also indicated a relationship between self-injury and symptoms of eating disorder and negative body esteem. Study 2 used a longitudinal survey design with a 1-year interval to further investigate self-injury in a community sample of 1052 adolescents. The battery of self-report questionnaires on self-injury and related factors was again employed, and both conventional statistical methods and hierarchical cluster analysis were used to analyze the results. Results indicated that 41.5 % and 42.9 % respectively had engaged in self-injury, as reported at the two occasions of data collection. The cluster analyses identified eight different subgroups of self-injuring adolescents (in each gender) based on patterns of self-injury. In both boys and girls a fairly large proportion (about 60 %) of self-injuring adolescents were found in a subgroup reporting low-frequency self-injury only, and little psychological difficulties. The analysis also identified a small subgroup of both girls and boys (about 5 % of self-injuring girls and 3 % of self-injuring boys) reporting frequent self-injury and multiple self-injury methods, as well as often reporting pronounced forms of both externalizing and internalizing psychopathology. A third subgroup of interest was found in girls (consisting of about 10 % of self-injuring girls) who showed a pattern of cutting behaviors as their main form of self-injury, primarily related to internalizing forms of psychopathology. Additionally, the cluster analyses identified subgroups within each gender, which were characterized by different patterns of self-injury, associated with varying degrees and forms of psychopathology. Overall, the subgroups of self-injuring girls were both more stable over time and associated with more psychological problems. Study 3 analyzed data collected through interviews with both self-injuring adolescents ( $n = 66$ ) and a group of their non-injuring peers ( $n = 31$ ) from the sample used in Study 2. Around 2/3 of the adolescents that were asked were willing to engage in an interview

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Taken together, these studies demonstrate that among young Swedish adolescents in the general community, a large proportion indicate having engaged in some form of self-injury. Even though self-injury in these studies appears to be clearly related to other psychological difficulties, only in a minority of the cases does this appear to be a serious problem. The findings highlight that self-injury in adolescents may have different clinical and developmental implications for different individuals. School based interventions may be warranted to address self-injury in the general community, and addressing self-injury in this setting may provide important information about individuals' self-injurious behaviors, and also provide a setting where support and care can be conveyed. However, such procedures need to be further developed in order to be sufficiently attractive for adolescents.



# Sammanfattning på svenska

Avhandlingens titel: Självskadebeteende bland ungdomar: resultat från tvärsnitts- och longitudinella studier i svenska skolor.

Självskadebeteende bland ungdomar (exempelvis när någon skär, bränner eller slår sig själva, eller avsiktligt åsamkar sig direkta skador på något annat sätt) har uppmärksammats som ett växande problem under de senaste årtiondena. Kunskap om omfattningen och arten av detta problem bland svenska ungdomar har dock varit tämligen begränsad. Föreliggande avhandling avser bidra med kunskap inom detta område, med fokus på självskadebeteende bland skolungdomar. Syftet med arbetet var dels att beskriva självskadebeteende bland ungdomar, dels att undersöka beteendets samband med andra svårigheter som ungdomar kan uppleva, och slutligen att utforska möjligheten att bemöta självskadebeteende i ett skolsammanhang.

I Studie 1 besvarade 202 ungdomar (14 år gamla) en kortare version av ett instrument utformat för att mäta självskadebeteende (Deliberate Self-Harm Inventory; DSHI) vid två tillfällen. Instrumentets psykometriska egenskaper och praktiska lämplighet för sammanhanget undersöktes. Vid de två mättillfällena angav 36.5 % respektive 40.2 % av ungdomarna att de någon gång avsiktligt skadat sig själva. I studien framkom också ett samband mellan självskadebeteende och andra typer av problem, inklusive externaliserande och internaliserande symptom, dysfunktionella strategier för att reglera känslor (i form av ruminerande/ältandebeteenden) och en relativ avsaknad av positiva relationer till föräldrar. Dessa två sista faktorer framstod som särskilt viktiga då de predicerade självskadebeteende oberoende av andra symptom. För flickor framkom också ett samband mellan självskadebeteende och symptom på ätstörning samt negativ kroppsuppfattning.

I studie 2 undersöktes en andra, större och mer representativ grupp av ungdomar kring sitt självskadebeteende. Ett syfte med denna studie var att förstå den stora variation i självskadebeteendets allvarlighetsgrad som kan observeras hos olika individer. Genom statistiska metoder identifierades därför undergrupper av ungdomar med olika mönster av självskadebeteenden i denna studie. Sammantaget fick 1052 ungdomar (13-15 år gamla) besvara ett frågeformulär vid två olika tillfällen (med ett års mellanrum). Resultat liknande dem i studie 1 framkom då 41.5 % respektive 42.9 % i gruppen angav att de någon gång skadats sig själva vid de två mättillfällena. Åtta olika undergrupper av ungdomar identifierades. Det visade sig att merparten av ungdomarna som rapporterade självskadebeteende tillhörde undergrupper som kännetecknades av bara rapportera få självskadetillfällen och som inte urskilde sig

nämnvärt från ungdomar som inte självskadat vad gäller förekomsten av andra problem. En minoritet av ungdomarna uppvisade dock självskadebeteenden i kombination med andra problem som kunde sägas klart utgöra ett allvarligt problem för individernas välbefinnande. Självskadebeteende bland ungdomar tycktes alltså ha olika kliniska och utvecklingsmässiga implikationer för olika individer.

I studie 3 intervjuades ungdomar för att ge en mer utförlig bild av deras självskadebeteende. Studien syftade till att använda intervjuer med elever i skolan för att samla viktig information om individens självskadebeteende som kunde komplettera informationen från frågeformulären. En förhoppning var att intervjun också kunde utgöra ett tillfälle för intervjuaren att förmedla förståelse och stöd kring individens livssituation. Ungdomar var i allmänhet villiga att delta i en sådan intervju och rapporterade att de upplevde det som positivt att prata om sin situation med en vuxen. Nyttan av intervjuer som informationskälla kring ungdomars självskadebeteende varierade dock. Bara i ungefär 1 av 5 fall då ungdomar intervjuades framkom att de var aktivt självskadande, trots att personen rapporterat detta i ett frågeformulär. Flera uppgav dock att de tidigare självskadat men numera slutat med detta och i ungefär hälften av intervjuerna delgav de intervjuade ingen information alls om självskadebeteende. I de fall där ungdomar delade med sig av information kring sitt självskadebeteende som medgav att en bedömning av problemets svårighetsgrad kunde göras bedömdes beteendet som allvarligt hos ungefär 1 av 4 ungdomar.

Sammantaget visar studierna i avhandlingen att en stor andel av svenska skolungdomar rapporterar att de någon gång avsiktligt skadat sig själva. Studierna visar att självskadebeteende bland ungdomar är tydligt relaterat till andra samtida problem, dock är det bara en mindre del av alla personer med självskadebeteende där detta verkar utgöra ett allvarligt problem. Implikationerna av beteendet och olika personers behov av stöd och hjälp varierar istället i hög grad för olika personer med självskadebeteende. Mot bakgrund av den relativt stora utbredningen av självskadebeteende bland skolungdomar kan det vara till nytta att utveckla skolbaserade metoder för att bemöta detta beteende. Intervjuer med ungdomar kan i vissa fall vara ett bra sätt att närma sig självskadebeteende och att förmedla stöd och omtanke. Sådana metoder behöver dock utvecklas ytterligare för att bli tillräckligt tilltalande för självskadande ungdomar.

# Tack

Det är många som på olika sätt bidragit till den här avhandlingen. Samtliga ryms inte att nämna här, men alla har min uppriktigaste uppskattning.

Mest avgörande har allt stöd jag fått från mina handledare *Lars-Gunnar Lundh* och *Margit Wångby-Lundh* varit. Lars-Gunnar: Tack för din generositet, för att du upplåtit tid, engagemang och din stora ämneskunskap till detta arbete! Och Margit: Tack för all konstruktiv kritik, givande diskussioner och för din stora omtänksamhet! Ert sammanlagda bidrag till avhandlingen har varit ovärderligt och jag är djup tacksam för privilegiet att få lära mig detta hantverk av er.

Jag vill också rikta ett stort tack till *Kajsa Pettersson*, som varit min alltid lika positiva och lösningsorienterade kompanjon i mycket av de praktiska inslagen i avhandlingsarbetet (såsom skolbesök, insamling av frågeformulär, och intervjuer av ungdomar).

Att skriva den här avhandlingen har tidvis varit en krävande och ganska ensam uppgift. Vid de tillfällena har umgänge med vänner och kollegor ofta varit en välbehövlig avlastning. Med anledning av detta vill jag tacka *Olof Johansson* och *Andreas Malm*, för att jag alltid har kunnat dryfta både ämnesrelaterade och helt andra frågeställningar med er. Jag vill också tacka mina kollegor på institutionen: särskilt *Björn Gustavson*, för att du alltid så självklart delat med dig av både dina omfattande professionella erfarenheter och av dig själv som person; och *Øyvind Jørgensen*, för att du erbjudit många trevliga samtal att ventilerat forskarutbildningens alla vedermödor i. Ett tack också till min vän *Mattias Andolfsson*: Tack för ditt sällskap och för att du ibland inte har visat ett så stort intresse för mitt avhandlingsarbete (det har varit en välkommen omväxling att kunna prata om annat).

Till allra största del har de senaste åren, tiden då jag arbetat med den här avhandlingen, ändå varit den allra ljusaste och mest meningsfulla tiden i mitt liv. För all den lyckan har jag främst två personer att tacka, och till dem vill jag också tillägna den här avhandlingen:

...till *Marlene* och *Alfred*, med all min kärlek!

# List of Original Papers

This doctoral thesis is based on the three empirical studies listed below:

## Study 1.

Deliberate Self-Harm in 14-Year-Old Adolescents: How Frequent Is It, and How Is It Associated with Psychopathology, Relationship Variables, and Styles of Emotional Regulation? Authored by: Bjärehed, J., & Lundh, L.-G. (2008). Published in *Cognitive Behaviour Therapy*, 37(1), 26–37.

## Study 2.

Nonsuicidal self-injury in a community sample of adolescents: subgroups and associations with psychopathology. Authored by: Bjärehed, J., Wångby-Lundh, M., & Lundh, L.-G. (2012). Accepted for publication in the *Journal of Research on Adolescence*.

## Study 3.

Examining the acceptability, attractiveness and effects of a validating interview for adolescents who self-injure. Authored by: Bjärehed, J., Pettersson, K., Wångby-Lundh, M., & Lundh, L.-G. (2012). Accepted for publication in the *Journal of School Nursing*.

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# 1. Introduction

Self-injury (deliberate self-induced injuries resulting in direct tissue damage, typically of mild or moderate severity; i.e., with low lethality) such as when an individual cut, burn, hit, or similarly injure themselves, has been a topic of growing concern during the last few decades. While previously being seen as a fairly marginal phenomenon pertaining to severe mental health disorders, today we are aware that this type of behavior is both common and widespread. An especially worrying trend has been the prevalent occurrences of self-injury amongst adolescents. In order to better understand and potentially alleviate the negative physical, psychological and social consequences that self-injurious behavior entails, additional research and clinical efforts aimed at the problem are warranted. This thesis contributes to that cause through a series of studies that explore the characteristics of self-injury in young adolescents in Sweden.

As an introduction to these studies, the following sections will describe how self-injury is generally viewed in contemporary clinical psychology; focusing first on how it can be delineated and generally understood and then in more detail by reviewing previous research on characteristics of self-injury that are explored further in this thesis. In the second part of the thesis, the three studies that constitute the empirical work of the thesis are summarized. The third part of the thesis describes a number of supplemental analyses contrasting and elaborating the data from these studies. Finally, the results, implication and limitations of the thesis are discussed in the fourth and final part of the thesis.

## 1.1 Defining and Classifying Self-Injury

There is a myriad of self-defeating, dangerous and harmful behavior that people engage in with regularity (Baumeister & Scher, 1988, Skegg, 2005), and similar behaviors can also be found in animals (Dellinger-Ness & Handler, 2006). Although extensive study has been conducted on many of these behaviors for decades (e.g. research on suicide and suicide attempts), researchers have only more recently begun to thoroughly focus specifically on direct forms of non-lethal self-injurious behaviors. It has become increasingly apparent that our understanding of this behavior has been



fairly limited and that it deserves further studies in its own right, apart from suicidal behaviors (e.g. Nock, Joiner, Gordon, Lloyd-Richardson, & Prinstein, 2006; Muehlenkamp, 2005).

Hence, self-injury is today often viewed as a distinct category of behaviors that can be hierarchically categorized under a broader construct that encompass the full range of self-injurious/self-harming behaviors that occur. Two separate traditions can be identified that denominate this top-level construct; in the UK and Europe the terms *deliberate self-harm* and *parasuicide* has been commonly used to refer to different self-injurious behaviors in a general sense (including both suicide attempts and less lethal behaviors). Similarly, in the USA the term *attempted suicide* has been used much in the same way, i.e. as an umbrella term for different behaviors with suicidal intent, but sometimes also including non-suicidal self-injury or self-injury with unclear motives (Skegg, 2005). The praxis of using a multitude of different terms describing alternately separate, similar, and overlapping constructs without clear conceptual and operational consensus about terminology has unfortunately created confusion and been hampering for the field of self-injury research (Gratz, 2001).

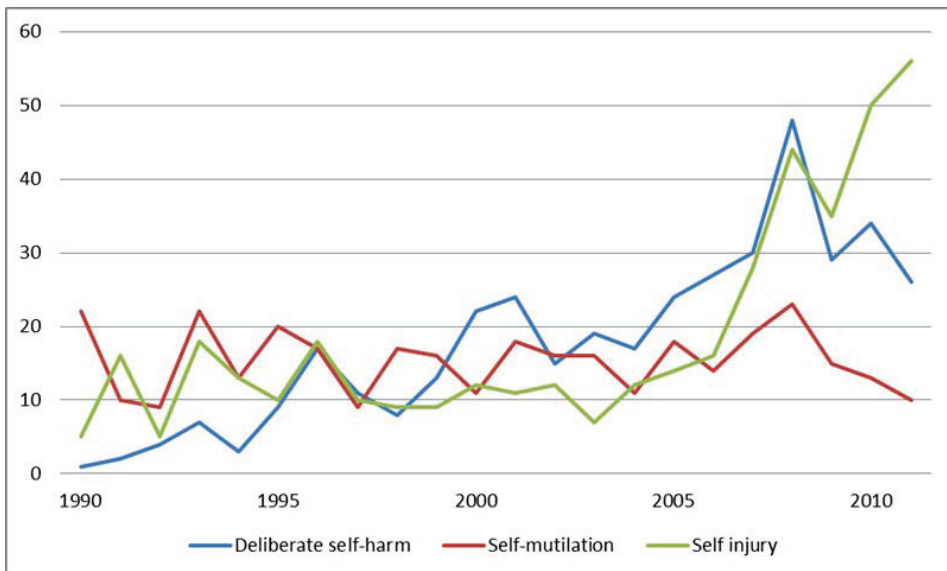
### **1.1.1 Suicidal and Non-Suicidal Self-Injury**

How different subsets of self-injurious behaviors should be delineated and termed has been a debated issue. Earlier literature tended not to make any clear distinction between suicidal and non-suicidal behaviors, viewing different forms of self-injury as basically the same class of behavior, varying only in their degree of lethality (Skegg, 2005). The distinction between suicidal and non-suicidal behaviors has however been increasingly emphasized as important both for research and clinical purposes (O'Carroll et al., 1996), and a multitude of empirical findings appear to support the relevance of this distinction. Today, it is clear that self-injury and suicide differ on a number of important features, including: intent, lethality, chronicity, methods, associated cognitions, typical reactions from others, aftermath, demographics and prevalence (Muehlenkamp, 2005; Muehlenkamp & Gutierrez, 2004). Both people who self-injure and people who attempt suicide can also constitute clearly distinguishable groups (Jacobson, Muehlenkamp, Miller, and Turner, 2008; Nock & Kazdin, 2002; Selby, Bender, Gordon, Nock, & Joiner Jr., 2012). It is important to note however that suicide and suicide attempts are overrepresented in people who self-injure (Nock, et al., 2006). Cooper et al. (2005) noted that individuals who engage in any form of self-injury (including both non-suicidal self-injury and suicide attempts) are 30 times more likely to die by suicide, relative to people who do not self-injure. This has been proposed to be due to self-injury habituating individuals to fear and pain common to both self-injury and suicide attempts, reducing the threshold for subsequent engagement in both types of behaviors (Joiner, 2005). Nock et al. (2006) in fact demonstrated that in adolescent psychiatric inpatients a longer

history of self-injury, the utilization of a greater number of self-injury methods, and the absence of pain when injuring were all associated with later making a suicide attempt.

Accordingly, it has been necessary for researchers interested primarily in the subset of less lethal self-injurious behaviors to adopt specific terms and constructs. These have been based on similar but somewhat varying definitions, and include terms such as *self-mutilation*: “behavior in which people deliberately alter or destroy their body tissue without conscious suicidal intent” (Favazza & Conterio, 1989, p 283); *deliberate self-harm* or *deliberate self-injury*: “deliberate, direct destruction or alteration of body tissue without conscious suicidal intent, but resulting in injury severe enough for tissue damage to occur” (Gratz, 2001, p 253; Gratz, 2007), *self-injurious behaviors*: superficial/moderate self-injurious behaviors [...] characterized as repetitive, low-lethality actions that alter or damage body tissue (e.g., cutting, burning) without suicidal intent” (Muehlenkamp, 2005, p. 324) and *non-suicidal self-injury*: direct, deliberate destruction of one's own body tissue in the absence of intent to die (Nock, et al., 2006, p. 65). As can be seen in Figure 1, recent years have seen an increase in the usage of the term self-injury, at the expense of other terms (i.e. self-harm and self-mutilation).

In the empirical studies that are part of the present thesis both the term deliberate self-harm (Study 1) and non-suicidal self-injury (Study 2 and 3) are used to describe the same class of behavior (i.e. non-lethal deliberately self-induced injuries resulting in direct tissue damage). For the sake of consistency, the introduction to the thesis, as well as the summary of the studies, and the supplemental analyses and discussion, will use the terms self-injury or self-injurious behavior when referring to this class of behaviors. For simplicity these terms will also be used when referring to previous research, even though originally the terms listed above were used.



**Figure 1. Number of published articles per year with the three most common overlapping terms describing self-injury (e.g. “self-injury”, “deliberate self-harm”, “self-mutilation”) in the title (ISI web of knowledge, 2012)**

### 1.1.2 Self-Injury in Contemporary Society

Self-injury has been documented throughout human history (Favazza, 1996). It has been speculated that from a cultural perspective, self-injury may represent a generic behavior performed with the purpose of achieving some fundamental human goals, such as to experience healing or spirituality, or to achieve social stability (Favazza, 2009). The meanings of self-injury are however constructed within a cultural context. Historically, culturally sanctioned forms of self-injuries have been common; such as behaviors performed through rites or as part of religious practices. Today however, in western society, self-injury is generally perceived as a pathologic (deviant) form of behavior (Favazza, 1996). Although many culturally accepted practices which involve some degree of self-injury can be found in modern society (such as tattooing and piercing for decorative purposes), these acts are seldom thought of, or referred to, as self-injurious behaviors.

The view that self-injury, in most cases, is a non-normative expression related to mental anguish and suffering can be traced back throughout the era of modern psychiatry and clinical psychology, to at least as early as the beginning of the previous century (e.g. Conn, 1932; Dabrowski, 1937). Self-injury has often been seen as puzzling and even incomprehensible, both in mental health settings and in the general public, perhaps because most are used to thinking of self-preservation and the

avoidance of pain and discomfort as basic foundations for all behaviors. Mental health professionals have also sometimes held negative views of self-injury, considering the behavior to be uncommon, senseless, difficult to treat, and often performed by difficult patients for manipulative purposes (Favazza, 2009). These attitudes even persist among many health care professionals today (Saunders, Hawton, Fortune, & Farrell, 2011).

Generally, self-injury has also been seen as relating specifically to severe mental health disorders, such as personality disorder (specifically borderline personality disorder) and schizophrenia (e.g. Feldman, 1988). Recent years have however signified a particularly increase in the interest in research on self-injury as a separate, independent phenomenon, possibly as a result of a growing general awareness of the behavior occurring in many different settings, and not least in non-clinical populations of adolescents.

This trend in contemporary research has been illustrated by Nock (2010), showing a tripling of the number of yearly published papers on non-suicidal self-injury between the years 1998 and 2008. Today, the field has progressed to the point where researchers are attempting at synthesizing empirical evidence and integrating different theoretical models to develop a more coherent and comprehensive understanding of self-injury (e.g. Fliege, Grim, & Klapp, 2009; Nock, 2009c). Although, recent years have seen important advancements towards the understanding of self-injury, still much remains unclear (Nock, 2010).

### **1.1.3 The Rise of Self-Injury in Adolescents**

During the 1980s and 1990s self-injury grew in to public awareness. This likely coincided with an increase in the rates of the behavior in adolescents and young people, which has sometimes been characterized as “dramatic” (e.g. Nock, 2009a). Definitive conclusions about the change in rates of self-injury over time are difficult to draw, as self-injury has typically not been included in large-scale epidemiological studies (Jacobson & Gould, 2007). The assessment methods and definitions of self-injury has also varied between different studies, making comparisons difficult (Nock, 2010). A number of authors have however proposed that self-injury was increasing during the 1990s, especially apparent through an increase in hospital presentations (Garrison et al., 1993; Hawton et al, 2003; Olfson, Gameroff, Marcus, Greenberg, & Shaffer, 2005). Recently, similar trends of increasing number of patients seeking treatment related to intentional self-harm (including both overdoses, cutting/sticking and other methods) have also been reported in Sweden, over the period 1997-2007 (Beckman, Dahlin, Tidemalm & Runeson, 2010). This trend is also supported by findings of an inverse correlation during recent years between lifetime rates of self-injury and the age of respondents (Klonsky, 2007a). Awareness of increasing rates of

self-injury since the late 1990s can also be linked to the increased cultural visibility of the phenomena during the period, expressed through depiction and coverage of self-injury in mass media and through trends in the popular culture (Whitlock, Powers, & Eckenrode, 2006; Whitlock, Purington, & Gershkovich, 2009). It is difficult however to say whether the increased media-coverage has been a contributing cause, or merely the result, of actually increasing rates of self-injury in adolescents. Recently, researchers have however suggested that rates of non-suicidal self-injury may have stabilized in the general community (Muehlenkamp, Claes, Havertape & Plener, 2012; Muehlenkamp, Williams, Gutierrez, & Claes, 2009).

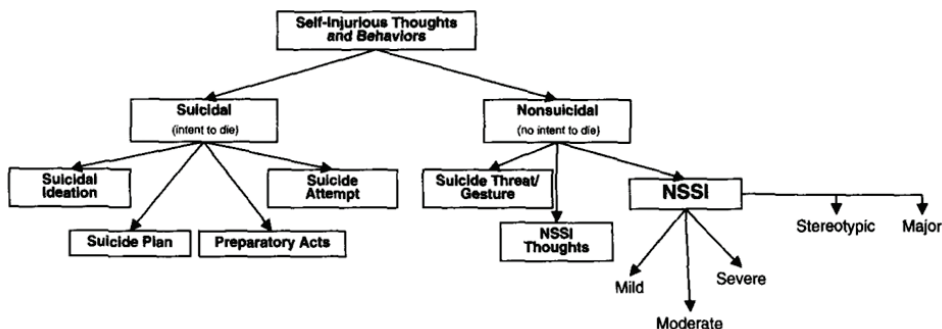
In Sweden, these concerns about rising rates of self-injury among adolescents, especially among young women, lead the Swedish board of health and welfare to compile a report entitled “What do we know about girls who cut themselves?” (“Vad vet vi om flickor som skär sig?”) (Socialstyrelsen, 2004). The report supported the impression that self-injury in adolescents was an emerging problem but concluded that knowledge about the phenomenon was insufficient. The need for more research in areas like prevalence, etiology, and prognosis, was underscored, as was the need to develop methods of prevention and treatment targeting self-injury in adolescents.

This development of self-injury into a prevalent expression of mental anguish and suffering among adolescents in the general community accentuates a need for research specifically targeting this group and further investigation into the meaning of the behavior in this context.

#### **1.1.4 Defining Deliberate, Direct Self-Injury**

Arguably, one of the most important advances made in research on self-injury during recent years has been efforts towards establishing a more comprehensive terminology that can be used to describe the many different self-injuring behaviors that exist. Nock (2009b; 2010) has recently proposed such a classification that has gained much support. He states that: “at the broadest level all behaviors that are performed intentionally and with the knowledge that they can or will result in some degree of physical or psychological injury to oneself could be conceptualized as self-injurious behaviors” (Nock, 2010, p 341). Within this class however, Nock proposes that different behavior need to be defined more closely. First, self-injury can either be the intended purpose of the behavior (termed directly self-injurious behaviors) or be an unintended consequence (termed indirectly harmful or risky behaviors). Indirect harmful behavior is also referred to as indirectly self-damaging, self-defeating, or unhealthy behaviors in the literature, and includes such acts as alcohol and tobacco use, procrastination (if it results in unforeseen/unintended injury or harm), dieting, and risk taking.

Nock's further categorization focuses predominantly on the direct self-injurious behaviors, acknowledging the need for stringency in terminology specifically for these behaviors. Figure 2 schematically shows Nock's classification of deliberate direct self-injury. At the top level, the term self-injurious thoughts and behaviors in the categorization refers to: "a broad class of experiences in which people think about or engage in behavior that directly and deliberately injures themselves" (Nock & Favazza, 2009, p.10). Nock then focuses on a further distinction between suicidal and non-suicidal thoughts and behaviors, i.e. whether there is intent to die or not associated to a thought or behavior (Nock and Favazza, 2009). Suicidal self-injurious thoughts and behaviors can be further classified in to suicidal ideations (active thoughts about ending one's life), suicide plans (formulating a specific method to end one's life), preparatory acts (taking actual steps towards a suicide attempt but stopping short of completion) and suicide attempts (engaging in self-injurious behavior with at least some intent to die). Non-suicidal self-injurious thoughts and behaviors can correspondingly be classified into suicide threats/gestures (statement or behavior that incorrectly lead others to believe that a person intend to kill themselves), non-suicidal self-injury thoughts (instances in which people think about or have urges to engage in non-suicidal self-injury) and non-suicidal self-injury, NSSI for short (behaviors that results in deliberate, direct, destruction of ones' own body tissue). In Nocks (2009b; 2010) terminology self-injury can thus refer both to a general class of behaviors (including direct self-injury and indirect self-injury), and also to a subclass of self-injury further specified by being of a non-suicidal nature. Hence, this latter subclass of behavior includes direct forms of self-injury, such as cutting, burning, and scratching, which is often what is generally intended when self-injury in adolescents is discussed.



**Figure 2. A proposed classification of different types of self-injurious behavior. Nock, M. K. (2009b). Understanding nonsuicidal self-injury: origins, assessment, and treatment. Copyright © 2009. American Psychological Association. Reprinted with permission.**

Nock and Favazza (2009) propose that the class of non-suicidal self-injuries can be further differentiated into several types: stereotypic non-suicidal self-injury (performed at very high frequency occurring mainly in individuals with developmental disorders such as Tourette's disorder and Lesch-Nyhan syndrome) and major non-suicidal self-injury (performed at very low frequency, perhaps only once, causing severe injury and typically associated with psychotic disorder and/or in the context of intoxication). Other acts of non-suicidal self-injury can be categorized based on the properties of the behavior into mild non-suicidal self-injury (low frequency, low severity of injuries); moderate non-suicidal self-injury (moderate severity, such as that requiring medical treatment); or severe non-suicidal self-injury (high frequency and severe injury, such as that causing scarring or permanent disfigurement).

In earlier writings Favazza (1996) has also proposed an alternative set of terms that overlap the later distinction between mild, moderate and severe self-injury. In this categorization Favazza classifies moderate/superficial self-injury into three types; compulsive (mild ritualistic behaviors such as hair pulling in trichotillomania); episodic (self-injuries performed occasionally with no strong identification with being a self-injurer, such as adolescents who engage in self-injury only a few times and then stop); and repetitive (self-injury performed on more regular basis, often accompanied by identification with the behavior, such as adolescents who engage in self-injury approximately once per week).

While acknowledging that the proposed terminology is imperfect and evolving, Nock and Favazza (2009) argue that it provides a clearer and more consistent structure for classification, as compared to more vague and general terms (e.g. parasuicide and deliberate self-harm) found elsewhere in the literature.

### **1.1.5 Self-Injury in the Diagnostic Systems**

With the conceptualization of self-injury as a pathological behavior it is relevant to consider the terms in the psychiatric diagnostics system that can be used to describe these behaviors. Even though self-injury has been documented often in clinical settings, it has typically been viewed as accompanying to other forms of mental health problems. Self-injury was first included in the Diagnostic and statistical manual of mental disorders, third Edition (DSM-III; American Psychiatric Association [APA], 1980), where it was included as one of the symptoms of borderline personality disorder (BPD). The diagnosis remains in latter revisions of the system where BPD is described as a severe personality disorder that is typically developed by early adulthood, and is expressed through a characteristic pattern of deficiencies in anger control, marked mood changes, impulsivity, difficulties in interpersonal relationships,



and life-threatening behaviors (e.g. self-injury) (APA, 1994). The International Classification of Disease (ICD-10; WHO, 2010) uses a definition similar to BPD termed emotionally unstable personality disorder, which in its borderline subtype include self-injury as one of the diagnostic criteria. The significance of self-injury in the clinical manifestation of BPD is undisputed. Arguably however, the problem arises when diagnosing those cases where individuals self-injure without showing the remaining symptoms of BPD. Research indeed shows that self-injury co-occurs with a spectrum of other psychiatric diagnoses and often occurs in non-clinical populations (Fliege et al., 2009). The strong emphasis on self-injury in BPD may have resulted in self-injuring patients being misdiagnosed with BPD (Blashfield & Herkov, 1996; Morey & Ochoa, 1989). Therefore, in many cases where self-injury is performed, it has been difficult to use the recognized psychiatric diagnostic system to describe these individuals.

In response to this, several researchers over the years have argued that self-injury would be better viewed as a distinct clinical syndrome. Beginning with Kahan and Pattison (1984), the term “deliberate self-harm syndrome”, was proposed as an alternative term. Along similar lines, Favazza and Rosenthal (1990; 1993) proposed the use of the term “repetitive self-mutilation syndrome”, which they in turn propose to be categorized as a form of impulse control disorder. Recently, Muehlenkamp (2005) reviewed the arguments for and against the adoption of a diagnosis specific for self-injurious behavior (e.g. in the DSM), concluding that a “self-injury syndrome” would be motivated based on current research data and the need for operational clarity.

These propositions appear to have gained support and recently, a proposal has been advanced for the inclusion of non-suicidal self-injury as a new disorder in the DSM-5, currently under development (APA, 2012, Shaffer, & Jacobson, 2009).

The proposed diagnostic criteria state that the individual during the past year, on at least 5 days should have “engaged in intentional self-inflicted damage to the surface of his or her body, of sort likely to include bleeding or bruising or pain (e.g. cutting, burning, stabbing, hitting, excessive rubbing)”. These behaviors should not be merely of a common or trivial nature. The criteria further state that the purpose of the behavior should not be socially sanctioned, and be expected to lead to only minor or moderate physical harm (as opposed to major harm). For making the diagnosis, the clinician needs to preclude that suicidal intent was present, either based on the patients self-report or through inferring it based on the frequency of the usage of the self-injury method. Additionally, the self-injury also should be associated with at least two out of four of the following criteria: 1) interpersonal difficulties or negative feelings or thoughts occurring prior to the act, 2) a period of preoccupation with the intended behavior that is difficult to resist preceding the act, 3) thinking about self-injury occurs frequently, even when it is not acted upon (i.e. preoccupation) 4) self-



injury is engaged in with a purpose, e.g. regulating cognitive or affective states or regulating social situations (i.e. a contingent response).

It is apparent that this conceptualization builds heavily on research during recent years that has focused on self-injury as a separate clinical syndrome/class of behaviors, and that delineates between suicidal and non-suicidal self-injury. This latter aspect is also apparent in the revision of the DSM-system, as it has also been proposed that suicidal behavior, should be included as a separate diagnosis, which also should be diagnosed on a separate, sixth axis in the diagnostic process (Oquendo, Baca-Garcia, Mann, & Giner, 2008).

The place of self-injury in the diagnostic system is currently under debate. Most researchers and clinicians seem to agree that the current diagnostic system (the DSM and the ICD) is inapt for categorizing and terming many cases where people injure themselves. It appears however that a solution for this problem may be found with the inclusion of non-suicidal self-injury as a specific syndrome in the DSM-5, when it is released in 2013.

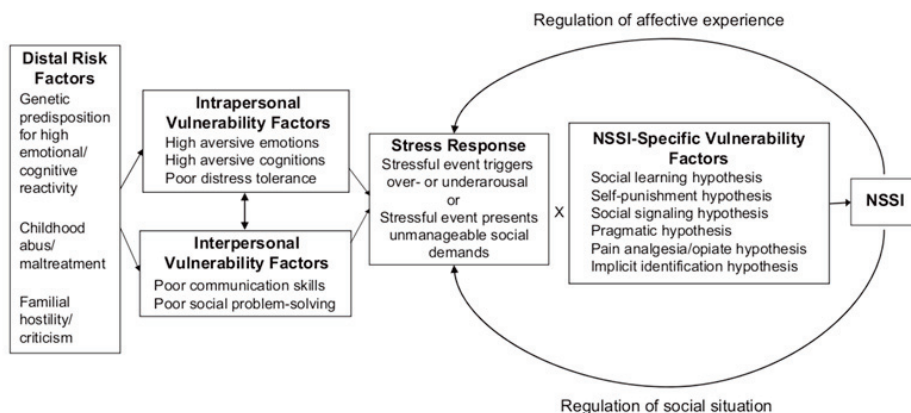
## 1.2 Understanding Self-Injury

Why people engage in self-injury is a question with enormous scope and there is no comprehensive theory that encapsulates all the current insights. Most theorizing about self-injury has derived from a clinical perspective and focused on adults. Through the years a number of theoretical models have been proposed; however most of these have had very limited empirical support (Klonsky, 2007b; Nock, 2010). Early psychological explanations of self-injury included views such as that self-injury represents a way of controlling urges related to sexuality and death, and popular opinion has often included negative or patronizing views such as that it is performed to manipulate others, or is related to impulsivity and low self-esteem (Nock, 2009c). In later years, research has begun to empirically test theories that account for why people injure themselves, and recently there have also been attempts to integrate the results from different approaches and traditions.

### 1.2.1 An Integrated Model of Self-Injury

A wide array of aspects needs to be considered in order to develop an integrated theory that account for self-injury. Typically researchers have targeted only a subset of these at a time, for example focusing separately on psychological factors, social (interpersonal) factors, neurobiological factors, developmental factors, or the influence that the surrounding culture, including media and the internet may have.

Perhaps the most thorough attempt towards integrating different theoretical accounts and empirical findings have recently been made by Nock (e.g. 2009c; 2010). A schematic view of Nocks integrated model can be seen in Figure 2. The model proposes that at its core, self-injury may result in favorable consequences, serving the double functions of effectively regulating affective experiences and regulating social situations, (functioning as communication with, or influencing, others).



**Figure 3. An integrated theoretical model of the development and maintenance of self-injury. Nock, M. K. (2009c). Why Do People Hurt Themselves?: New Insights Into the Nature and Functions of Self-Injury. Current Directions in Psychological Science, 18(2), 78–83. Copyright © 2009, Association for Psychological Science. Reprinted with permission.**

Whether self-injury is adopted as a strategy for these purposes or not is proposed to be influenced by a second component in the model; by individual risk- and protective factors and self-injury specific vulnerabilities. Nocks model distinguishes between distal individual risk-factors (e.g. genetic predispositions and childhood experiences of abuse/maltreatment or criticism), that in turn may result in more proximal individual vulnerabilities that can be both intrapersonal (e.g. poor distress tolerance) and interpersonal (e.g. poor communication skills). Why self-injury would take precedence over other behaviors that may also function to regulate emotion/cognition (e.g. drinking alcohol), or social situations (e.g. acting out), is hypothesized in Nocks' model as influenced by both individuals' general vulnerabilities and self-injury specific vulnerability. Nock (2009c) lists five such self-injury specific vulnerabilities that have some preliminary empirical support. The "social learning hypothesis" stipulates that seeing the behavior in others influences the likelihood that an individual will engage

in self-injury. The “self-punishment hypothesis” stipulates that individuals, from being exposed to abuse or criticism by others, may have learned to direct abuse towards themselves. The “social signaling hypothesis” stipulates that self-injury may represent a more intense form of communication that may be escalated to when other strategies fail (e.g. the individual have difficulties with expressing needs or when the environment fail to respond adequately to these needs). The pragmatic hypothesis stipulates that self-injury may be performed simply due to it being easily accessible and fast, and can be engaged in in most contexts, without much prior planning. The pain analgesia/opiate hypothesis stipulates that individuals that self-injure may not feel pain when injuring, which restrain other individuals from engaging in self-injuring behaviors. Lastly, the implicit identification hypothesis stipulates that self-injuring individuals may begin to identify with the behavior and integrating this behavior pattern into their self-perception.

Self-injury appears to be particularly strongly associated with adolescence. Higher rates of self-injury are generally found in adolescents and the age of onset is typically reported as occurring during this period. Many adolescents who have self-injured also show a number of additional psychiatric problems and go on to repeat this behavior, which is seen as problematic as repeated self-injury is thought to be a more serious problem (Nock, et al. 2006). Therefore, it may also be relevant to consider how self-injury is linked to individual development during adolescence and how self-injury might influence future development. Unfortunately, surprisingly few researchers studying adolescent development have to date focused on self-injury (Levesque, 2010). Theoretically, it has been hypothesized that trauma and maltreatment during childhood may cause deficits in adaptive functioning and skills, and that self-injury may evolve in this context as a relational and regulatory adaptation, thus constituting a functional behavior for developmentally vulnerable individuals (Yates, 2004). A similar conceptualization is proposed by Linehan (1993) to account for the development of BPD, that is, for vulnerable individuals, in the context of an invalidating environment, self-injury may function as a strategy to regulate negative emotions. The period of adolescence is generally viewed as a distinct developmental stage during a person’s lifespan where significant, and potentially stressful, physical, psychological and social transitions occur (Adams & Berzonsky, 2005). The developmental outcome of this period is dependent on the way that these developmental tasks, and the strains that they place on the individual, are resolved. If the developmental timing, individual dispositions and environmental factors are overly demanding or challenging, negative consequences can arise. From this perspective, psychopathology can be viewed as developmental deviation from the normative developmental processes and pathways (Sroufe & Rutter, 1984). Developmental stress in adolescence could thus contribute with potential triggers of stress responses, and this could be further aggravated by the generally more immature self-regulatory skills of adolescents, creating a particularly adverse condition where self-injury may serve as a dysfunctional method of managing stress and alleviating

negative emotions (especially against a backdrop of earlier adverse experiences). Such a general developmental view on self-injury appears to be in accordance with the model proposed by Nock (2009c), even though developmental stress and processes are not emphasized.

Research support that self-injuring adolescents, when compared to their non-injuring peers, do in fact tend to exhibit higher levels of physiological reactivity in response to stress, a reduced ability to tolerate stress, and deficits in social problem-solving abilities (Nock & Mendes, 2008). Parental criticism has been found to be strongly associated with self-injurious thoughts and behaviors in adolescents, especially in individuals with a self-critical cognitive style (Wedig & Nock, 2007). Yates, Tracy, and Luthar (2008) also found that parental criticism, via negative relationship representations (i.e., parental alienation), was a longitudinal predictor of self-injury in a sample of “privileged” youths. Further, Sim et al. (2009) also found support for a model stipulating that family climate influence self-injury through emotion regulation skills in psychiatrically hospitalized adolescent girls (but not in boys). Guerry and Prinstein (2010) showed that in clinically referred adolescents who experienced stressful interpersonal life events (i.e. a stress response) and that also showed a negative attributional style (which can be seen as a form of dysfunctional cognitive regulation) tended to report increasing levels of self-injury between 9 and 18 months after being admitted to a psychiatric inpatient treatment facility. Hence, an adolescent cognitive-vulnerability-stress model predicted subsequent engagement in self-injury; and further, this effect was not mediated by depressive symptoms as measured 9 months post-baseline. Guerry and Prinstein (2010) interpreted this as suggesting multifinality for the cognitive-vulnerability-stress interaction, i.e. that this combination of risk-factors may lead to several different negative outcomes, including self-injury in addition to depressive symptoms.

Taken together, findings on functions and risk factors associated with self-injury appear to fit with the integrated model by Nock (2009c) and also with Linehan's (1993) model and the developmental psychopathology conceptualization described by Yates (2004). In summary it appears early environmental factors increases the risk, possibly by creating intrapersonal and interpersonal vulnerabilities, that individuals will later use self-injury to regulate primarily negative emotions, but possibly also interpersonal situations.

### **1.2.2 The Functions of Self-Injury**

Klonsky (2007b) has reviewed the literature on self-injury searching for studies on the functions of self-injury (defined as “motivating and reinforcing variables”, p.228). The review identified 18 empirical studies that evaluated one or more functions of self-injury. Based on these Klonsky identified seven functions that had been

repeatedly examined, concluding that converging evidence appeared to most strongly support an affect-regulating function of self-injury (i.e. injuring to alleviate negative affect or aversive arousal). This function was supported both by research based on the experiences of self-injuring individuals, and by laboratory research on self-injury proxies. The latter type of findings include presenting self-injuring subjects to self-injury imagery, which has been shown to result in decreased psychophysiological arousal (Brain, Haines, & Williams, 1998; Haines et al. 1995), and to a cold pressor test, i.e. where subjects immerse their hands in cold water, which has been shown to result in reduced negative feelings in female inpatients with BPD (that do not experience pain when self-injuring) (Russ et al., 1992).

Klonsky's review also finds strong support for a self-punishment function (injury to derogate or express anger towards oneself). In several studies this type of reason for self-injury is endorsed by self-injuring individuals; however research has also shown that this function is reported as secondary to affect regulation (e.g. Klonsky, 2009). Only modest evidence was found for the five additional functions identified: "anti-dissociation" (injuring to end experiences of depersonalization or dissociation); "interpersonal influence" (injuring to seek help from, or to manipulate, others), "anti-suicide" (injuring to replace, compromise with, or avoid suicidal impulses), "sensation seeking" (injuring in order to generate exhilaration or excitement), and "interpersonal boundaries" (injuring to assert autonomy or boundaries to others).

This also points to the relevance of considering different possible meanings of the term function in the context of self-injury models. Function can be used more loosely to refer to the purpose of the act in a general sense (e.g. as it is perceived by the individual) or in a more stringent sense referring to the operant and respondent processes ("antecedents" and "consequences") that control the behavior (i.e. to the usage of the term functional in learning theory and within behaviorally oriented therapies; Nock & Cha, [2009]). In this later sense, Chapman, Gratz, and Brown, (2006) argue that self-injury could be viewed as belonging to a functional class of behaviors that has been termed experiential avoidance. Hayes, Wilson, Gifford, Follette, and Strosahl (1996) explain experiential avoidance as different behaviors which functions to avoid, or escape from, unwanted internal experiences or those external conditions that elicit them. Experiential avoidance is typically thought to be maintained through negative reinforcement (i.e. the removal of an aversive consequence), and this is also strongly emphasized in the model of self-injury by Chapman, Gratz, and Brown (2006). However, it is also possible to identify self-injury that is reinforced through favorable consequence (i.e. positive reinforcement). Factor analysis has repeatedly shown a four-factor structure emerging when analyzing data on self-reported motives for self-injury (Klonsky & Glenn, 2009a; Klonsky & Olino, 2008; Nock & Prinstein, 2004; 2005). These findings have been interpreted in terms of a "four functions model" of self-injury; that self-injury can be reinforced primarily socially (interpersonally) or automatically (intrapersonally) and secondly,

that the type of reinforcement can be either positive reinforcement or negative reinforcement. In comparing these different possible functions however, automatic/intrapersonal reinforcement (especially negatively reinforced) appears to be most commonly reported among adolescents (Nock & Prinstein, 2004). In a particularly interesting recent study where 30 adolescents and young adults conducted real-time ecological assessment of self-injurious thoughts and behaviors through handheld computers (reducing the risk of memory biases), most self-injury episodes were ascribed to intrapersonal negative reinforcement (64.7% of episodes), followed by intrapersonal positive reinforcement (24.5%), and fewer to interpersonal negative reinforcement (14.7%), and very few to interpersonal positive reinforcement (3.9%) (Nock, Prinstein, & Sterba, 2009).

### **1.2.3 Risk Factors for Self-Injury**

As to the risk and vulnerability factors in Nock's (2009c) model, there is a great deal of literature that has examined the relationships between self-injury and associated factors, including a variety of family, social, environmental, and psychological variables. Factors that are recurrently discussed as risk-factors for self-injury include emotion dysregulation (such as negative emotionality, dissociative experiences and alexithymia), self-derogation, psychiatric disorders (such as borderline personality disorder, anxiety, depression, eating disorders, substance disorders), and childhood environmental factors and adversities (such as family neglect, physical, emotional and sexual child abuse, and attachment difficulties) (e.g. Gratz, 2003; Klonsky & Glenn; 2009b; Klonsky & Muehlenkamp, 2007). Possible protective factors include the effective management of negative emotions, and family and social support (Klonsky & Glenn; 2009b).

Most research that has explored the associations between self-injury and related factors has however been carried out with cross-sectional designs, which means that in a strict sense they can only inform about correlates of self-injury, and not about risk factors. According to Kraemer et al. (1997), a risk factor is a measurable variable that must precede an outcome and be associated with a higher risk of developing that outcome, which means that risk factors can only be identified by means of prospective studies (a factor that has a correlation with an outcome, with both variables being assessed at the same time, can only be termed a correlate until the correlation is explained). Fliege et al. (2009) conducted a systematic review of the empirical literature on self-injury, identifying 59 studies on sociodemographic and psychological correlates and risk factors. They concluded that a majority of these studies had only used cross-sectional or retrospective designs and therefore that data did not justify terming a number of correlates as risk-factors. Only five studies tested predictors of self-injury in longitudinal designs. Three of these studies investigated patients who were already medically treated for self-injury at Time 1, by testing

predictors of self-injury recurrence at Time 2; and the studied predictors were mainly of a demographic nature. The two remaining studies used large representative birth cohorts of adolescents to examine self-injury (but without distinguishing between suicidal and non-suicidal behaviors). In one of these, Sourander et al. (2006) studied predictors at age 12 for acts of self-injury at age 15, and found that self-reports of internalizing problems and somatic complaints, as well as parental reports of the child's externalizing problems and aggressiveness, mother's reports of her health problems, and living in a non-intact family at age 12 independently predicted self-reported acts of self-injury 3 years later. In the other study Haavisto et al. (2005) studied risk factors at age 8 for acts of self-injury at age 18 in a community-based study that included 2,348 boys: the results showed that self-reported depressive symptoms at age 8 predicted acts of self-injury 10 years later. In conclusion, Fliege et al. (2009) derived that based on the available literature pertaining to evidence on risk factors; only distal biographical stressors could be characterized as having strong support.

## 1.3 Characteristics of Self-Injury in Adolescents

### 1.3.1 Rates of Self-Injury in Adolescents

While recent years have clearly shown that self-injury is prevalent even amongst adolescents in the general community, it is difficult to arrive at any exact figure of how common it is. Expert approximations based on the available literature often mentions rates of 15-20% of adolescents that have injured at least once (Heath, Schaub, Holly, & Nixon, 2009). Heath et al. (2009) base this estimate on findings over 30 studies of both clinical and non-clinical samples of adolescents and adults, of which 10 studies specifically targeted adolescent community samples (e.g. high school students). Similar overall conclusions about prevalence rates in adolescents were also reported in a recent critical literature review by Jacobson & Gould (2007). This review included only studies that distinguished between non-suicidal self-injury and suicide attempts and that focused on children and adolescents. The review identified 25 relevant studies (that to a large extent overlapped those summarized by Heath et al. [2009]). Based on the reviewed material Jacobson & Gould (2007) estimated the lifetime prevalence of non-suicidal self-injury to range between 13.0-23.2 %, but also noted that comparisons are difficult because the time frame for the assessed behavior varied, and the representativeness of the studied samples were unknown. Recently, Muehlenkamp et al. (2012) conducted a systematic review of 52 studies published between 2005 and 2011 reporting on the frequencies of non-suicidal self-injury and deliberate self-harm (with or without suicidal intent) in adolescents from different



countries, and comparing the respective results. The authors conclude that the mean rates using these separate definitions were similar, averaging 18.0 % in studies on non-suicidal self-injury and 16.1 % in studies on deliberate self-harm. In clinical samples of adolescents, such as psychiatric patients, the rates self-injury are often reported to be even higher, perhaps ranging from 40 to 80 %, (e.g. Klonsky & Muehlenkamp, 2007; Jacobson & Gould, 2007). It is however difficult to compare such rates over different studies as the exact distribution of different diagnoses and type of problem differ between studies.

One characteristic of previous literature studying community samples of adolescents is that estimates of the rate of self-injury have varied considerably over different studies. To illustrate this, the findings from the different studies included by Heath, et al (2009) can be considered: the lowest rates found were 4 % (in a study by Rodham, Hawton, & Evans [2004]), where self-cutting was the only non-suicidal self-injury asked about and 5 % (in a studies by Patton et al. [1997]), in a study which also include self-poisoning and indigestion of indigestible substance or object in the definition. In contrast, the highest rates found in the review were reported in a study by Lloyd-Richardson et al. (2007), where 46.5% reported non-suicidal self-injury during the past 12 months. Similarly, high estimates were also reported in a study by Lloyd, Kelley, & Hope (1997), where 39 % of respondents reported to have self-injured. The remaining six studies reviewed reported estimates spanning in-between these extremes, ranging between a lifetime prevalence of self-injury of 13 %, reported by Laye-Gindhu & Schonert-Reichl, (2005), to a current engagement in non-suicidal self-harm (including substance abuse) reported by 25 % by Izutsu et al. (2006). The four remaining studies by Muehlenkamp & Gutierrez (2004), Muehlenkamp & Gutierrez (2007) Ross & Heath, 2002 and Zoroglu et al. (2003) fell in-between.

At least four studies on Swedish adolescents have reported rates of self-injury. Jutengren, Kerr, and Stattin, (2011) found overall rates of self-injury between 34-36 % in a sample 880 junior high school students examined at two time points and Lundh, Karim and Quilisch (2007) found overall rates 65.9 % in a sample of 123 15-year-old adolescents. Landstedt & Gillander Gådin (2011) found that 17.1 % of 1663 17-year-old students reported a lifetime history of injuring themselves or having taken an overdose. In Sweden's largest study to date, Zetterqvist, Lundh, Dahlström and Svedin (2012) found an overall self-injury rate of 35.6 % in a sample of 3054 adolescents aged 15-17 years.

Heath et al. (2009) conclude that the differences between studies can be largely ascribed to differences in definition of the examined construct, as well as differences in methodology used to measure these constructs. Lower rates are found when shorter and more ambiguous measures are used, and the highest rates are consistently found when utilizing checklist-type measures of different forms of self-injurious behaviors. This conclusion is supported by findings in the study by Zetterqvist et al. (2012) where the rates of self-injury in the same sample were reported as lower (17.4 %)



when measured with a one-item question (“Have you ever actually engaged in non-suicidal self-injury [that is, purposely hurt yourself without wanting to die, for example by cutting or burning]?”), than with a checklist questionnaire (35.6 %).

Recently, an international comparison has also been performed comparing self-injury and suicide attempts between adolescent samples from the general community in Germany and the United States, using cross-nationally validated assessment instruments (Plener, et al., 2009). Totally 25.6 % in this study reported having injured at least once in their lifetime and 9.5 % reported having injured more than four times. No differences in rates were found over the two regions and this was interpreted as self-injury being a worldwide phenomenon, at least in Western cultures.

### **1.3.2 Different Methods for Self-Injury in Adolescents**

It is difficult to arrive at any comprehensive list of all different methods of self-injury which people may engage in. Still, it has been recognized that not all forms of self-injury are equally predominant and that some behaviors believed to be non-typical, are fairly common. Rodham and Hawton (2009) identify five typical methods from the literature, including skin cutting, burning, hitting, severe skin scratching and interference with wound healing, and estimate that cutting is the most common (occurring in 70-90 % of those who self-injure), followed by banging or hitting (21-44 %) and burning (15-35 %). These behaviors do appear in most studies on self-injury (even though the exact wordings may differ between studies). There are also some additional behaviors that appear with regularity and are worth mentioning. Gratz (2001) considered different potential forms of behavior from a broad vantage point arriving at a set of 16 different methods. Gratz’ included behaviors “based on clinical observations, numerous testimonies of individuals who engage in self-harming behavior, and common behaviors reported in the literature” (Gratz, 2001, p 255). Some of the behaviors included were however rarely or never endorsed when queried in a sample of undergraduate students (i.e. rubbing sandpaper on skin; dripping acid on skin; using bleach or oven cleaner to scrub skin; rubbing glass in to skin; and breaking bones), and several were mere variants on the same behavior (i.e. burning with cigarette/burning with lighter or match; carving words into skin/carving pictures in to skin; banging head/punching self). Extending the list by Rodham and Hawton (2009) with the remaining unique behaviors mentioned by Gratz, that has been fairly commonly reported in several studies (e.g. Briere & Gil, 1998; Gratz, 2001; Gratz, 2003), would mean adding carving oneself; biting oneself; and sticking oneself.

Other behaviors that can be found in the literature but that are not typically asked about include self-tattooing, inserting objects under nails/skin; scraped/erased skin;

pulled hair (eyebrows/eyelash/genital hair) (e.g. Lloyd-Richardson, et al., 2007), pinching, taking scalding showers/baths, (e.g. Briere & Gil, 1998).

### **1.3.3 Gender Differences in Self-Injury**

Self-injury has often been depicted as a problem mainly pertaining to girls and women, but empirical findings on gender differences have been inconclusive (Muehlenkamp, 2005). Concerning rates of self-injury, the review by Fliege, et al. (2009), identified six studies reporting higher rates for women/girls; but seven additional studies reported no gender differences. Based on this material it was concluded that the evidence on gender and rates of self-injury was complex. The strongest effects for gender have typically been found within psychiatric samples where self-injury has been more often recognized in women (e.g. Zlotnick, Mattia, & Zimmerman, 1999). Studies on clinical samples however have often focused on patients with borderline personality disorder, which is diagnosed more frequently in women (Johnson et al., 2003), and there are also studies that have found that rates of self-injury do not differ between men and women even in psychiatric samples (e.g. Stanley, Gameroff, Michalsen, & Mann, 2001). There are also indications that gender differences in rates may be most pronounced in early adolescence, and less pronounced later on (Hawton et al., 2003).

A number of studies in community samples also show similar inconclusive results. In some studies, self-injury have been found to be up to 4 times more likely to occur in girls (Hawton, Rodham, Evans, & Weatherall, 2002; Evans, Hawton, Rodham, & Deeks, 2005; Laye-Gindhu & Schonert-Reichl, 2005). In other, small or no effect of gender has been reported (Lloyd-Richardson et al., 2007; Muehlenkamp & Gutierrez, 2004, 2007; Izutsu et al., 2006; Zorglu et al., 2003). In previous Swedish samples of adolescents clear gender differences also failed to be ascertained (Jutengren, Kerr, & Stattin, 2011; Lundh, et al., 2007). Heath et al. (2009) has noted that when examining studies on gender differences in community samples of adolescents, whether or not overdoses and pill abuse is included account for the presence or absence of observed gender differences, as these behaviors are much more common in girls. Hence, instruments that focuses predominantly on self-injury typical in girls might underestimate the rate of self-injury in boys, but it has also been suggested that boys are overall less prone to report problematic behavior (Verhulst & Ende, 1992), and that this could also account for some of the gender effect

There are also other aspects of self-injury that may be relevant when examining gender differences. It has been suggested that, girls/women and boys/men may engage in different forms of self-injury, or self-injure for different reasons. This can be the case even if the overall rates are similar. Research has indicated that cutting is more common in girls, while boys may hit themselves more (Heath, et al., 2008; Izutsu et

al., 2006; Whitlock, Eckenrode, & Silverman, 2006; Laye-Gindhu & Schonert-Reichl, 2005). In a recent very large study (N = 11529) of college-aged students, women were indeed found to be at higher risk for self-injury, even when controlling for other demographic characteristics (Whitlock, 2011). More interesting however, this study also found that females were more likely to report being upset or hoping someone would notice them when initiating self-injury, while males were more likely to report anger and alcohol or drug abuse as initiating factors. As for different functions for girls and boys respectively and, especially, potential differential meanings of self-injury in males and females will be further discussed in the next section

It is difficult to draw any clear conclusions about differences between self-injury in girls and boys, but it is also clear that overall differences in rates may not be very relevant if there are more fundamental differences in self-injury methods and functions.

### **1.3.4 Assessing Self-Injury: Severity and Seriousness**

Not all cases of self-injury can be considered equally perilous and significant, especially when considering the very high rates of the behavior in non-clinical samples. Previous literature has approached this question mainly by refereeing to the severity of the behavior. On which criteria severity is assessed however differ between authors and is often ambiguous or not at all stated explicitly. Typically, when discussing the severity two dimensions have been included a) the degree of tissue damage and b) the frequency/stability of the behavior. In its most basic sense, severity of self-injury has been viewed as the amount of damage that the injury results in, or the lethality of the behavior (e.g. that deep cuts are seen as more severe than more superficial cutting; and behaviors resulting in clear scarring or disfigurement is seen as more severe than injuries that leaves less clear markings). This thinking can be found in Walsh & Rosen's (1988) attempt at categorization of different forms of self-injury (and similar behavior) into four categories where the degree of physical damage inflicted is the key variable. In category I (which is not considered actual self-injury) behaviors causing superficial to mild damage are included, e.g. ear-piercing, nail-biting, tattooing, cosmetic surgery. In category II (which are seen as self-injury because the behaviors are not socially sanctioned) behaviors causing mild to moderate degree of damage are included (e.g. piercings, saber scars, ritualistic clan scarring, and sailor and gang tattoos). In category III behaviors resulting in mild to moderate damage are included (e.g. cutting self, self-inflicted cigarette burns and wound-excoriation). In category IV behaviors resulting in severe damage are included (e.g. as auto-castration, self-enucleation, and amputation). Another approach towards categorizing self-injury methods in terms of their severity can be found by Lloyd-Richardson et al. (2007), who analyzed self-injury on the behavioral level by means of

principal components analysis. Based on their analysis they categorized 11 different forms of self-injury, into two factors; first one causing moderate/severe self-injury (e.g. cutting/carving and burning), and a second causing minor self-injury (e.g. hitting oneself, biting, and inserting objects under nails or skin). Whitlock, Muehlenkamp and Eckenrode (2008) also similarly grouped different forms of self-injury into three categories ordered by potential degree of tissue damage: mild (e.g. scratching, pinching, and preventing wounds from healing), moderate (e.g., punching/banging, sticking sharp objects into the skin), and severe (e.g., cutting, carving, burning).

Frequency of self-injury is also often used as an implicit or explicit proxy for the severity of self-injury. Self-injury is generally considered more severe if it is engaged in on many occasions, (e.g. cutting once a week for 6 months is seen as more severe than cutting once). The frequency of 5 or more episodes of self-injury has been used as a cut-off for repeated self-injury in a number of studies (e.g. Plener, et al, 2009), generally indicating more severe forms of self-injury. In other cases however, different cut-off points has been used (e.g. 4 or more episodes; Brunner et al, 2007). Also the proposed non-suicidal self-injury diagnosis for the DSM-5 stipulate that an individual has to have engaged in intentional self-inflicted damage on 5 or more *days* during the last year, also focuses on frequency as a signifying aspect of the clinical severity.

Both the degree of tissue damage and frequency are central in theoretical categorizations of self-injury; Nock and Favazza's (2009) categorization described earlier relates to the severity aspect when categorizing non-suicidal self-injury into mild, moderate and severe classes, and mentions both degree of damage and frequency as criteria for making this distinction. It could be argued however that beyond the mere frequency of the self-injurious behavior, the actual stability of the behaviors is a better indicator (e.g. consistently injuring over time would be seen as more severe than only self-injuring occasionally). This aspect of stability of self-injury has generally not been approached in self-injury research.

It could be argued that severity, as it has been hitherto described, represents a fairly limited view out of all possible aspects of self-injurious behaviors. Recently research has identified combinations of self-injurious behaviors and functional aspects and/or concomitant conditions that have been interpreted as representing varying degrees of severity. In a study of college students, Klonsky and Olino (2008) used latent class analysis to identify subgroups on the basis of differences in method of self-injury (e.g., cutting versus biting versus burning), descriptive features (e.g., injuring oneself alone or with others) and function (i.e., social versus emotion regulation). The analysis yielded four subgroups with different patterns of self-injury that were also found to differ on key clinical variables. The two largest groups of individuals exhibited few clinical symptoms, and were regarded as either mainly experimenting with non-suicidal self-injury (61% of the sample, characterized by a moderate-high probability of banging or hitting oneself, but lower probabilities of other forms of self-injury) or

as having a mild form of non-suicidal self-injury (17% of the sample, characterized primarily by biting, pinching, and hitting oneself). Two other subgroups were regarded as engaging in more serious self-injury: (1) a multiple functions/anxious group, characterized by high levels of anxiety and the use of a variety of methods, both for communicative purposes and emotion regulation (11% of the sample), and (2) an automatic functions/suicidal group, characterized by an overrepresentation of females with a probability of cutting themselves in private, as a premeditated means to regulate negative emotions (10% of the sample). The authors concluded that if these results could be generalized, it would mean that approximately one in five young adults who have engaged in non-suicidal self-injury have heightened psychiatric problems. A similar methodology was also used by Whitlock et al. (2008) in a sample of university students with two or more reported episodes of self-injury. Latent classes were identified on the basis of number of self-injury incidents, number of self-injury behaviors used, and potential degree of tissue damage inflicted, and compared in terms of characteristics associated to the behavior. Whitlock et al. (2008) identified three distinct subgroups characterized by different severity of self-injury when the totality of self-injury characteristics was assessed. The first group consisted mainly of women generally engaging in one form of self-injury with superficial tissue damage and with moderate incidence. A second group consisted predominately of men, typically engaging in self-battery with light tissue damage and low lifetime incidence, while the third group largely consisted of women using more than three forms of behavior with potential for high degree of tissue damage and with moderate to high incidence. Also of relevance in this context is a study by Stanford and Jones (2009) that focused specifically on adolescents. This study, however, differs from the other two by identifying subgroups of self-injuring adolescents not on the basis of their patterns of self-injury, but on the basis of differences in other psychological variables (psychopathology, positive problem solving, social support, withdrawal, and impulsivity). By means of a non-hierarchical cluster analysis, they identified three separate subgroups: (1) a subgroup (about 25% of the sample) characterized by clear psychopathology and difficulties in both peer and family relationships; (2) another subgroup (about 30% of the sample) with a high proportion of boys, characterized by impulsivity, but displaying a normal psychological profile; and (3) a third subgroup (about 50% of the sample) with a high proportion of girls and characterized by essentially normal psychological profiles.

In order to distinguish severity in terms of tissue-damage/lethality and frequency/stability, from severity in terms of the totality of the individual's problem profile the term *seriousness* could be used for the latter. Seriousness of self-injury thus could be understood as not only the severity but also include concomitant symptoms and individual factors that have bearing on the individual self-injury case. For instance, self-injurious behavior in combination with restricted regulatory strategies and drug abuse could be seen as more serious than an identical behavior in an individual with access to better regulatory strategies and no comorbid problems.

While the concepts of severity and seriousness of self-injurious behavior clearly overlap, it may be an important distinction, especially for assessment purposes and for clinical decision-making. It is perceivable that two individuals could present with identical episodes of severe self-cutting, but one case may be assessed as considerably more serious than the other (thus being alleageable for different treatment efforts).

## 1.4 Objective of this Thesis

The objective of the present thesis is to further the understanding of self-injury by investigating its characteristics in Swedish adolescents. More specifically, the focus is to examine methods, rates, and associated factors of this behavior among young adolescents in the general community. It was assumed that this investigation would improve our understanding of those individuals who engage in self-injury, as well as what professionally can be done to reduce negative consequences that the behavior may result in.

The three studies included each contribute to this general objective in different ways. Study 1 examines general characteristics of self-injury in adolescents: the rates of the behavior, the different methods that are used, and the importance of a number of associated factors. Study 2 expands on these results by using a larger and more representative sample of adolescents. It also contributes with new knowledge by identifying subgroups of self-injuring adolescents with different patterns of self-injurious behavior and different associated problems. Study 3 investigates the feasibility of using interviews in supplement to questionnaires as a means to collect additional information on self-injury and establishing a constructive relationship with self-injuring adolescents in a school setting. The study also attempts to evaluate the potential iatrogenic and beneficial effects that could arise when interviewing adolescents about self-injury.

## 2. Research Studies

The studies in this thesis were conducted within a research project at Lund University examining a number of aspects of adolescent mental health, including self-injurious behaviors. The overall design of this project included the use of a questionnaire survey in schools (grades 7-9) to collect data. Pilot testing of the instruments and procedures were conducted in a convenience sample of adolescents using a test-retest design (Study 1 uses this data), and subsequently the main data collection was done in a larger community sample of adolescents (Study 2 and Study 3 uses this data). Data in the community sample was collected with a longitudinal design, at two separate occasions with a one year interval. Between the two data collections, a subsample of adolescents was also interviewed by clinical psychologists belonging to the research group.

Data were collected by research assistants, (including this author), as part of a separate lecture during an ordinary school day. Teachers were present but did not take part in the data collection. Confidentiality was ensured by dispersing students during data collection, and by ensuring that students placed their completed questionnaires in unmarked envelopes. Questionnaires were marked with a research code that allowed for longitudinal analyses. The project design was reviewed and approved by the regional Ethics committee at Lund University. Informed consent was ensured by sending written information to both students and their parents, as well as verbal information to students in school. A passive consent procedure was used, where parents or students could opt to refrain by contacting teachers or the researchers.

### 2.1 Study 1

#### 2.1.1 Background

The turn of the 2<sup>nd</sup> millennium saw raised concerns about the increase of self-injury in Swedish adolescents. These concerns were most notably expressed by the Swedish national board of health and welfare (e.g. Socialstyrelsen, 2004). Study 1 was conducted alongside this background and aimed to broadly investigate self-injury in this group in the general community. For this purpose it was necessary to develop and

evaluate an instrument that could be used to measure self-injury in adolescents. Previously, Gratz (2001) had developed the Deliberate Self-Harm Inventory (DSHI), which had been translated and used in an abbreviated form in a sample of Swedish 15-year old adolescents (Lundh, et al., 2007). For Study 1 it was however deemed necessary to further adapt the DSHI so that it could be used as a brief check-list type screening questionnaire suitable for community samples of younger adolescents. The study by Lundh et al. (2007) had shown that self-injury was commonly reported in 15-year olds, and by targeting a slightly younger group it was also expected to arrive closer to the average debut of the behavior. Simplifying the DSHI was achieved by adapting it and shortening it considerably so that it only asked respondents to report on the frequency of nine different methods of self-injury. The resulting instrument was termed the Deliberate Self-Harm Inventory – nine item version (DSHI-9).

Beyond simply assessing the rates of self-injury and evaluating the properties of the DSHI-9, Study 1 also aimed to investigate the relationships between self-injury and a number of associated factors thought to be of importance.

### **2.1.2 Aims and Hypotheses**

In summary, the purpose of Study 1 was to investigate the rates of various kinds of self-injury in adolescents through the use of the DSHI-9. Based on previous studies, it was expected that high frequencies of self-injury would be found and that the rates would be similar to those found in previous studies using the same type of instrument. It was expected that the DSHI-9 would reliably measure self-injury and that the self-injury measured would be valid, in terms of showing the expected converging relationships with related variables. More specifically, it was assumed that self-injury would be associated with general psychopathology, and with more specific forms of both internalizing problems (e.g. emotional symptoms) and externalizing problems (e.g. attentional problems, conduct problems). Further, it was expected that deficiencies in social relationships (peer problems, preponderance of negative feelings in relation to friends and parents), negative lifestyle factors (e.g. smoking and drinking alcohol) and problematic eating behavior and negative body esteem would also be associated to self-injury. Additionally, emotion regulation strategies of adolescents were also examined in relation to self-injury. Drawing on the conceptualization of self-injury proposed by Linehan (1993), where self-injury is understood as a dysfunctional form of emotion regulation performed in the context of an invalidating environment, it was expected that negative relations to parents and poor emotional regulation (in the form of a tendency for rumination and negative thinking) would be predictive of self-injury.



### **2.1.3 Method**

Study 1 was essentially a survey study with a test-retest design. The DSHI-9 was included in a battery of self-report questionnaires and presented in a convenience sample ( $N = 202$ ) of adolescents from grades 7 and 8 (14 years old). Participating classes were picked out from four different schools by the school management, and data was collected at two separate occasions, 44-126 days apart. At Time 1, 175 students (86.7% of all the students in the classes), participated and at Time 2, 184 students (89.7%), participated. Complete test-retest data were available for 166 students (82.2 %).

### **2.1.4 Results and Discussion**

The most salient result from Study 1 was findings of quite high rates of self-injury in adolescents, ranging between 36.5–40.2%. As expected, these rates were similar to rates found in other studies in adolescent community samples using check-list type measures (e.g. Hilt, Cha, & Nolen-Hoeksema, 2008; Lloyd-Richardson, et al., 2007; Plener, et al., 2009). A compilation of the findings in Study 1 is presented in Tables 1 and 2 (in section 3.1.1). These high rates of self-injury found in Study 1 raised the question whether measures like the DSHI-9 include non-relevant (benign) forms of self-injury. The consistently strong relationships between all the different methods of self-injury examined, and psychopathology, were however interpreted as speaking against that some behaviors included in the DSHI-9 were not relevant.

Overall, the results from Study 1 were interpreted as corroborating both the reliability and validity of the DSHI-9 as a measure of self-injury. The internal consistency for the instrument was satisfactory,  $\alpha = .66$ , at Time 1 and  $\alpha = .85$  at Time 2. The test-retest coefficients, which are considered important in the assessment of the reliability of an instrument (Nunnally & Bernstein, 1994), were interpreted as satisfactory. As the length of the test-retest interval varied over the schools and because the interval was longer than what is typically the case when assessing reliability, the reported test-retest coefficients ( $r = .85, .74, .64$  and  $.27$ , in the different schools respectively) were seen as setting a lower boundary for the true test-retest reliability, suggesting that the reliability was sufficient.

The convergent validity of the DSHI-9 was ascertained from findings of robust positive correlations between self-injury and emotional symptoms, conduct problems, attentional problems, smoking, alcohol use, and a ruminative style of emotional regulation. In addition, in girls robust positive correlations were also found between self-injury and both symptoms of eating disorder and a negative body image. The findings comprised a picture consistent with self-injury being associated with both externalizing and internalizing problems. The results also supported the assumptions

of Linehans' (1993) model, through the findings that both a relative absence of positive feelings toward parents (interpreted as a proxy for an invalidating environment) and rumination/negative thinking (interpreted as a proxy for poor emotion regulation strategies) predicted self-injury, independently of general psychopathology.

## 2.2 Study 2

### 2.2.1. Background

Given the high rates of adolescent self-injury found in many studies it seems relevant to understand the significance of these behaviors over different cases. It is obvious that not all self-injury carries the same meaning, and that related developmental and psychopathological implications vary over different individuals (and groups of individuals). Previous research had often failed to account for individual differences in self-injury, and only a few studies on young adults (Klonsky & Olino, 2008; Whitlock et al., 2008), had focused on identifying subgroups of self-injuring individuals based on their self-injuring behaviors. Therefore Study 2, aimed to approach this question in young adolescents. In order to do so a person-oriented approach was adopted (Bergman & Magnusson, 1997). This approach specifically focused on investigating heterogeneity in adolescents who self-injure, by organizing them based on their patterns of self-injury.

Study 2, would also allow for a further expansion of the findings of rates and characteristics of self-injury from Study 1. Both the reliability and generalizability of those findings could be strengthened, as data representing a larger and more representative sample was used.

### 2.2.2 Aims and Hypotheses

Study 2 aimed to further examine rates of self-injury in adolescents by using a methodologically improved design. More specifically the aim was to explore subgroups with different patterns of self-injury which would differ in terms of other types of psychopathology. Analytically, this was achieved through an advanced form of hierarchal cluster analysis (Bergman, 1998; Bergman & El-Khoury, 2002; Bergman, Magnusson, & El-Khoury, 2003). Cluster analysis of the individual patterns of self-injury reported in questionnaire would result in the identification of subgroups of self-injuring adolescents. The longitudinal design used would also allow

the investigation of the stability of self-injury and psychopathology over time in the different groups.

The focus on subgroups would give a more detailed picture of self-injury in adolescents and contribute to interpret the different meanings that self-injury can have in community adolescents. Based on previous research on young adults (Klonsky & Olin, 2008; Whitlock et al., 2008), a number of hypotheses about what different subgroups that could be expected were formulated. First, the hypotheses were that (1) a large proportion of self-injuring adolescents would report only low-frequent self-injury and little psychopathology. Further it was expected that at least two subgroups of adolescents would report more severe self-injury: (2) one subgroup with frequent and multi-faceted self-injury in combination with both externalizing and internalizing problems, and (3) one subgroup primarily of girls with self-cutting as the main form of self-injury in combination with internalizing problems. It was also hypothesized that the different subgroups identified would show stability, both that they would show (4) structural stability (i.e. that the same subgroups would be found at the Time 1 and Time 2 data collections) and (5) individual stability over time (i.e. that individual cases would present with the same pattern of self-injury at the Time 1 and Time 2 data collection).

Second, it was also expected that a more detailed picture of the differences between girls and boys would emerge in the study. More specifically it was expected that (6) more girls than boys would report self-injury, and that self-injury in girls would be more associated with psychopathology (i.e. being a more serious problem in girls). Finally, in a more exploratory fashion, it was also expected that a number of additional self-injury patterns would emerge. In these subgroups different patterns of self-injury were expected, and the stability and relation to different levels of psychopathology were also expected to vary.

### **2.2.3 Method**

Study 2 was essentially a longitudinal survey study targeting a community sample of young adolescents. Participants were all students (N = 1052) enrolled in regular schools (grade 7 and 8) of one municipality in southern Sweden. These students attended one of five regular schools in the municipality. Data was collected in two waves with a one year interval. At time 1, 991 (94.2 %) students participated. At T2, a total of 984 (96.5%) students filled out the questionnaire. Longitudinal data on NSSI were available for 895 students (85.0 % of those available for inclusion at Time 1).

The battery of instruments used in Study 1 was again included in Study 2, after minor adjustments were made. The DSHI-9 was further revised and two modifications were made. First an additional new item was added: in the Swedish

language, there is a differentiation between “skära” which refer to deeper cuts and “rispa”, which is more superficial cutting – this differentiation was added to the DSHI in Study 2 (the differentiation has been translated into “cutting” and “minor cutting” in English). A second modification was that the two items “Banging head, thereby causing a bruise” and “Punching self, thereby causing a bruise” were combined in to a single item, thus keeping the length of the instrument. The revised instrument was termed the Deliberate self-harm inventory – nine item version, revised (DSHI-9r).

#### **2.2.4 Results and Discussion**

Results from Study 2 confirmed similarly high rates of self-injury as in Study 1. The rates of self-injury ranged between 41.5-42.9%. Again, a compilation of the rates can be seen in Table 1 and 2 (in section 3.1.1). In accordance with the hypotheses, and consistent with previous studies of subgroups, the analysis of data in Study 2 did indeed identify different subgroups of self-injuring adolescents.

First, a subgroup (1) was identified consisting of a large proportion of self-injuring adolescents with low-frequent self-injury and little psychopathology. This group consisted of 60-63% of the self-injuring adolescents, and was interpreted as supporting that most young adolescents who self-injure do so only infrequently and that the behavior might not be very serious. Further, (2) a small subgroup of adolescents, about 5% of self-injuring girls and 2% self-injuring boys, with frequent and multi-faceted self-injury was identified. This group was characterized by having generalized high-frequent self-injury and very often reported pronounced forms of both externalizing and internalizing psychopathology. A third subgroup (3) with primarily girls (consisting of about 10 the % of self-injuring girls) was also of particular interest. This group showed a pattern of cutting behaviors as their main form of self-injury, primarily related to internalizing forms of psychopathology. This later group is often seen as the “typical self-injurer”, i.e. a young girl who cuts herself related to pressing emotional problems. Study 2, however shows that this view is very constricted and that several other manifestations of self-injury are equally relevant to consider. Beyond those subgroups already mentioned, the more exploratory part of the study identified five additional subgroups within each gender, which were characterized by different patterns of self-injury, associated with varying degrees and forms of psychopathology.

Most of the self-injury patterns characterizing the different subgroups found in the cluster analysis appeared stable over time; six of the clusters within each gender were replicated from Time 1 to Time 2. Overall, more girls than boys appeared to show stable patterns of self-injury over time, as girls more often than boys showed the same patterns of self-injury over the one-year period; i.e. belonging to the same subgroup at

Time 1 and Time 2 (five of the girl and two of the boy clusters met this criteria for individual stability). Concerning gender differences, the results also confirmed the hypothesis that (4) more girls than boys reported self-injury, and that self-injury among girls was more associated with psychopathology.

In summary, Study 2 added in a number of ways to previous research. It strengthened the findings on rates of self-injury found in Study 1. It also contributed in a novel way by being the first study on subgroups of self-injury among young adolescents. Notably, the results on subgroups were similar to those found in adults (Klonsky & Olino, 2008; Whitlock et al., 2008). The results on the structural and individual stability of the subgroups, allowed by the analyses of longitudinal data were also a significant development from these previous studies that only used cross-sectional data.

## 2.3 Study 3

### 2.3.1 Background

The evolving literature on self-injury in adolescents raises many new questions about different aspects of the phenomenon. Self-injury appears to be fairly common among adolescents in the general community; hence it is a phenomenon highly relevant to schools and school health-care, and that might need to be managed in this context. The literature however describes that many teachers and school health professionals feel inapt to handle self-injury in students (White Kress, Gibson, & Reynolds, 2004). There are also few suggested guidelines and studies of different approaches to address self-injury in this context. For such purposes it would be natural to approach self-injuring individuals more directly. Study 3 therefore included a procedure for interviewing adolescents that reported self-injury in the questionnaire and thus collect additional information about their situations.

### 2.3.2 Aims and Hypothesis

In Study 3, the aim was to attempt to approach the question of how self-injury can be managed in a school setting. Therefore, a semi-structured interview was constructed by the research-group, focusing on exploring adolescents' views on themselves and their situation, including whether and why they self-injure. The interview was designed with two main purposes: primarily to validate any feelings the respondent would express concerning their own situation and thereby conveying a positive feeling of being listened to, understood and supported. Secondly, the interview also

intended to assess the respondents' self-injury. The rationale for the interview was drawn from literature on self-injury that emphasizes that self-injuring individuals should be met with a non-judgmental, supportive and empathic stance (Linehan, 1997; Walsh, 2005; 2007).

The idea was to screen for self-injury and then to assess these behaviors further, and in doing so to promote disclosure and to establish potentially beneficial relationships with adolescents who self-injure. Based on previous research, it was expected that (1) more adolescents would accept answering a relatively anonymous questionnaire than taking part in the interviews, but (2) that, still, the interview would be sufficiently acceptable to most self-injuring adolescents, and (3) that those who took part in the interview would feel positive about the interview. Finally, an experimental design was also used when selecting adolescents to participate in the interview; allowing study of the effects of the interview, i.e. to evaluate if it had any beneficial or iatrogenic effects in terms of future risk for self-injury.

### **2.3.3 Method**

Participants in Study 3 were adolescents from the same community sample studied in Study 2. After responding to the questionnaire at Time 1 a subsample (n=132) self-injuring adolescents were selected to participate in an experimental design, of which half (n = 66) were randomized to participate in an interview conducted about 1-2 weeks after responding to the first survey, whereas the remaining 66 served as a matched control group. This design both collected information from a large number of interviews and also (due to the experimental design) later allows for the evaluation of whether participating in the interview affected the subsequent tendency to engage in self-injury (by comparing the two groups at Time 2).

In addition to recruiting the self-injury group, a second subsamples of adolescents (n = 31) that had not reported self-injury were also recruited. This group would represent the views in the interview of non-injuring adolescents and allow for comparison between self-injuring and non-injuring adolescents. Also, it meant that the study would not only target self-injuring adolescents, and thus reduce the risk of stigmatization of a particular group of adolescents.

A letter was sent to the parents of those in the self-injury group that was randomized to participate in the interview, as well as those non-injuring adolescents who were also randomly selected. Respondents were then contacted by telephone by the interviewer. If the student agreed to participate an appointment was arranged in school. The interview was framed as an interview of the respondents' general life-situation and life-satisfaction. It was emphasized that both positive and negative aspects were to be included. An interview took between 30-80 minutes and covered a range of topics, from neutral questions to more sensitive personal information (e.g. self-injury), once

rapport was established. The interview was concluded by focusing on positive aspects of the respondents' future and on reinforcing functional competencies and strengths. If the respondents did not want to acknowledge self-injury in the interview, even though having indicated it in the questionnaire, the interviewer did not press for further information on that theme. Three licensed clinical psychologists belonging to the research group conducted the interviews.

### **2.3.4 Results and Discussion**

Overall, results from Study 3 showed some merits for the procedure of interviewing adolescents who self-injure about their situation. A majority (71 %) of adolescents that were approached proved willing to participate in an interview about their situation, and there were no indications that adolescents that had engaged in self-injury were less willing than their non-injuring peers to participate. A large majority of the adolescents who participated reported feeling positive about the interview. Together these findings speak for the feasibility of using this kind of proactive procedures, to make supportive resources available to adolescents. Despite this, the experimental design did not indicate that being interviewed actually reduced the tendency to engage in self-injury over the following year. As important however, the result neither indicated that the tendency towards self-injury increased, which could be a risk if attention given to self-injury would be perceived as a functional method to gain social support and care, i.e. that being interviewed would inadvertently reinforce self-injury.

The interview's value to assess and gather information on self-injury can also said to have varied. In about half of the cases, it generated important information of self-injury, adding to the information about self-injury collected in the questionnaire. In these cases where self-injury was disclosed, the interview created opportunities to establish a relationship with adolescents and to provide important information helping to assess the gravity of their self-injurious behavior. The psychologists that performed the interviews assessed that in approximately 1 in 4 cases where the respondents did disclose self-injury this raised enough concern to warrant some kind of intervention.

Of those who disclosed self-injury in the interview, a majority (62%) reported to have ceased with the behavior. This finding was of particular interest and can be interpreted in several ways. Previous research (e.g. Study 2) has indicated that self-injury is not very stable over time, and therefore in many cases is fairly temporary behavioral expression. It is however also possible that the finding represents an unwillingness to disclose acts of self-injury. Even in a positively framed interview, adolescents may feel it less threatening to report having ceased to engage in such acts. This finding taken together with the finding that about half of those interviewed did

not acknowledge self-injury at all, even though having reported such behaviors in the questionnaire, show important areas for further research. It appears as important to better understand the needs of adolescents who self-injure, how disclosure of such behaviors may be promoted and how they themselves would wish to be approached about such behaviors.



## 3. Supplemental Analyses

### 3.1 Compilation of Self-Injury Rates

#### 3.1.1 Rates of Different Self-Injury Categorizations

In order to compare the rates of the different categorizations of self-injury in Study 1 and Study 2, the results from the self-injury questionnaires are summarized across studies in Table 1. The table shows the proportions of adolescents reporting self-injury (i.e. any form of self-injury at least once); the proportions reporting only one single episode of self-injury; the proportions reporting repeated self-injury (i.e. defined as 5 or more episodes totally); and finally the proportions reporting repetitive self-injury (i.e. defined as 5 or more episodes of [at least] one form of self-injury). Results are overall fairly consistent over the two samples (and both data collection points in each sample).

As can be seen in the table, the overall rates of self-injury vary between 36.5-42.9 %. The girls consistently report slightly higher rates of self-injury, varying between 44.1-48.7 %; compared to 28.2-38.1 % in boys. Between 6.7-10.0 % of adolescents report only one single episode of self-injury (7.8-11.9 % of the girls and 4.7-9.8 % of the boys). Repeated self-injury is reported by between 18.3-21.9 % of adolescents (20.7-25.7 % of the girls and 15.9-22.3 % of the boys). The more stringent definition of repetitive self-injury is reported by between 11.5-14.4 % of the adolescents (7.4-15.5% of the girls and 11.1-14.4 % of the boys).

**Table 1. Total percentages, and percentages of boys and girls respectively in Study 1 (N = 175 at T1 and 187 at T2) and Study 2 (N = 991 at T1 and 984 at T2) that reported self-injury (measured at the two different time points).**

Time 1/Time 2	Study 1			Study 2		
	<b>Total</b>	Girls	Boys	<b>Total</b>	Girls	Boys
	T1/T2	T1/T2	T1/T2	T1/T2	T1/T2	T1/T2
Any self-injury	<b>40.2/</b>	47.6/	33.3/	<b>41.5/</b>	45.2/	38.1/
	<b>36.5</b>	44.1	28.2	<b>42.9</b>	48.7	36.8
Self-injury once only	<b>9.2/</b>	8.3/	10.0/	<b>10.5/</b>	11.9/	9.8/
	<b>6.7</b>	8.6	4.7	<b>8.8</b>	7.8	9.8
Repeated self-injury (5 or more episodes totally)	<b>19.5/</b>	22.6/	16.7/	<b>18.3/</b>	20.7/	15.9/
	<b>21.9</b>	21.5	22.3	<b>21.0</b>	25.7	16.2
Repetitive (5 or more episodes of any one or more self-injury methods)	<b>14.4/</b>	14.4/	14.1/	<b>12.0/</b>	13.3/	12.2/
	<b>11.5</b>	7.4	14.4	<b>12.8</b>	15.5	11.1

Note: Time 1 and Time 2 interval was 44-126 days in Study 1 and one year in Study 2

### **3.1.2 Rates of Self-Injury Methods**

The rates of the different methods of self-injury were similarly compared between Study 1 and Study 2, these results can be seen in Table 2. Again, results are fairly consistent over the two samples (and both data collection points), with generally slightly higher rates of most methods of self-injury reported in the girls. Overall, the proportions of adolescents that employ the different methods of self-injury varied considerably between 1.1 % (the proportion of boys in Study 1 that reported biting self) and 24.3 % (the proportion of girls in Study 2 that reported minor cutting).

Between 9.8-15.2 % of adolescents reported cutting; 16.7-17.4 % reported minor cutting; 15.7-18.5 % reported carving; 14.4-19.8 % reported preventing wounds from healing; 9.2-21.5 % reported punching or banging; and 14.4-15.2 % reported severe scratching. Slightly lower rates were found for some behaviors; 5.2-9.0 % reported biting; 6.9-11.3 % reported burning; and 9.8-11.4 % reported sticking.

The highest rates of repetitive engagement in the different self-injury methods are all found in girls: cutting (7.9 %: among girls in Study 2); minor cutting (7.0 %: among girls in Study 2) and preventing wounds from healing (6.7 %: among girls in and Study 2).

**Table 2. Total percentages, and percentages of boys and girls in Study 1 and Study 2 that reported different self-injury methods at the two different time points reported separately.**

Study	Total rates of methods		Total rates of repetitive methods		Girls rates of methods		Girls rates of repetitive methods		Boys rates of methods		Boys rates of repetitive methods	
	1	2	1	2	1	2	1	2	1	2	1	2
Time	T1/T2	T1/T2	T1/T2	T1/T2	T1/T2	T1/T2	T1/T2	T1/T2	T1/T2	T1/T2	T1/T2	T1/T2
Cutting wrists, arms, or body areas	9.8/15.2	15.2/14.8	3.4/4.5	5.1/5.1	14.3/19.4	20.6/20.1	4.8/5.4	7.9/7.4	5.6/10.6	9.7/9.4	2.2/3.5	2.2/2.7
Minor cutting*	16.7/17.4	16.7/17.4	4.6/4.4	4.4/4.4	22.1/24.3	22.1/24.3	7.0/5.8	7.0/5.8	11.1/12.4	11.1/12.4	2.1/2.9	2.1/2.9
Burning with cigarette, lighter or match	6.9/10.1	8.5/11.3	0.6/1.7	1.6/3.6	6.0/9.7	7.7/11.2	0/1.1	1.8/3.4	7.8/10.6	9.3/11.6	1.1/2.4	1.4/3.8
Carving words, pictures, etc. into skin	16.1/18.5	16.1/15.7	3.5/5.6	3.2/3.8	21.4/23.7	19.6/19.0	3.6/5.4	3.4/4.0	11.1/12.9	12.6/12.4	3.3/5.9	2.9/2.7
Severe scratching, causing bleeding	14.4/15.2	14.9/14.4	1.1/2.8	3.7/3.0	19.0/19.4	18.9/18.6	1.2/1.1	5.3/4.0	9.5/10.6	10.9/11.1	1.2/4.7	2.1/1.9
Biting yourself, so that the skin is broken	5.2/5.1	7.7/9.0	1.1/1.1	2.3/3.0	9.5/7.5	10.7/11.7	1.2/1.1	2.0/2.7	1.1/2.4	4.6/6.3	1.1/1.1	0.8/2.7
Striking sharp objects into the skin	9.8/11.8	11.4/11.3	2.8/4.5	2.5/3.4	13.1/16.1	13.1/15.1	1.2/3.2	4.4/3.8	6.3/9.2	9.7/7.5	1.1/5.9	2.3/2.9
Banging head, thereby causing a bruise**	11.8/11.5	20.2/21.5	0.6/2.8	4.7/5.1	9.5/8.6	21.6/24.0	0/1.1	4.4/5.4	8.9/15.3	9.8/9.1	1.1/4.7	4.9/4.8
Punching self, thereby causing a bruise**	11.5/16.9	11.5/16.9	1.1/2.8	2.8/2.8	11.9/9.7	11.9/9.7	1.2/0	1.2/0	11.1/11.8	11.1/11.8	3.3/3.5	3.3/3.5
Preventing wounds from healing	14.4/16.9	16.8/19.8	4.6/5.6	4.3/5.6	20.2/22.6	19.5/23.7	6.0/6.5	5.3/6.7	9.9/10.6	14.1/15.9	3.3/4.7	3.3/4.6

Sample-sizes: Study 1, n = 178-174; Study 2 n = 983-974. \* Only included in Study II. \*\* Included in Study I, combined to one item in Study 2.

### **3.1.3 Methods in Self-injuring Adolescents**

In order to explore which forms of self-injury that was most often endorsed by adolescents who self-injure the rates of each self-injury method were compared among only those who reported having injured. These results, from both Study 1 and Study 2 are reported in Table 3. As can be seen, a number of self-injury methods were common among self-injuring individuals, 24.3-41.5 % of those reporting self-injury indicated having cut themselves; 28.8-40.0 % reported minor cutting; 11.0-27.7 % reported burning; 29.4-50.8 % reported carving; 26.6-41.5 % reported severe scratching; 12.9-18.4 % reported biting; 19.9-33.8 % reported repowered sticking; 22.9-48.9 % reported banging/hitting; and 28.7-46.2 % reported preventing wounds from healing.

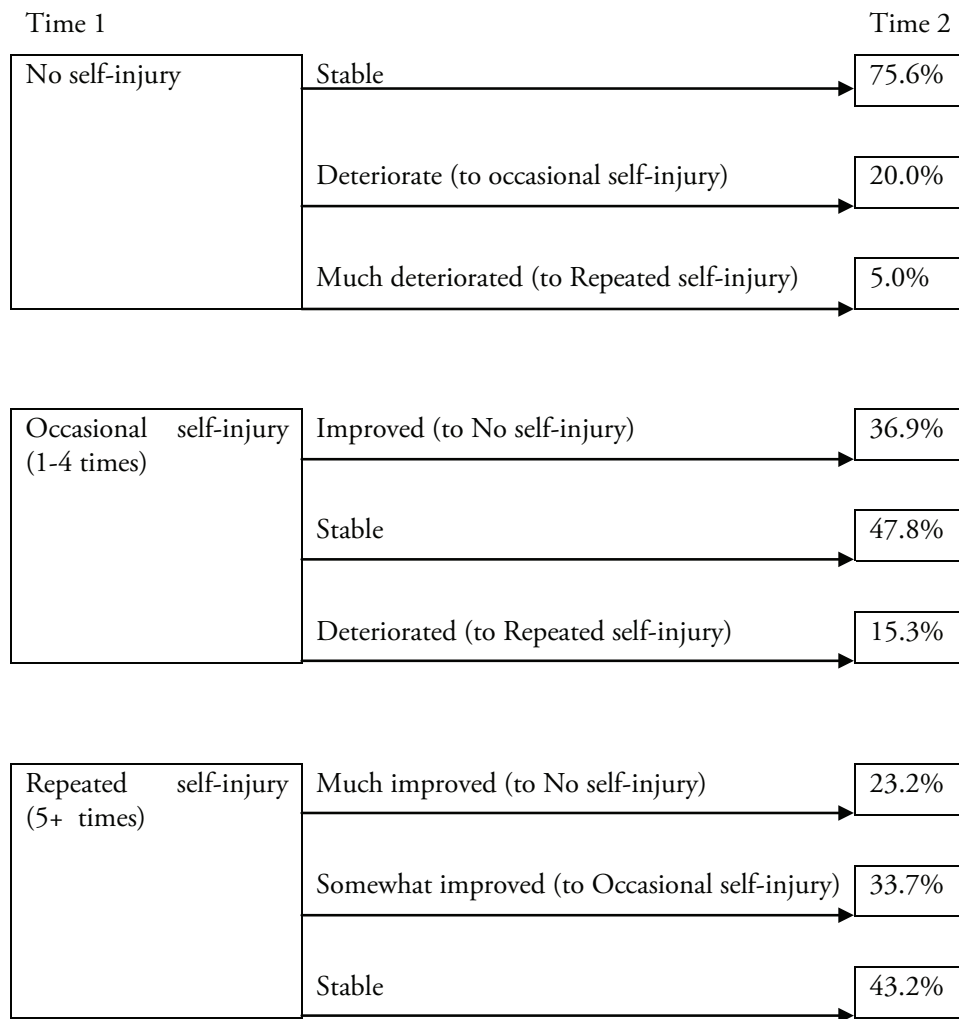
**Table 3. Percentages of self-injuring adolescents (and boys and girls respectively) that endorsed the different self-injury methods in Study 1 and Study 2 (results from Time 1 and Time 2 are reported separately for each method).**

	Study 1			Study 2		
	Total	Girls	Boys	Total	Girls	Boys
Cutting wrists, arms, or body areas	24.3/ 41.5	30.0/ 43.9	16.7/ 37.5	36.4/ 26.0	45.3/ 33.6	25.5/ 15.4
Minor cutting*				40.0/ 28.8	48.7/ 36.4	29.3/ 19.1
Burning with cigarette, lighter or match	17.1/ 27.7	12.5/ 22.0	23.3/ 37.5	20.4/ 11.0	17.0/ 9.7	24.5/ 12.9
Carving words, pictures, etc. into skin	40.0/ 50.8	45.0/ 53.7	33.3/ 45.8	38.2/ 29.4	43.5/ 33.3	33.2/ 23.9
Severe scratching, causing bleeding	35.7/ 41.5	40.0/ 43.9	30.0/ 37.5	36.1/ 26.6	42.3/ 33.2	18.8/ 11.4
Biting yourself, so that the skin is broken	12.9/ 13.8	20.0/ 17.1	3.3/ 8.3	18.4/ 14.8	23.8/ 19.4	12.0/ 8.4
Sticking sharp objects into the skin	24.3/ 33.8	27.5/ 36.6	20.0/ 28.2	27.7/ 19.9	29.1/ 21.7	25.8/ 17.4
Banging head, thereby causing a bruise**	22.9/ 32.3	20.0/ 19.5	26.7/ 54.2	48.9/ 34.7	48.0/ 33.3	50.0/ 27.7
Punching self, thereby causing a bruise**	28.6/ 29.2	15.0/ 22.0	33.3/ 41.7			
Preventing wounds from healing	35.7/ 46.2	42.5/ 51.2	26.7/ 37.5	40.8/ 28.7	43.4/ 29.4	33.6/ 27.7

\* Only included in Study 2, \*\* Included in Study 1, combined to one item in Study 2.

## 3.2 Stability of Self-Injury Categorizations

Figure 4 shows the relative stability of the different self-injury categorizations (non-injuring adolescents, adolescents with occasional [1-4 self-injury episodes] and adolescents with repeated self-injury [5+ self-injury episodes]). Out of the 532 adolescents with longitudinal data in Study 2 (92.7%) who did not report any self-injury at Time 1, 402 (75.6 %) still reported no injury at Time 2. An additional 101 (20.0 %) individuals reported occasional self-injury at Time 2 and 29 (5.0 %) reported to have engaged in repeated self-injury at Time 2. Out of the 268 adolescents with longitudinal data (92.1 %) who did report occasional self-injury at Time 1, 128 (47.8 %) still reported occasional self-injury at Time 2. An additional 99 (36.9 %) reported not to have engaged in self-injury at Time 2 and 41 (15.3%) reported to have engaged in repeated self-injury at Time 2. Out of the 95 268 adolescents with longitudinal data (81.2 %) who did report repeated self-injury at Time 1, 41 (43.2%) reported Repeated self-injury again at Time 2. An additional 22 (23.2 %) individuals reported not to have engaged in self-injury at Time 2 and 32 (33.7%) reported occasional self-injury at Time 2.



**Figure 4. Graphical illustration of change in self-injury categorizations from Time 1 to Time 2 in Study 2 (N = 984).**



## 4. Discussion

This thesis aimed to further the understanding of self-injury amongst Swedish adolescents. The methodological approaches, and resulting findings, can roughly be divided into three categories; first those related to comparing and corroborating results in previous research, in the studied groups of young Swedish adolescents (e.g. comparisons of findings concerning the rates of self-injury, its relationships to psychopathology, and gender differences), second, those relating to new contributions to the existing research (e.g. the use of a longitudinal design and a person-oriented approach, findings on subgroups of adolescents with different patterns of self-injury, and differentiating these in terms of psychopathology), and third, those that can be said to explore some new directions for self-injury research, where choice of methodology and the resulting findings must be considered tentative until further examined (e.g. attempting to supplement questionnaire reports through interviews, evaluating the feasibility and effect of this procedure in a school-context).

Overall, the findings seem to confirm the picture that has emerged in international literature during recent years, which has found non-suicidal self-injury to be relatively common in community samples of adolescents and that view non-suicidal self-injury as a phenomenon in its own right. The new findings however also point towards the relevance of viewing self-injury as a heterogeneous phenomenon in adolescents (consisting of several subgroups or types), where a large proportion of self-injuries may not be very serious or severe, and a relatively smaller proportion where self-injury is part of a more extensive problem constellation. Further, the present findings also support that the school-setting may be an appropriate context in which to develop response protocols for managing self-injury, including screening and further assessment, and possibly management of less severe cases of self-injury.

In the following sections I will summarize the main findings and conclusions that the thesis resulted in, and discuss their implications. I will also consider the limitations of the thesis, and make some suggestions for further research throughout the text.

## 4.1 Principal Findings

On a whole, there have been few previous Swedish studies on self-injury and knowledge about adolescent self-injury has largely been lacking. In several important ways the results generated in this thesis corroborated the notions presented in recent international self-injury research, supporting the assumption that self-injury may be viewed as a worldwide phenomenon (Plener, et al., 2009), and implies that self-injury among Swedish adolescents can be placed in this international context.

### 4.1.1 Self-Injury Rates and Methods

Findings in this thesis converge with the international literature indicating that self-injury in adolescents is both widespread and typically engaged in through a number of different methods. As compared to previous estimates of rates between 5-7 % in Sweden (i.e. The National Board of Health and Welfare, 2004), the rates of adolescent self-injury in this work were found to be considerably higher; as consistent overall rates varied between 36.5-42.9 % (Study 1; Study 2). Similar high rates of about 40 % have been found in other international studies (e.g. Hilt, et al., 2008; Lloyd-Richardson, et al., 2007; Plener, et al., 2009), and other Swedish studies with similar methodological approaches have also found rates between 34-36 % in recent years (Jutengren, Kerr, & Stattin, 2011; Zetterqvist et al. 2012).

These rates are higher compared with the overall estimates of self-injury rates found in reviews of the existing literature, which can be described as ranging between 13.0-23.2 % (Heath et al, 2009; Jacobson & Gould, 2007; Muehlenkamp, et al., 2012). Several authors have noted that the rates of self-injury found in studies are largely dependent on the type of measurement used and that higher rates seem to emerge especially when multiple item check-list type measures of self-injury are used (Heath, et al, 2009; Lundh, et al., 2007). The discrepancy between the current findings and, for example, the rates mentioned by the National Board of Health and Welfare, can thus largely be explained by differences in measures, as the latter estimate is based on studies that use other types of instruments (typically less comprehensive and more ambiguously worded single item screening questionnaires that consistently seem to result in lower rates of self-injury) (Lund et al., 2007).

As for the various methods of self-injury examined it seems that all nine forms asked about in the questionnaires appear to be relatively common among adolescents, with rates of between 5.1-21.5 % for the individual behaviors over both Study 1 and Study 2 (Supplemental analysis). Among self-injuring adolescents, there also appears to be very common to use several different methods of self-injury (Supplemental analyses; Study 2). Previously, cutting behaviors have often been considered the typical self-

injury method but it is clearly relevant to expand this view to encompass a number of additional self-injury methods to correctly represent the phenomenon as it appears in adolescents here.

Findings on rates of more repeated (and repetitive) self-injury were also fairly consistent over the two studies. Study 1 reports the rates of repetitive self-injury, in terms of individuals who has engaged in any *one* method of self-injury on at least five occasions; which in both Study 1 and Study 2 varied between 11.5-14.4 % (Supplemental analysis). In Study 2 however, repeated self-injury was defined as at least five episodes of self-injury irrespective of which methods that were used; and the rates according to this classification varied between 18.3-21.9 % over the two studies (Supplemental analysis). Thus, self-injuring repetitively (engaging in the same method of self-injury five or more times) appears to be a less encompassing criteria, possibly indicating that this is clinically a more relevant indicator of self-injury. The definition proposed for the DSM-5 takes still another approach by focusing on the number of days where self-injury has been engaged in (self-injury on five or more days). What aspect of the frequency of self-injury that is most relevant (total number of episodes, repeating the same behaviors, or injuring on a number of separate occasions) are currently unknown and further research should evaluate the significance of these different characterizations.

Over the time interval in Study 2, the difference between the rates of adolescents who only occasionally injured themselves and those with a repeated behavior appear to be stable, i.e. proportions were similar when measured one year apart. The overall rates of self-injury among adolescents thus appear to be relatively stable over time, at least in young adolescent. For individual cases however, a different picture emerge as self-injury appears fairly unstable in many individual cases, suggesting that many who self-injure do not necessarily continue to do so over time (Supplemental analysis; Study 2). This is consistent with a number of recent findings that have shown that self-injury is not very stable behavior and that most that injure themselves as adolescents spontaneously cease to engage in the behavior (Moran et al., 2011). Future research that explore how self-injury develops over time within cases is clearly warranted, both targeting pathways leading to more serious or severe self-injury, and pathways that lead to discontinuation of self-injurious behaviors.

In order to improve understanding of epidemiological characteristics of self-injury, future research need to deploy repeated surveys of representative samples of adolescents using relevant, standardized and validated measures targeting self-injury. One important question would be to monitoring trends of self-injury rates over time.

#### **4.1.2 Self-injury in Girls and Boys**

As previous literature has been inconsistent on findings relating to self-injury in girls as compared to boys, some of the present findings are interesting. Overall, in Study 2, there appears to be an over-representation of self-injury in girls (reported by 45.2 vs. 38.1 %), although the results are less clear in the smaller convenience sample in Study 1, this speaks for a small but significant general overrepresentation of self-injury in girls. Compared to what have sometimes been seen in previous research (e.g. Hawton, et al., 2002), the overall gender-differences can be said to be smaller than expected. Where significant differences between girls and boys clearly emerged however, cutting behaviors, scratching, biting, and preventing wounds from healing were all more frequently reported by girls (Study 2). Cutting behaviors for example appeared as about twice as common among girls. The most pronounced differences between girls' and boys' self-injury in the current findings appear when more frequent self-injury are considered. Repetitive self-injurious behavior (defined as five or more episodes of one specific behavior), were more common in girls, accentuating the pattern of gender differences further. The largest difference was found for repetitive cutting, which was reported by approximately 3 times more girls than boys. Hence, as to the rates of self-injury in girls and boys respectively, a rather multi-faceted picture emerged. The overall differences appeared quite small, but in more specific respects differences were more pronounced. When more repetitive self-injurious behavior, especially cutting behaviors, is considered girls appear to be more clearly over-represented. This implies that self-injury in girls and boys are best viewed separately. As the main focus on self-injury has typically been placed on girls, further research should closer ascertain its characteristics in boys. If self-injury in boys differs in important respects from girls, assumptions about the characteristics of the behavior derived from research on girls/women may have been erroneously generalized to boys.

#### **4.1.3 Self-Injury, Psychopathology and Subgroups**

An important question that follows from the findings of high rates of self-injury in adolescent is how relevant these behaviors are for the general well-being of the individuals that report them. When so many adolescents report to have self-injured, a reasonable supposition would be that the meanings and relevance of these acts vary considerably among cases. Overall, the findings in this thesis clearly speak to an overall association between self-injury in adolescents and various psychopathological problems. For instance, robust correlations were found between self-injury and general psychopathology, both in Study 1 and Study 2. In Study 1, correlations were also seen between lifestyle factors such as alcohol use and smoking, emotional aspects of parental relationships, emotion regulation styles (ruminating/negative thinking); and among girls a negative body image and risk behaviors for eating disorder also

correlated. This appears in line with both Linehans' (1993) and Nocks' (2009c) models of self-injury as both distally and more proximally associated to psychological difficulties. Especially the results in Study 1, which found that the absence of positive emotions in relation to parents and rumination/negative thinking predicted self-injury independently of general psychopathology supports the assumption that self-injury may constitute an emotion regulation strategy used in the absence of more effective strategies that has arisen in the context of more distal interpersonal risk factors, rather than merely being an artifact of general difficulties. However, current findings do not directly approach the question of causal relationships between the associated factors and self-injury, as only cross sectional associations were examined in this thesis. Findings of longitudinal bidirectional relationships between self-injury and both general psychopathology and depressive symptoms in the sample studied in Study 2 have however been documented elsewhere (Lundh, Wångby-Lundh, & Bjärehed, 2011; Lundh, et al., 2011).

Interestingly, the overall relationship between self-injury, and psychopathology also hold for all individual self-injury methods (Study 1; Study 2), and speaks against that some self-injury methods should be considered more benign than others, as has sometimes been hypothesized (e.g. Whitlock et al. 2008). Beyond these general associations however, the thesis also disentangles a more nuanced picture of the differences in psychopathological relevance of different cases of self-injury. The results from the study of subgroups with different patterns of self-injury in Study 2 indicate that certain patterns of self-injury (i.e. combinations self-injury occurrences and methods) seem to have different psychopathological implications. Conceptually, several researchers have previously suggested that individuals with self-injury may represent a relatively heterogeneous group that may be considered as consisting of several subgroups. This idea has been confirmed in studies in young adults (Klonsky & Olino, 2008, Whitlock et al., 2008). Study 2, however, extends this idea and shows that it also is relevant to young adolescents. Study 2 also contributes to the present literature on self-injury by analyzing longitudinal data. Especially in girls the results showed that there was considerable stability in self-injury patterns over time, i.e. that the same patterns are largely found at different measurement occasions. This strongly indicates that the patterns can be seen as reliable stable patterns (i.e. subgroups of self-injurers) over time. More specifically, there appears to be at least two sub categories of different constellations of psychopathology amongst self-injuring adolescents, one characterized by both internalizing and externalizing problems (which is found among both boys and girls) and one characterized by predominantly internalizing problems (found mainly in girls). Among boys, the link between psychopathology and self-injury appears as generally less pronounced than in girls. Problem constellations characterized by internalizing problems only, and a combination of internalizing and externalizing may need to be considered separately. For example, it is possible that these different groups have different needs in terms of the type of support and help that they are in need of.

The more diverse picture that Study 2 presents on the psychopathological relevance of various self-injury patterns include finding a subgroup of self-injuring individuals who show a very low-frequency pattern of self-injury (consisting of 60-67 % of all self-injuring individuals), and which did not appear to be associated with elevated levels of psychopathological problems for this group. Thus, it may be assumed that for a large part of the self-injuring adolescents, this behavior is of lesser importance, and these individuals are not in immediate need of help and support. Previous research among young adults has identified similar subgroups (Klonsky & Olino, 2008, Whitlock et al., 2008).

Another much smaller group (3-5 % of self-injuring boys and girls) that was identified instead displayed a pattern of high frequency and diverse self-injury in combination with a markedly elevated proportion of both internalizing and externalizing problem types. This group reflects a pattern also found in previous research among young adult subgroups (Klonsky & Olino, 2008, Whitlock et al., 2008), and may represent a potentially much more serious problem constellation.

A third group identified generally showed a pattern of relatively high frequency cutting behavior. Especially girls reported this pattern and it seemed particularly linked to internalizing problems. This group is especially interesting as it corresponds well to the conventional picture of self-injuring individuals; that of self-injurers as typically young women who cut themselves in relation to emotional difficulties. It is possible that this group has different needs in terms of support and treatment efforts, as compared to those who exhibit both internalizing and externalizing problems. Especially the visibility of symptoms may be limited, as compared to externalizing problems which are more readily noticeable by others. Therefore, this group may be in need of active efforts to detect and assess their self-injuries.

Also, currently there are no definitive guidelines for when self-injury should be seen as more serious or relatively less serious. The present research does give some indication about this, but further research needs to develop more reliable ways to identify and assess clinically relevant cases of self-injury so that selective preventive measures or treatment can be started in time.

#### **4.1.4 Self-Injury in a School Context**

From the reasoning above, the importance of the methods used to measure self-injury is clear. Study 1 indicates that the self-injury methods that are asked about in the DSHI-9 are relatively comprehensive, because few additional self-injury episodes were found when respondents were given the opportunity to freely report other behaviors (Study 1). The psychometric properties of the instrument were adequate, the reliability was good (Study 1:  $\alpha = .66-.85$  Study 2:  $\alpha = .90$ ) and test-retest reliability was deemed satisfactory (Study 1). The validity was supported by showing the

theoretically expected patterns of converging and diverging associations with other variables. A potential shortcoming related to the DSHI in the present thesis, is the response format. The question about the range of episodes only goes to five and then "more than five" episodes, which results in a restriction in range in the measurement of self-injury.

Hence, it can be derived that the DSHI-9 and its adaptations seems to be suitable for broad screening of self-injury among community samples of adolescents. The DSHI-9 alone may however not be very suitable to identify more serious cases of self-injury. For this purpose it may be necessary to complement the instrument with other measures (e.g. of general psychopathology) or assessment methods (e.g. through interviews). The instrument used to measure self-injury in this thesis seems to work well as a brief screening measurement among normal adolescents but, the utility is limited in regard to more thoroughly assessing self-injury. For clinical practice and research in clinical groups it may therefore be more relevant to use instruments that are more comprehensive. For example, a series of instruments has been developed that in addition to the mere existence of self-injury also assesses the function of these behaviors. Such instruments validated in Swedish would be warranted, and some preliminary attempts have already been initiated in this direction (Lindholm, Bjärehed, & Lundh, 2011; Zetterqvist et al. 2012)

An interview assessment of NSSI was included in Study 3, but the results must be considered tentative as the reliability and validity of the interview used is unknown. It is however interesting to note that the information about self-injury as revealed by interviews differed considerably in comparison with the DSHI-9, a pattern also observed in previous research (Ross & Heath, 2002).

On a whole, it seems feasible to complement initial screening questionnaires with follow-up interviews. In Study 3, the majority (70 %) of adolescents who had reported self-injury in the questionnaire were also willing to be interviewed about their general life situation by a psychologist. In addition to being perceived positively by adolescents, the interview also enabled the interviewer to collect additional information on self-injury. To some surprise, many adolescents, even though having agreed to participate in the interview and previously having reported self-injury in the questionnaire, denied such behaviors when asked about it in the interview situation. This may be explained by the fact that many adolescents are reluctant to talk about self-injury with an adult. Some studies have previously documented that adolescents holds concerns that adults may overreact when faced with self-injury (Rissanen, Kylmä, & Lukkanen, 2009), and in addition, individuals with self-injury may have experienced being treated negatively by health-care professionals, as a number of studies have shown that health-care professionals often hold more negative attitudes towards patients who self-injure (Saunders, et al, 2011).



An alternative explanation to the differences seen when information from self-report questionnaires were compared to that from interviews is that questionnaires overestimate the rates of self-injury, for example by often being misunderstood, so that the interviews actually represent a more accurate picture of the rates of self-injury. From the present findings, it is not possible to evaluate if this is the case, and previous research has seldom compared different methods of self-injury assessment in the same study. A significant proportion of those who actually reported self-injury in the interview also reported that they had currently stopped injuring. This is consistent with the findings on individual stability in Study 2, i.e. that self-injury may be unstable over time, but it could also be that these statements represents a less threatening way for adolescents to talk about self-injury, than to acknowledge it as an ongoing behavior.

The findings on measurement and assessment of self-injury in the present thesis means that today we have access to a suitable instrument in Swedish, to screen for the presence of self-injury in adolescents, but that at least the DSHI-9 is limited to collecting mere topographic information about self-injury methods and frequencies.

The spread of self-injury in adolescent also raises the question about how self-injury can be approached and further assessed by adults that may encounter it in their professional roles. In many cases, professional may feel insecure in terms of how they should respond to self-injuring individuals. Many are aware that self-injury can be socially mediated and thus may feel that they need to act in a particular way (e.g. by not giving attention and thereby promoting self-injuring as a strategy to access support) in order not to inadvertently reinforce or exacerbate the behavior. The experimental design in Study 3 showed no indication that approaching and interviewing adolescents increased the risk of self-injury one year later. This finding is admittedly tentative and speaks only indirectly to the possibility of adopting similar procedures. How others approach self-injury may still affect the propensity to injure again and further research therefore needs to generate testable hypotheses about such processes and how a professional approach towards managing self-injury could be formulated.

As for these findings in Study 3; the procedure of offering adolescents who self-injure the opportunity to talk with a professional about their situation show some promise. This approach provides the possibility both to collect additional information about an individual's self-injury that may be difficult to collect through questionnaires, and possibly also establish a positive relationship with that individual.

A significant proportion of young people (both self-injuring and non-injuring) chose to refrain from contact when approached by an adult about their situation. Study 3 also raises the suspicion that many may also withhold or distort information when asked about self-injury by professional adults. Further efforts are therefore necessary



to understand the reasons for this, and to develop better methods to establish contacts also with adolescents who refrain from adult involvement.

#### 4.1.5 Redefining Self-Injury

A central issue in the work with this thesis was the definition and operationalization of self-injury. As is apparent from previous literature, arriving at an optimal definition of self-injury and reliably and validly measuring that construct has been difficult. Only during recent years has an international consensus about a comprehensive classification and praxis for terminology begun to form. The present work has been conducted in parallel with the ongoing debate on these issues among researchers in the field. One aspect of this issue has been how the behaviors studied should be delimited and defined. A central premise for the present thesis was to define self-injury strictly at the behavioral level. It was reasoned that such a definition would leave less room for misunderstanding and idiosyncrasy over what was asked about, both for the respondents in the studies and when communicating the results. Self-injury was therefore defined in the present work as: whether an individual purposefully (expressed as *deliberately [on purpose]*) had engaged in nine specific behaviors resulting in direct, self-injury of mild or moderate severity, namely: 1) cutting (including minor cutting<sup>1</sup>), 2) carving, 3) biting, 4) burning, 5) severe scratching, 6) sticking sharp objects into the skin, 7) punching/banging oneself<sup>2</sup>, and 8) preventing wounds from healing; and that the act led to tissue damage (expressed as bleeding, bruising, puncturing of the skin or scaring) and had been performed during the past 6 months. Originally (in Study 1) we use the term “deliberate self-harm” to describe this class of behaviors, because the instrument that was used to measure the behavior was derived from Gratz’ (2001) Deliberate Self-Harm Inventory. Later (in Study 2 and 3), we chose to use the less ambiguous term “non-suicidal self-injury” which had recently been proposed (Nock, 2009b; 2010), and as it gained in recognition this was also suggested to us by reviewers of Study 2. Also, in contrast to some other researchers, we choose not to delimit self-injury in terms of intention associated with the behaviors (i.e. asking explicitly about suicidal intention). It can be argued that such definitions may be problematic, especially in adolescents, as it relies on introspection and the ability to correctly recall intentions from episodes in the individual’s past, which may be difficult (Nisbett & Wilson, 1977). Further, it may be an unnecessary distinction as behaviorally, suicidal behavior and non-suicidal

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<sup>1</sup> “Minor cutting” was included in the DSHI-9r used in Study 2, see section 2.2.3.

<sup>2</sup> Punching self and banging head were two items in the DSHI-9 (Study 1), see section 2.2.3.

self-injury represent two clearly distinguishable categories. In contrast to the behaviors we have examined, common methods for committing suicide are hanging, drowning, shooting, jumping from heights, poisoning, and taking overdoses. The behavioral overlap between suicidal and non-suicidal self-injury is therefore minimal (although the two kinds of behaviors often co-occur). This is further supported by statistics on methods for suicide, in Sweden, during 2008 only 2.2 % of all suicides were through cutting/sticking methods (which is the only overlapping category that can be found in the official statistics on suicide) (Jiang, Floerus, & Wasserman, 2010). Taken together this indicate that explicitly asking adolescents about suicidal intent when using checklist-type screening questionnaires may not add very much information if the items of the measure explicitly ask about self-injury methods that are typically non-suicidal. It is further very unlikely that any significant number of suicidal behaviors is actually misrepresented as non-suicidal behavior in the present studies, even though this was not explicitly asked about in the DSHI-9. Nock (2010) does claim that the determination of an individual's explicit intention relating to suicide (i.e. to establish a zero level suicidality) is required for classifying a behavior as non-suicidal self-injury, even though this will result in an incorrect classification of ambivalent behaviors (e.g. inaccurate memories or ambivalent intentions). Agreed, this may be true in many situations such as when conducting clinical assessments, but may be misdirected in other situations. An overstated focus on suicidal intent can potentially even hinder rapport if respondents feel that the researcher or clinician are overestimating or exaggerating the meaning of self-injury (Rissanen, Kylmä, & Lukkanen, 2009). Perhaps it would be relevant however to add this distinction in the definition of self-injury, as it is measured by the DSHI-9r in order to be more consistent with current praxis, this becomes especially relevant if the diagnosis is adopted in the new version of the DSM (i.e. DSM-5).

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