Direct and Indirect Non-Suicidal Self-Injury (NSSI) Expression: An Investigation into the Nature of NSSI and Childhood Maltreatment

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Abstract

Non-Suicidal Self-Injury (NSSI) involves deliberate damage to the body without suicidal intent. St. Germain and Hooley (2012) classify two forms of NSSI: direct and indirect. Direct NSSI is expressed through behaviours with immediate results (e.g. cutting), whereas indirect NSSI is expressed through means that are damaging to the body without immediate injury (e.g. promiscuity, substance abuse, risk behaviours, etc.). Research supports that NSSI behaviours occur in youth with histories of childhood maltreatment (CM; Trocmé et al., 2010); however, no study has examined if experiences of CM influence NSSI expression. Utilizing the InterRAI Child and Youth Mental Health tool ($N=4,616$), an association between childhood maltreatment and NSSI expression (direct-only, indirect-only, and direct and indirect) was determined, with over half of participants reported experiencing polyvictimization. Engagement in NSSI was most commonly presented in older youth (16-18) and exhibited more frequently in females (vs. males); however, no gender differences were identified in those who engage in indirect-only NSSI. Of those youth who experienced maltreatment, they most commonly engaged in behaviours associated with indirect-only forms of NSSI expression (e.g. substance use, eating disorder symptomatology, risky behaviours, and sexual promiscuity). In relation to polyvictimization, a significant association was found between the three dimensions of NSSI expression, with polyvictimization significantly predicting engagement in indirect-only NSSI behaviours. Implications for targeted prevention within clinical practice and directions from future research are discussed.

Key words: Childhood maltreatment, polyvictimization, non-suicidal self-injury (NSSI), direct NSSI, indirect NSSI, InterRAI ChYMH
Summary for Lay Audience

Non-Suicidal Self-Injury (NSSI) involves deliberate damage to the body without suicidal intent. Two forms of NSSI have been classified: direct and indirect. Direct NSSI is expressed through behaviours that have an immediate impact on the body (e.g. cutting), whereas indirect NSSI is expressed through behaviours that are damaging to the body, but do not result in immediate injury (e.g. promiscuity, substance abuse, risky behaviours, etc.). Past research supports a strong relationship between adolescents who have experienced childhood maltreatment (e.g. CM; neglect, physical abuse, sexual abuse, emotional abuse, witnessing domestic violence) and their engagement in NSSI. However, no current research had investigated whether adolescents who have experienced CM, including polyvictimization (2+ experiences of CM), express their NSSI in direct-only, indirect-only, or a combination of both forms. In order to explore this question, data was derived from the interRAI Child and Youth Mental Health Assessment tool. A total of 4,616 youth were found to have experienced CM, with results suggesting a strong relationship between CM and NSSI expression (e.g. direct-only, indirect-only, and direct and indirect). Of those youth with histories of CM, engagement in NSSI behaviours in all three forms of expression were most common across older youth (16-18). Moreover, female youth with histories of CM (vs. males) were found to engage in direct-only and both direct and indirect NSSI more often; however, male and female engagement in indirect-only NSSI expression was similar. Of those youth who experienced CM, emotional abuse was the most commonly reported form, with results suggesting that the most common behaviours associated with NSSI were related to indirect-only forms of expression. Finally, the present study determined a strong association between each of the three different domains of NSSI expression and youth with a history of polyvictimization. In particular, polyvictimization was found to predict engagement in
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indirect-only NSSI expression in youth. The present study recognizes that NSSI behaviours can be expressed in a number of ways across youth who have experienced CM, and as a result, should be taken into consideration both in clinical practice and in the development of future research.
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Introduction

According to Van der Kolk (2017), the Theory of Developmental Trauma postulates that exposure to traumatic experiences during childhood, such as experiencing maltreatment, can impact later-life functioning. These early experiences, coupled with the vulnerable period of adolescents, can exacerbate such risks and promote maladaptive coping strategies such as NSSI (Van der Kolk, 2017; DeBellis, 2001). Currently, the majority of research that exists focuses on the consequences of singular forms of childhood maltreatment as it relates to suicidal and direct forms of non-suicidal self-injury across females; however, while there is evidence to suggest the NSSI can be expression in more than one way (e.g. directly, indirectly, and a combination of both forms), and that maltreatment rarely occurs in isolation, little to no research has examined these associations.

As such, the present study extended upon the current collection of research, and aimed to examine if youth with histories of childhood maltreatment, including both singular and multiple victimizations, uniquely expressed their NSSI in different ways (direct, indirect, or both forms). In addition, the current study aimed to explore the distribution of age and gender as it relates to engagement in order to identify those at highest risk, as knowledge of this information can help establish developmentally appropriate prevention and intervention strategies.

Literature Review

Non-Suicidal Self-Injury

Non-Suicidal Self-Injury (NSSI) is classified as the deliberate and direct damage to an individual’s body tissue without suicidal intent (American Psychiatric Association [APA], 2013; Nock and Favazza, 2009). NSSI has commonly been viewed as a coping mechanism with the intent of managing distress and suffering that the individual is currently experiencing. However,
defining NSSI has proven difficult, as some researchers employ different inclusion criteria in its diagnosis, and may not clearly distinguish between engagement for suicidal and non-suicidal purposes (Nock and Prinstein, 2005). For instance, while behaviours such as intentional cutting, pinching, stabbing, poking, scratching, and self-hitting are among those identified as forms of NSSI, these behaviours can also be engaged in by individuals who intend to utilize these methods for suicidal purposes (Zetterqvist, 2015; Nock and Favazza, 2009).

Historically, NSSI has been regarded as a symptom of Borderline Personality Disorder (BPD). BPD is categorized as a pervasive pattern of unstable interpersonal relationships, self-image, emotions, and increased impulsivity that begins in early adolescence (Biskin and Paris, 2012). Although research evidence still endorses the inclusion of NSSI as a symptom of BPD (APA, 2013), researchers have suggested that other clinical diagnoses such as substance abuse disorder, eating disorders, posttraumatic stress disorder, depression, anxiety, and non-clinical populations all can engage in NSSI behaviors (Haw, Hawton, Houston & Townsend, 2001; Klonsky, Oltmanns & Turkheimer, 2003). As a result, NSSI is now considered within the Diagnostic and Statistical Manual of Mental Disorders-5 (DSM-5; APA, 2013). With the inclusion of NSSI in the DSM-5 (e.g. section 3), it is suggested that unwarranted diagnosis of BPD can be avoided, as not all individuals that engage in NSSI behaviours experience other BPD symptomatology (Nock, Joiner, Gordon, Lloyd-Richardson, & Prinstein, 2006).

**Prevalence**

There have been various frequencies reported in the literature regarding the prevalence of NSSI that differ in regard to age and the population of interest (clinical vs. non-clinical). However, while there has been variability, there is strong support in examining NSSI as it relates to adolescents with mental health concerns. Barrocas, Hankin, Young, and Abela (2012)
examined youth engagement in NSSI before the age of 11, and determined that the minimum age for a child to engage in NSSI behaviours with the intent to harm themselves was seven years of age, though NSSI behaviours typically manifest themselves in adolescents (ages 12-17 years; see for example Baiden, Stewart, & Fallon, 2017; Lewis et al., 2012, Klonsky, 2011).

In regard to a non-clinical sample, Swannell and colleagues (2014) conducted a detailed review and meta-analysis on the prevalence of NSSI and concluded that the rate was estimated to be 17%. Whereas in clinical samples examining youth with mental health needs, such as those in Ontario, results reveal that 20% of adolescents with mental health concerns engaged in NSSI (Stewart, Baiden, & Theall-Honey, 2014). However, additional clinical samples examining NSSI in adolescence have found prevalence rates as high as 70-80% (Thomassin, Shaffer, Madden, & Londino, 2016; Auerbach, 2014; DiClemente, Ponton, & Hartley, 1991). Therefore, additional studies are warranted in order to help quantify the degree to which NSSI impacts adolescents.

**Sex and NSSI**

Across studies, findings have stayed consistent in identifying females as more commonly engaging in NSSI with respect to biological sex (Armiento et al., 2016; Sansone & Sansone, 2011). However, there have been inconsistencies within the literature that have examined potential discrepancies between females and males in relation to prevalence rates of NSSI (Hamza, Stewart, & Willoughby, 2012; Hilt, Nock, Lloyd-Richardson, & Prinstein, 2008). In one longitudinal study by Hilt et al. (2008), 508 sixth- to eighth-grade students were assessed for NSSI, other health-risk behaviours, and parental relationships. According to the results, 7.5% of the sample engaged in NSSI within the past year. Nevertheless, there were no significant differences in regard to sex (Hilt et al., 2008). However, Laye-Gindhu and Schonert-Reichl (2005), who investigated the prevalence, nature, and function of self-harm among adolescents,
determined that of the 15% of high-school students who reported engagement in self-harm, 20% of the females participated in these behaviours compared to less than ten per cent of the males (9%). While research supports that sex differences tend to emerge with age (Barrocas, et al., 2012), additional research on the relationship between NSSI and sex is warranted due to inconsistencies in the literature, especially in a youth sample.

**Differentiating Non-Suicidal Self-Injury from Suicidal Self-Injury**

According to a review by Hamza et al. (2012), self-injurious behaviours (SIB) include any form of behaviour that causes deliberate harm to the individual. Although NSSI and Suicidal Self-Injury (SSI) can co-occur in the same individual (Miranda-Mendizabel et al., 2019; Jacobson, Muehlenkamp, Miller, & Turner, 2008), and can fall under the encompassing term of SIB, there are distinct differences between the two behaviours. Zetterqvist (2015), who advocated for the acceptance of NSSI in the DSM-5, noted that failure to recognize these differences can lead to the incorrect assessment and treatment of an individual.

While both forms of self-injury can be used as a mechanism to relieve negative affect, NSSI and SSI differ on three main characteristics: lethality, frequency, and intention (Hamza et al., 2012). According to Ougrin et al. (2012) who studied a clinical sample of 70 adolescents engaging in SIB, those who engaged in SSI were more likely to use more lethal methods of harm (e.g. self-poisoning) than NSSI individuals. Moreover, in regards to characteristics of frequency and intention, a study conducted by Preyde and colleagues (2012) found that in clinical sample of 55 Canadian children and youth, that those who engaged in SIB without the intention to end their life (NSSI), engaged in self-harming behaviours more frequently, compared to those who engaged in behaviours with the intention to end their life (e.g. SSI).
Direct and Indirect Expressions of Non-Suicidal Self-Injury

Due to the increasing research and support for NSSI inclusion in the DSM-5 (Zetterqvist, 2015), it is important to acknowledge the similarities and differences by which NSSI is expressed; more importantly, whether it is through direct or indirect means.

Previous research conducted by Klassen, Hamza, and Stewart (2017) investigated potential risk factors for direct versus indirect forms of SIB. In this study, substance use constituted an indirect form of self-injury, while SSI and NSSI were associated with direct self-injury. Results indicated that clinically referred females, primarily those in later adolescents who exhibited high levels of depressive symptomatology, and reported neighborhood violence, engaged in direct forms of self-injury (NSSI and SSI) more frequently (Klassen, Hamza, & Stewart, 2017), however, little research has examined the distinction of expression in regard to NSSI itself.

This distinction in expression can be difficult to differentiate as most individuals tend to consider NSSI behaviours as they relate to the self-harming behaviours of cutting and burning without suicidal intent (Brausch, Williams, & Cox, 2016). Although these two methods are commonly used among those who engage in NSSI, they are not the sole behaviours engaged in by people who are involved in self-harm (Brausch, Williams, & Cox, 2016). Similarly, it is important to recognize that not all behaviours that induce harm to the body are classified as NSSI (Klonsky, Victor, & Saffer, 2014); rather, it is only behaviours that are not seen as socially acceptable. Therefore, tattooing, piercing, nail-biting, and/or religious and cultural rituals do not classify as NSSI behaviours (Klonsky et al., 2014; Walsh, 2006).

Taking into consideration the research conducted by Walsh (2006) and St. Germain and Hooley (2012), NSSI behaviours are classified into two forms: direct and indirect expression.
Direct NSSI expression refers to behaviours that are clearly used for the purpose of mutilating the body, involve tissue damage, and give rise to immediate results of physical stimulation/pain (St. Germain and Hooley, 2012; Walsh, 2006). For example, behaviours such as cutting, scraping, self-hitting, and burning would all be considered as a direct form of NSSI expression, since the results of engagement would occur directly after its performance (St. Germain and Hooley, 2012; Walsh, 2006).

Conversely, indirect NSSI expression is defined as behaviours that are damaging to the body which may not be intentional and does not produce immediate results; rather, the harm to the body of those who engage in indirect NSSI behaviours is experienced later in time (St. Germain and Hooley, 2012; Walsh, 2006). These forms of self-injury often include risky/reckless behaviours, eating disorder symptomatology, substance abuse, and sexual promiscuity (St. Germain & Hooley, 2012).

The following section summarizes the underlying risk factors for NSSI engagement; in particular, the relationship with experiences of child maltreatment and developing trauma.

**Developmental Trauma**

**Childhood Maltreatment**

Developmental Trauma can be used as a framework for understanding NSSI expression as it relates to childhood maltreatment. According to the *World Health Organization* [WHO] (2016), childhood maltreatment is defined as “abuse or neglect towards children under the age of 18, that threatens or harms a child's dignity, development, health, and overall survival.” Within Canada, approximately 235,842 investigated childhood-maltreatment related incidents were reported in the 2008 *Canadian Incidence Study of Reported Abuse and Neglect* [CIS] (Trocmé et al., 2010), and of this number, 36% of cases were substantiated. However, the current prevalence
rate of childhood maltreatment in Canada is suspected to be higher given the extent of time since
the report has been published.

According to the CIS, childhood maltreatment is categorized into five major types:
exposure to intimate partner violence, physical abuse, neglect, emotional maltreatment, and
sexual abuse (Trocmé et al., 2010). Of these forms, exposure to intimate partner violence (34%)
and neglect (34%) are the highest reported form of childhood maltreatment in Canada (Trocmé et
al., 2010).

While the Theory of Developmental Trauma has been informed by research in trauma,
developmental psychology, and neuroscience, it is still a relatively new area of research,
warranting the need for additional studies (Van der Kolk, 2017). However, preliminary research
investigating childhood maltreatment suggests that childhood exposure to traumatic experiences,
particularly complex trauma (i.e. multiple traumatic events), can have an overwhelming impact
on later-life functioning that includes emotional regulation, difficulty establishing a positive self-
concept, developing secure attachments, mitigating impulse control, and behavioural regulation
(Van der Kolk, 2017; DeBellis, 2001). These multiple traumatic events, commonly referred to as
polyvictimization, can lead to the development of psychological and physical difficulties and
prompt a range of negative reactions (Finkelhor et al., 2007; Ogle, Rubin, Berntsen, & Siegler,
2013).

One area that poses a significant problem in youth who are exposed to trauma during
childhood, and is especially concerning in those who have experienced polyvictimization, relates
to the development of adult attachment styles (Fraley, Roisman, Booth-LaForce, Owen, &
Holland, 2013). According to Rahim (2014), the development of securely attached relationships
has been found to mitigate the number of negative outcomes associated with trauma, and has
been associated with positive mental health and well-being outcomes. Unfortunately, research has found that nearly 80% of all youth who have experienced maltreatment develop insecure attachment patterns, which are marked by high levels of distress and an inability to see the world as a safe place (Cook et al., 2005). In addition, those individuals with insecure attachment styles are more likely to engage in risk behaviours, develop mental-health problems (e.g. depression, anxiety, etc.), and have difficulty regulating their emotions well into adulthood (Widom, Czaja, Kozakowski, & Chauhan, 2018).

Knowing the potential long-term outcomes associated with childhood maltreatment, and acknowledging that adolescence is already a vulnerable period for engagement in risky behaviours and poor decision making, makes exploration of these traumatic experiences in youth vital. Additionally, a better understanding of later-life outcomes is warranted given that developmental trauma is positively correlated with increased use of medical services, correctional involvement, and mental health services (Hilt, Nock, Lloyd-Richardson, & Prinstein, 2008; Van der Kolk, 2005). The Mental Health Commission of Canada (2019) supports the continuation of research to better identify both children and youth who are at risk, and provide intervention as early as possible in order to mitigate negative life impacts, and additional mental and physical health concerns. Therefore, in taking into consideration the role of early childhood maltreatment experiences, and the impact they can have on later life functioning, as outlined by the Theory of Developmental Trauma (Van der Kolk, 2005), understanding the relationship between childhood maltreatment and engagement in NSSI behaviours is imperative.
Childhood Maltreatment and Non-Suicidal Self-Injury

Serafini et al. (2017) conducted a systematic review to assess the relationship between childhood maltreatment and NSSI. With over 62,000 individuals accounted for, a positive correlation between childhood maltreatment and NSSI was found. This suggests that childhood maltreatment serves as a risk factor for NSSI engagement. However, it is important to recognize that variations of the relationship exist due to the number and type of maltreatment experienced (Serafini et al., 2017).

In one study that examined the impact of childhood maltreatment on NSSI within a community sample of 2,498 participants, 65% of individuals who engaged in NSSI reported at least one type of childhood maltreatment, with 50% of those individuals reporting that they had experienced multiple forms of childhood maltreatment (Brown, 2018). In particular, emotional abuse (72%) and neglect (65%), were among the most commonly reported types of maltreatment at a mild-moderate severity (Brown, 2018). Moreover, studies have differentiated between the types of maltreatment experienced by individuals who engage in NSSI (Brown, 2018), and have shed light on the frequency of NSSI behaviours such as sexual abuse being correlated with repetitive self-injurious behaviours (i.e. three or more NSSI events), with physical abuse being associated with more intermittent behaviours (i.e. one or two NSSI events; Yates, Carlson, & Egeland, 2008; Van derKolk, Perry & Herman, 1991). Similar results were reported by Baiden, Stewart and Fallon (2017) who examined the interplay between adverse childhood experiences and NSSI in youth aged 8-18 years who were seeking inpatient treatment. Results indicated that physically abused children and youth had a 49% increased likelihood of NSSI engagement, with childhood sexual abuse constituting a 60% chance increase (Baiden et al., 2017). However, research has not indicated whether the behaviours related to NSSI are more direct or indirect in
regard to single and polyvictimization cases of childhood maltreatment, leading to a gap in the current literature.

Research has examined how youth in a community sample tend to express their NSSI through different behavioural methods. For example, girls report more cutting, while boys engage in more self-hitting (Barrocas et al., 2012). Sex differences as they relate to adolescents who have experienced childhood maltreatment, as well as being engaged in indirect NSSI expression, have yet to be determined. The current study aims to fill the gaps within the literature regarding overall NSSI expression (direct vs. indirect), and how it relates to overall childhood maltreatment, polyvictimization, sex, and the nature of maltreatment.

**Present Study**

There is an extensive amount of research examining the relationship between childhood maltreatment and NSSI involvement. A positive association between these two experiences has been identified. The present study aimed to extend these findings in addressing the gap relating to possible differences in the expression of NSSI, that being through either the direct, indirect, or both forms of its expression. In particular, while research has determined different forms of expression of SIB behaviours, and has recognized that there are indirect and direct forms of NSSI, no study had yet addressed whether the expression of NSSI (direct vs. indirect vs. direct/indirect) differs among youth who have a history of childhood maltreatment. Since childhood maltreatment has unique effects on later-life functioning as established by the Theory of Developmental Trauma (Van der Kolk, 2005), it was important to determine if the expression of NSSI differed within this unique population of adolescents. Results of this study hold important clinical implications, as knowledge of this information can help clinicians and researchers establish developmentally appropriate interventions for at-risk adolescents.
Due to the exploratory nature of the current study, the following hypotheses are framed as research questions that relate to a youth’s expression relative to their trauma. It was expected that adolescents would have a variety of ways to express themselves in relation to these life-altering events, and within this subset of adolescents who were exposed to trauma, there are some who would involve themselves in behaviours that meet the diagnostic criteria of being self-injurious, and will consequently express themselves through either direct, indirect, or both forms of NSSI.

**Research Questions**

The following questions were explored in a large clinically referred sample of adolescents from various child and adolescent mental health centers from across the Province of Ontario:

1. What is the frequency of the nature of childhood maltreatment (e.g. physical, emotional, and sexual abuse, neglect, and witnessing domestic violence)?

2. What is the frequency of expression of NSSI (direct-only vs. indirect-only vs. direct and indirect) in adolescents with an experience of childhood maltreatment?

3. Is the experience of trauma arising from maltreatment linked to the expression of NSSI (direct-only vs. indirect-only vs. direct and indirect) in adolescents?

4. Do youth who experience polyvictimization express their NSSI through more than one way (direct and indirect), compared to those who only experience one form of maltreatment?

5. Does the presence of prior childhood maltreatment influence the way in which biological females and males express NSSI (direct-only vs. indirect-only vs. direct and indirect)?
Methods

Participants

The present study was conducted with participants who were recruited from several children’s mental health facilities across Ontario, Canada. These facilities serve children and youth between the ages of 4-18 years who present developmental and mental health concerns, and who have undergone a comprehensive assessment using the interRAI Child and Youth Mental Health Assessment system (ChYMH), including the interRAI Adolescent Supplement (ChYMH-A). In order to be eligible for participation in the current study, participants needed to meet the following inclusion criteria: 1) engagement in NSSI, and 2) have a history of childhood maltreatment. While the ChYMH is inclusive to children as young as four years of age, due to the incorporation of ChYMH-A items which are geared towards adolescents ages 12 and older, eligible participants needed to fall within these age parameters and were required to have signed the consent protocol for the larger interRAI study (Stewart et al., 2015). As such, participants who did not engage in NSSI behaviours, including those who engaged in SSI behaviours, and fell under 12 years of age, were excluded from the study.

Measures

InterRAI

The primary measure used to assess the interplay between NSSI behaviours and childhood maltreatment across a particular developmental period (12-18) was the interRAI Child and Youth Mental Health Instrument, specifically related to the Ontario initiative (ChYMH; Stewart, Hirdes et al. 2015a). The ChYMH is one of several child/youth tools developed by interRAI, which is a collective of multiple instruments utilized to help assess and treat various populations at different life stages. The general interRAI network is comprised of various
researchers and expert clinicians from several countries that work towards the common goal of improving care for vulnerable individuals including those who have complex medical and/or mental health conditions or who are disabled (Stewart & Hamza, 2017). Many countries utilize the integrated assessment suite as the basis of their health information system.

The ChYMH is a comprehensive standardized mental health assessment tool delivered in a semi-structured format for use with children and youth who access community and/or residential mental health services (Stewart et al., 2015a). The interRAI ChYMH consists of 382 items and 31 summary scales that examine approximately 400 clinical elements covering medical, functional, psychological, social, and environmental strengths, that is geared towards school-aged children (Hirdes, et al., 2019). In addition to its clinical utility as an assessment tool, the ChYMH triggers Collaborative Action Plans (CAPs), which are evidence-based recommendations that are based on the unique results of each child and youth (Stewart et al., 2015b). While the CAPs are not prescriptive, they provide targeted areas of intervention to support clinicians’ work with their clients. Within the ChYMH, there is an integrated interRAI Adolescent Supplement that is to be completed by all youth who are 12 or older. It provides a more comprehensive assessment on more mature and risky behaviours such as sexual activity and substance use; however, in the event that a younger child also engages in similar behaviours, the Adolescent Supplement (ChYMH-A) can be used in tandem.

Utilizing empirical evidence and incorporating the needs of establishing evidence-informed clinical care to clients, the interRAI possesses high levels of inter-consistency reliability and criterion validity (alpha level >0.70), and is considered to have strong clinical utility and perform as a “gold standard” as an integrated health information system alongside additional interRAI instruments (Lau, Stewart, Saklofske, Tremblay & Hirdes, 2018; Lau,
Childhood Maltreatment and NSSI Expression

Stewart, Saklofske & Hirdes, under review; Philips et al., 2011; Phillips et al., 2012; Stewart & Hamza, 2017; Stewart, Thornley, Poss & Hirdes, 2019).

Demographics. Demographic information, including variables such as the child/youth’s age, sex, nature of the referral, history with accessing mental health services, current living arrangement, and caregiver status were explored.

Explanatory variables: Measures of Childhood Maltreatment

Childhood Maltreatment. Overall Childhood Maltreatment was determined by responses to items related to stress and trauma within the interRAI ChYMH (Section N.1. i, j, k, o), including experiences of neglect (emotional, physical, and safety), sexual, physical, and emotional abuse, and witnessing domestic. Coding of each item of childhood maltreatment is explored below.

The variable of Childhood Maltreatment ranged from 0 - 7, which indicated the number of forms of maltreatment experienced, and was recoded into 0 = Childhood Maltreatment Not Experienced, and 1-7 = 1 Childhood Maltreatment Experienced. Individuals who scored a 1 were determined to have experienced Childhood Maltreatment and were included in the study. Adolescents who indicated a 0 were believed to have not experienced childhood maltreatment and were excluded from the study.

Neglect Variable. Neglect was measured based on responses related to parental failure to provide basic needs (e.g. Emotional neglect B.9.a., Physical Needs B.9.b., Safety Needs B.9.c.). These questions measured how long ago these experiences of maltreatment occurred (0 = never, 1 = more than a year ago, 2 = 31 days to a year ago, 3 = 8 to 30 days ago, 4 = 4-7 days ago, 5 = in last 3 days), and for the current study, each item of neglect (e.g. emotional, physical, and safety needs) were recorded in order to determine general experiences (e.g. 0 = no
experience of neglect, 1 = experienced neglect). The three neglect items were computed into one variable to constitute a total neglect on a scale of zero to three. Adolescents who indicated a 1 to 3 on the neglect variable were determined to have had experienced neglect, and allocated a score of 1.

**Abuse Variable.** Responses on items pertaining to sexual, physical, and emotional abuse, and witnessing domestic violence (N1.i, j, k, o, respectively) constructed a variable of abuse. For each item, the recency of maltreatment was measured (0 = never, 1 = more than a year ago, 2 = 31 days to a year ago, 3 = 8 to 30 days ago, 4 = 4 to 7 days ago, 5 = in last 3 days); however, for the current study, each time was recoded to become dichotomous (e.g. 0 = 0 (not present), 1-5 = 1 (present)) in order to examine the presence of the maltreatment. A total abuse score between 0-4 was created when each item was computed into the variable, thus indicating the number of abuse related experiences in a youths life, when each item was computed into the variable. The total score of abuse was then translated into a dichotomous variable in order to examine whether the presence of abuse was absent (0) or present (1-4 = 1).

**Polyvictimization.** According to the assessment, if an adolescent had indicated that they have experienced more than one form of childhood maltreatment, they were identified as having experienced polyvictimization. In relation to the variable of childhood maltreatment which included scores from 0-7, any score greater than 1 (e.g. 2-7) indicated polyvictimization (0-1 = 0; No Polyvictimization, 2-7 = 1; Yes Polyvictimization).

**Outcome variables: Measures of Direct NSSI, Indirect NSSI, and Direct and Indirect NSSI**

**Direct NSSI.** Direct NSSI expression was measured based on responses to items on the interRAI ChYMH. Two items were selected to identify participants who fit criteria related to direct NSSI expression consistent with the interRAI ChYMH’s conceptualization of NSSI
behaviours including 1) participation in self-injurious behaviours, and 2) the intent behind self-injurious behaviours.

1. *Current engagement in self-injurious behaviours* (ChYMH, Section E.1.b). The first item was used to determine if adolescents had engaged in direct self-injury over the course of his or her lifetime (0 = never, 1 = more than a year ago, 2 = 31 days to a year ago, 3 = 8 to 30 days ago, 4 = 4-7 days ago, 5 = in last 3 days). The item was recoded into 0 = has never engaged and 1 = has engaged. Youth who had not engaged in, or never thought of engaging in self-injury, were coded as 0.

2. *Intent behind self-injury* (ChYMH, Section E.2). The second item was used to distinguish between NSSI and SSI, as it aided to establish the intent behind the self-injury, and if the “attempt was to kill [one]self” (0 = no, 1 = yes, 8 = no attempt). If the participants’ self-injurious behaviours were suicidal in intent, a score of 1 was given to represent the occurrence of SSI.

Inclusion in the direct NSSI category was achieved by receiving a total combined score of either 1 or 9, and was coded as a 1 (see Figure 1.). SSI was coded as 2, and neither engagement in NSSI or SSI was coded as 0. This method was also used in previous studies examining NSSI, SSI, and indirect self-injurious behaviours (substance use exclusively), using the interRAI ChYMH (Klassen et al., 2018).

\[
\text{SIB Category} = \text{Engagement Score} + \text{Intention Score} \\
\text{NSSI} = (1+0 = 1) \text{ and } (1+8 = 9, \text{ recoded into } 1) \\
\text{SSI} = (1+1 = 2) \\
\text{Neither SSI or NSSI} = (0+8 = 8, \text{ recoded into } 0) \text{ and } (0+0 = 0)
\]

*Figure 1.* Illustration of coding for Direct NSSI.
**Indirect NSSI.** Indirect NSSI expression was measured by several responses on both the standard interRAI ChYMH assessment tool and the Adolescent Supplement. Items were selected based on the current literature regarding indirect NSSI expression including 1) substance use, 2) sexual promiscuity, 3) eating disorder behaviour engagement, and 4) risky behaviours.

1. *Substance use* was determined from responses on six items. Within the interRAI ChYMH, daily use of tobacco (ChYMH, Section D.3) and nicotine (ChYMH, Section D.4) were assessed (0 = no, 1 = not in the last 3 days, but smokes/uses occasionally, 2 = not in the last 3 days, but is usually a daily smoker/user, 3 = yes), and recoded into dichotomous variables (0 = no, 1-3 = 1, yes). The remaining four items were derived from the Adolescent Supplement addressing alcohol and illicit substance use within a recent time frame (e.g. 14 days), including consumption of alcohol (ChYMH, Section B.1; 0 = none, 1 = 1, 2 = 2-4, 3 = 5 or more), consumption of alcohol to the point of intoxication (ChYMH, Section B.2; 0 = none, 1 = 1 day, 2 = 2-8 days, 3 = 9 or more days, but not daily, 4 = daily), illicit drug use (e.g., cannabis, hallucinogens, inhalants, stimulants, or opiates; ChYMH, Section B.3; 0 = never, 1 = more than 1 year ago, 2 = 31 days-1 year ago, 3 = 8-30 days ago, 4 = 4-7 days ago, 5 = in the last 3 days), or intentional misuse of prescription medication (ChYMH, Section B.4; 0 = no, 1 = yes) were identified. All items were recoded into dichotomous variables (0 = not present, 1 = present (score of >1)), with a total score of substance abuse created (0-10). A variable of substance abuse was then created based on the total scores [0 = 0; Substance Use Not Present, 1-10 = 1; Substance Use Present].

2. *Sexual promiscuity* was determined by responses to three items that take into consideration the following behaviours: inappropriate public sexual behaviours or
public disrobing (ChYMH, Section F; 0 = not present, 1 = present, but not exhibited in the last 3 days, 3 = exhibited on 1-3 of the last 3 days, 4 = exhibited daily in last 3 days, 3 or more episodes or continuously), knowledge of problematic sexual behaviour (0 = no, 1 = yes), as well as one item from the Adolescent Supplement (ChYMH, Section B.8) that assessed for engagement in risky sexual activity in the past 90 days, including performing sexual acts for money, favors, or desirable objects (0 = no, 1 = yes). All items were created into dichotomous variables [0 = No, 1 = Yes (score of >1)], with a total scale score of sexual promiscuity created (0-3). A variable of substance abuse was then created based on the total scores [0 = 0; Sexual Promiscuity Not Present, 1-3 = 1; Sexual Promiscuity Present].

3. Three items in the Adolescent Supplement (ChYMH, Section B.7) will be used to determine signs of eating disorder engagement in the past 30 days, including instances of binging, purging (B.7.a), restriction or fasting for diet purposes (B.7.b), and distorted body image (B.7.c; 0 = no, 1 = yes). A total scale score of eating disorder engagement was created (0-3). A variable of eating disorder engagement was then created based on the total scores [0 = 0; Eating Disorder Engagement Not Present, 1-3 = 1; Eating Disorder Engagement].

4. Risky behaviours will be measured by the extreme risk-taking item (ChYMH, Section F.1.i), in which the individual fails to recognize the potential harm in which they are placing themselves. Risk-taking behaviours were coded as 0 = not present, 1 = present.

A total indirect NSSI scale score (0-4) was computed based on the four dichotomous variables based on the dimensions of indirect NSSI (e.g. substance abuse, sexual promiscuity,
eating disorder engagement, and risky behaviours). Scores were recoded into a dichotomous variable of indirect NSSI \( [0 = \text{Not Present}, 1-4 = 1; \text{Present}] \).

**Both Types of NSSI.** Adolescents who indicate that they engage in both direct (i.e. cutting, burning, scraping), and indirect (i.e. substance use, eating disorder symptom engagement, risk behaviours, etc.) forms of NSSI expression, were coded as experiencing both types of NSSI (e.g. direct and indirect) and analyzed accordingly \([\text{Direct NSSI Variable (0 = No, 1 = Yes)} + \text{Indirect NSSI Variable (0 = No, 1 = Yes)} = \text{Direct and Indirect NSSI (0 = none, 1 = one type of NSSI, 2 = both types of NSSI)}]\). Based on the results, the direct and indirect NSSI variable was computed \( (0-1 = 0; \text{No Direct and Indirect NSSI}, 2 = 1; \text{Yes Direct and Indirect NSSI}) \).

**Procedure**

Data collection using the interRAI ChYMH and ChYMH-A instruments was approved by the University of Western Ontario’s ethics board. Trained assessors administered the interRAI ChYMH and obtained informed consent (either written or verbal) during these sessions. In order to perform this secondary analysis, de-identified data from these assessments beginning as early as 2013 have been used to constitute the sample. All data is kept on a web-based software, password-protected, that does not operate on the internet nor have the ability to transfer data to external sources (e.g. USB) to ensure confidentiality.

Once the data was vetted according to the inclusion criteria, namely 1) engagement in NSSI, and 2) history of childhood maltreatment, variables of interest were defined using the available items in the interRAI, as described in the measurement section, and data was analysed accordingly using IBM SPSS. Based on preliminary knowledge of the current interRAI ChYMH data set, it had been predicted that the sample would be comprised of roughly 5000 participants.
Ethical Considerations

While the larger project has been given ethical approval by two Research Ethics Boards (REBs) at both the University of Waterloo and Western University, the study still had ethical concerns to consider. While the questions in the assessment were constructed with extreme caution to ensure that ethical standards were upheld, it was possible that they could have elicited undue emotional distress among the participants. In order to mitigate these risks, the interRAI ChYMH assessment was done in a clinical setting with trained professionals and participants and families were given the opportunity to withdraw from assessment at any time. All assessors who administered the ChYMH were required to have at least two years of clinical experience with children and youth, and were to have either a diploma or degree in a mental health or related field. In addition, prior to the administration of the ChYMH and the ChYMH-A, all assessors completed a two-day training program, which was delivered and overseen by members of interRAI.

Moreover, as researchers of secondary data, it was important to take into consideration how the data was collected, as it was done so at various agencies, and by different assessors who may have utilized the tool in different capacities. Due to the secondary nature of the study, no names are associated with the participants, only a study-specific participant number, and all data will be kept on a secure drive at interRAI Canada.

Lastly, due to the sensitive nature of the research topic, it is important to acknowledge the impact the results can have on the researcher. In order to ensure that the researcher was not feeling overwhelmed or distressed by the material they are exposed to, engagement in lab debriefings with team members was critical throughout the research process.
Results

Participants

A convenience sample of 15,435 was included in the present study, with 621 duplicated cases identified and removed. In order for the most accurate and up-to-date data related to the youths’ mental health status, the most recent case was kept. Moreover, duplicated cases were removed in order to uphold the statistical assumption of independence. Therefore, the convenience sample constituted of 15,119 (8,466 males, 6,620 females, 33, gender non-conforming/other) clinically referred children and youth ages 4-18, from the province of Ontario. Based on exclusion criteria, cases were filtered based on experience of childhood maltreatment (any score > 0 on any item of CM) and age (> 12 years of age).

The final sample was constructed of 4,616 primary cases, constituting 30% of the total ChYMH sample. 2,641 (57.4%) youth were between the ages of 12-15, and 1,959 were between 16-18 (42.6%), with a mean age of 14.96 (SD = 1.78; Range 12-18). Of the 4,616 participants, 2,032 identified as male (44%), 2,568 as female (55.6%), and 16 as “other,” with 8.4% of the sample (N = 388) self-identifying as First Nation, Métis, and/or Inuit.

Among the 4,616 youth included in the analysis, reasons pertaining to their admission to corresponding mental health facilities were explored. 41.1% (N = 1,899) were admitted on the premise of increased threat/harm towards themselves, with 25.8% (N = 1,192) being admitted related to concerns against harming others. In addition, concerns relating to substance and/or non-substance addiction and/or dependency (11.3%, N = 521), presenting psychiatric symptomatology (65.1%, N = 3,007), and involvement with the youth justice sector (11.7%, N = 538), were also identified as contributors to the youth’s admission. It is important to note that in some cases, there was more than one reason for admission.
Within the final sample \((N = 4,616)\), the majority of youth being assessed were engaged at an outpatient level at the time of referral \((N = 4,128; 89.4\%)\), with the remainder being seen in an inpatient setting \((N = 488; 10.6\%)\). Moreover, majority of youth \((82.9\%)\) had contact with a community mental health agency within the past year, with 27.4% having experienced 1-3 lifetime psychiatric \((6.2\% = 4 \text{ or more})\) admissions.

Pertaining to living environment, 3,722 \((80.6\%)\) reported living with their parent(s) or primary caregiver, 6.8% living with non-relatives, 5.8% with other relatives, fewer than 5% with a foster family, and fewer than 2% with either their siblings in the absence of parents or primary caregivers, or alone. One quarter \((26.1\%)\) of youth had parents who were still married, with the remaining youth reporting that their parents were either never married \((24.4\%)\), divorced \((21.9\%)\), separated \((14.5\%)\), widowed \((2.4\%)\), had another partner or significant other \((2.1\%)\), or were unable to report their parent’s marital status \((e.g. \text{ unknown}; 8.6\%)\). In addition, assessments indicated that 40.7% of youth in the sample were under the legal guardianship of both parents, with 35.6% reporting legal guardianship by the mother only. Fewer than 10% of the youths’ assessments reported guardianship by father only \((6\%)\), neither parent but of other relatives \((7.2\%)\), child protection agencies \((8.8\%)\), or responsibility for self \((1.7\%)\).

Table 1.

*General Demographics*

<table>
<thead>
<tr>
<th>Items</th>
<th>Frequency (N)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participants</td>
<td>4,616</td>
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</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12-15</td>
<td>2,641</td>
<td>57.4%</td>
</tr>
<tr>
<td>16-18</td>
<td>1,959</td>
<td>42.6%</td>
</tr>
<tr>
<td>Sex</td>
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<td></td>
</tr>
<tr>
<td>Male</td>
<td>2,032</td>
<td>44%</td>
</tr>
<tr>
<td>Female</td>
<td>2,568</td>
<td>55.6%</td>
</tr>
<tr>
<td>Other</td>
<td>16</td>
<td>0.4%</td>
</tr>
<tr>
<td>First Nation/Métis/Inuit</td>
<td>388</td>
<td>8.4%</td>
</tr>
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</table>
Table 1. Continued.

*General Demographics*

<table>
<thead>
<tr>
<th>Items</th>
<th>Frequency (N)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reasons for Admission</td>
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</tr>
<tr>
<td>Threat/Harm Towards Self</td>
<td>1,899</td>
<td>41.1%</td>
</tr>
<tr>
<td>Threat/Harm Towards Others</td>
<td>1,192</td>
<td>25.8%</td>
</tr>
<tr>
<td>Substance Use/No-Substance Addiction</td>
<td>521</td>
<td>11.3%</td>
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<tr>
<td>Psychiatric Symptomatology</td>
<td>3,007</td>
<td>65.1%</td>
</tr>
<tr>
<td>Involvement in Youth Justice System</td>
<td>538</td>
<td>11.7%</td>
</tr>
<tr>
<td>Patient Type</td>
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<tr>
<td>Outpatient</td>
<td>4,128</td>
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</tr>
<tr>
<td>Inpatient</td>
<td>488</td>
<td>10.6%</td>
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<tr>
<td>Time Since Last Community Mental Health Contact</td>
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<tr>
<td>Not in the past year</td>
<td>792</td>
<td>17.2%</td>
</tr>
<tr>
<td>31 days or more</td>
<td>1,213</td>
<td>26.3%</td>
</tr>
<tr>
<td>30 days or less</td>
<td>2,611</td>
<td>56.6%</td>
</tr>
<tr>
<td>Lifetime Psych Admissions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>3067</td>
<td>66.4%</td>
</tr>
<tr>
<td>1-3</td>
<td>1,264</td>
<td>27.4%</td>
</tr>
<tr>
<td>4-5</td>
<td>144</td>
<td>3.1%</td>
</tr>
<tr>
<td>6 or more</td>
<td>141</td>
<td>3.1%</td>
</tr>
<tr>
<td>Living Environment</td>
<td></td>
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</tr>
<tr>
<td>With Parents/Primary Caregiver</td>
<td>3,722</td>
<td>80.6%</td>
</tr>
<tr>
<td>With Siblings/No Parents</td>
<td>23</td>
<td>0.5%</td>
</tr>
<tr>
<td>With Other Relatives</td>
<td>270</td>
<td>5.8%</td>
</tr>
<tr>
<td>With Foster Family</td>
<td>229</td>
<td>5.0%</td>
</tr>
<tr>
<td>Non-Relatives</td>
<td>313</td>
<td>6.8%</td>
</tr>
<tr>
<td>Alone</td>
<td>59</td>
<td>1.3%</td>
</tr>
<tr>
<td>Parent’s Marital Status</td>
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<td></td>
</tr>
<tr>
<td>Married</td>
<td>1,205</td>
<td>26.1%</td>
</tr>
<tr>
<td>Never Married</td>
<td>1,126</td>
<td>24.4%</td>
</tr>
<tr>
<td>Divorced</td>
<td>1,011</td>
<td>21.9%</td>
</tr>
<tr>
<td>Separated</td>
<td>669</td>
<td>14.5%</td>
</tr>
<tr>
<td>Widowed</td>
<td>111</td>
<td>2.4%</td>
</tr>
<tr>
<td>Other Partner/Significant Other</td>
<td>97</td>
<td>2.1%</td>
</tr>
<tr>
<td>Unknown</td>
<td>397</td>
<td>8.6%</td>
</tr>
<tr>
<td>Legal Guardianship</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Both Parents</td>
<td>1,879</td>
<td>40.7%</td>
</tr>
<tr>
<td>Mother only</td>
<td>1,642</td>
<td>35.6%</td>
</tr>
<tr>
<td>Father only</td>
<td>277</td>
<td>6%</td>
</tr>
<tr>
<td>Neither parents but other relative</td>
<td>332</td>
<td>7.2%</td>
</tr>
<tr>
<td>Child Protection Agency</td>
<td>404</td>
<td>8.8%</td>
</tr>
<tr>
<td>Responsible for self</td>
<td>82</td>
<td>1.7%</td>
</tr>
</tbody>
</table>
Analysis of Research Questions

**Research Question One**

In order to gain an understanding of the frequency of childhood maltreatment, and the nature of the maltreatment itself (e.g. physical, emotional, and sexual abuse, neglect, and witnessing domestic violence), descriptive statistics were calculated using data from the ChYMH. Of the 4,616 youth who experienced maltreatment, 35.9% experienced neglect. In particular, of that 35.9%, 1,451 experienced emotional neglect, 946 physical neglect, and 1,113 reported neglect relating to safety concerns.

In addition, 94% of those youth who experienced childhood maltreatment reported a history of abuse. Of the 94%, 1,273 (27.6%) reported instances of sexual abuse, 1,993 (43.2%) reported physical abuse, 2,911 (63.1%) emotional abuse, and finally, 2,510 (54.4%) reported that they had witnessed instances of domestic violence. See Table 2.

**Polyvictimization.** Youth who were classified as experiencing polyvictimization reported a history of two or more experiences of childhood maltreatment in any domain (e.g. neglect, sexual abuse, physical abuse, emotional abuse, witnessing domestic violence). Of the 4,616 youth who reported at least one case of maltreatment, 62.8 % met criteria for polyvictimization.

<table>
<thead>
<tr>
<th>Items</th>
<th>Frequency (N)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experienced Childhood Maltreatment</td>
<td>4,616</td>
<td>100%</td>
</tr>
<tr>
<td>Experienced Polyvictimization</td>
<td>2,898</td>
<td>62.8%</td>
</tr>
<tr>
<td>Total Neglect Present</td>
<td>1,655</td>
<td>35.9%</td>
</tr>
<tr>
<td>Emotional Neglect</td>
<td>1,451</td>
<td>31.4%</td>
</tr>
<tr>
<td>Physical Neglect</td>
<td>946</td>
<td>20.5%</td>
</tr>
<tr>
<td>Safety Neglect</td>
<td>1,113</td>
<td>24.1%</td>
</tr>
<tr>
<td>Total Abuse Present</td>
<td>4,340</td>
<td>94%</td>
</tr>
<tr>
<td>Sexual Abuse</td>
<td>1,273</td>
<td>27.6%</td>
</tr>
<tr>
<td>Physical Abuse</td>
<td>1,993</td>
<td>43.2%</td>
</tr>
<tr>
<td>Emotional Abuse</td>
<td>2,911</td>
<td>63.1%</td>
</tr>
<tr>
<td>Witnessing Domestic Violence</td>
<td>2,510</td>
<td>54.4%</td>
</tr>
</tbody>
</table>
Research Question Two

In order to gain a better understanding of those youth who had experienced some form of childhood maltreatment (N = 4,616; e.g. neglect, sexual abuse, physical abuse, emotional abuse, or witnessed domestic violence), the frequency of expression of NSSI, including direct-only, indirect-only, and both forms of expression were explored. Only 12.5% of youth engaged in direct-only NSSI behaviours, with 32% engaging in indirect-only forms of NSSI expression, and a total of 24% of youth engaging in both direct and indirect forms of NSSI. With regard to youth who engaged in indirect-only forms of NSSI expression (N = 1,475), 42% engaged in substance use, with cannabis use being the most commonly used substance amongst those who engaged; moreover, 15.5% reported engagement in risky behaviours. Additionally, 11.2% reported sexual promiscuity, with 7.3% of those youth reporting increased sexual knowledge, and 15.3% reported eating disorder symptomatology, with fear of weight gain being cited in 9.5% of those who identified with this sub category. A total of 31.5% youth who experienced childhood maltreatment did not engage in any form of NSSI expression. Descriptive data related to frequency of NSSI expression is found in Table 3.

Table 3.
Frequency Statistics Related to NSSI Expression in Youth with Histories of Childhood Maltreatment (N = 4,616)

<table>
<thead>
<tr>
<th>Items</th>
<th>Frequency (N)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>No NSSI</td>
<td>1,455</td>
<td>31.5%</td>
</tr>
<tr>
<td>Direct-Only NSSI Expression</td>
<td>576</td>
<td>12.5%</td>
</tr>
<tr>
<td>Indirect-Only NSSI Expression</td>
<td>1,475</td>
<td>32%</td>
</tr>
<tr>
<td>Substance Use</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoking Tobacco</td>
<td>939</td>
<td>20.3%</td>
</tr>
<tr>
<td>Other Nicotine Products</td>
<td>258</td>
<td>5.6%</td>
</tr>
<tr>
<td>Alcohol Ingested Recently</td>
<td>679</td>
<td>14.7%</td>
</tr>
<tr>
<td>Inhalants</td>
<td>54</td>
<td>1.2%</td>
</tr>
<tr>
<td>Hallucinogens</td>
<td>288</td>
<td>6.2%</td>
</tr>
<tr>
<td>Cocaine/Crack</td>
<td>265</td>
<td>5.7%</td>
</tr>
</tbody>
</table>
Table 3. Continued.

*Frequency Statistics Related to NSSI Expression in Youth with Histories of Childhood Maltreatment (N = 4,616)*

<table>
<thead>
<tr>
<th>Items</th>
<th>Frequency (N)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stimulants</td>
<td>216</td>
<td>4.7%</td>
</tr>
<tr>
<td>Opiates</td>
<td>137</td>
<td>3%</td>
</tr>
<tr>
<td>Cannabis</td>
<td>1,645</td>
<td>35.6%</td>
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<tr>
<td>Prescription Drug Misuse</td>
<td>328</td>
<td>7.1%</td>
</tr>
<tr>
<td>Sexual Promiscuity</td>
<td>516</td>
<td>11.2%</td>
</tr>
<tr>
<td>Inappropriate Sexual Knowledge</td>
<td>336</td>
<td>7.3%</td>
</tr>
<tr>
<td>Promiscuity</td>
<td>313</td>
<td>6.8%</td>
</tr>
<tr>
<td>Performing Sexual Acts</td>
<td>54</td>
<td>1.2%</td>
</tr>
<tr>
<td>Eating Disorder Symptomatology</td>
<td>706</td>
<td>15.3%</td>
</tr>
<tr>
<td>Binge Eating and Purging</td>
<td>355</td>
<td>7.7%</td>
</tr>
<tr>
<td>Fear of Weight Gain/Distorted Body Image</td>
<td>437</td>
<td>9.5%</td>
</tr>
<tr>
<td>Fasting/Restriction</td>
<td>344</td>
<td>7.5%</td>
</tr>
<tr>
<td>Risky Behaviours</td>
<td>716</td>
<td>15.5%</td>
</tr>
<tr>
<td>Direct and Indirect NSSI Expression</td>
<td>1,110</td>
<td>24%</td>
</tr>
</tbody>
</table>

**Research Question Three**

In order to determine whether or not there was a bivariate association between the occurrence of childhood maltreatment and NSSI expression in adolescents, a chi-square test of association was conducted for each form of expression: direct, indirect, and both direct and indirect. A cleaned original data set (N = 15,435) with no duplicates was used during this analysis. All assumptions were met, and 0 cells had an expected count less than 5.

**NSSI and Childhood Maltreatment.** A clinically significant interaction was found, with a medium effect size (*Phi* = 0.24), between engagement in NSSI expression (direct, indirect, and both direct and indirect) and the presence of a history of childhood maltreatment (*χ*²(3) = 494.61, *p* < 0.000). In addition, a value of eta-squared was conducted, and determined that
approximately 5% (0.055) of variance in NSSI expression was explained by maltreatment experiences.

Of the sample, 576 of youth who experienced childhood maltreatment engaged in direct-only forms, compared to 639 who did engage in direct-only NSSI but did not have a history of maltreatment. Moreover, 1,475 youth with histories of childhood maltreatment engaged in indirect-only forms of NSSI, compared to 887 who did not have a history of maltreatment. Finally, 1,110 youth with histories of maltreatment engaged in both direct and indirect forms of NSSI, compared to only 575 who also engaged in the absence of childhood maltreatment.

In addition to the general association between NSSI engagement and childhood maltreatment, chi-square analyses were conducted to determine the interaction between NSSI expression and each form of childhood maltreatment (e.g. neglect, sexual abuse, physical abuse, emotional abuse, and witnessing domestic violence) among the sample of youth with histories of maltreatment (N = 4,616).

**NSSI and Neglect.** The interaction between NSSI expression and Neglect was significant at p < .002 (χ² (3) = 14.470). Results reflect that of those youth who reported experiencing neglect as a form of maltreatment (N = 1,655), the majority engaged in some form of NSSI expression (1,163; ~70%), with almost half of those youth (571; 49%) expressing their NSSI in indirect-only behaviours. The remaining youth expressed their NSSI through either direct-only (N = 179; 15%) or both direct and indirect (N = 413; 36%) forms.

**NSSI and Sexual Abuse.** A clinically significant interaction between NSSI expression and Sexual Abuse was found (χ² (3) = 225.187, p<0.000). Results reflected that of those youth who reported experiencing sexual abuse as a form of maltreatment (N = 1,273), the majority engaged in some form of NSSI expression (1,053; 82.7%), with most of those youth expressing
their NSSI through either indirect-only forms (453; 43%), or both direct and indirect (457; 43.4%). As such, only 143 (13.6%) youth who experienced sexual abuse during childhood reported expression of their NSSI through direct-only forms.

**NSSI and Physical Abuse.** A clinically significant interaction between NSSI expression and Physical Abuse was found ($\chi^2 (3) = 55.966$, $p<0.000$). Results reflected that of those youth who reported experiencing physical abuse as a form of maltreatment ($N = 1,993$), the majority of those youth engaged in some form of NSSI expression (1,455; 73%), with indirect forms being the most common form (711; 49%). The remaining youth who also reported experiencing physical abuse and engagement in NSSI, also expressed their NSSI through direct-only (214; 15%) and both direct and indirect forms (530; 36%).

**NSSI and Emotional Abuse.** A clinically significant interaction between NSSI expression and Emotional Abuse was found ($\chi^2 (3) = 30.454$, $p<0.000$). Results reflected that of those youth who reported experiencing emotional abuse as a form of maltreatment (2,911), the majority engaged in some form of NSSI expression (2,064; 71%), with almost half (~47%) of those youth expressing their NSSI through indirect-only forms. However, 36% of the youth with histories of emotional abuse also engaged in both direct and indirect (751), and the remaining 17% engaged in direct-only forms of NSSI expression (347).

**NSSI and Witnessing Domestic Violence.** No significant interaction between NSSI expression and youth who witnessed domestic violence was found. Regarding the distribution of those youth who did engage in NSSI and witnessed domestic violence (1,696), 319 engaged in direct-only, 789 in indirect-only, and 588 in both direct and indirect forms of NSSI expression.
Research Question Four

Associations between NSSI expression and polyvictimization were explored to determine if youth who have experienced polyvictimization \((N = 2,898)\), express their NSSI in more than one way (direct and indirect), compared to those who only experience one form of maltreatment \((N = 1,718)\).

Analyses revealed that there was a clinically significant association between polyvictimization and engagement in NSSI \((\chi^2 (3) = 52.88, p< 0.000)\). In particular, participants who experienced more than one form of childhood maltreatment were 2.24 times more likely to engage in both direct and indirect forms of NSSI expression \((N = 767)\) than those who only experienced only one form of maltreatment \((N = 343)\).

In addition to increased engagement in both direct and indirect forms of NSSI expression, results indicated that youth who experienced polyvictimization \((N = 342)\) also engaged in more direct-only NSSI behaviours compared to youth who only experienced one form of maltreatment \((234)\). Of interest, 33.4\% \((969)\) of participants who experienced polyvictimization engaged in indirect-only behaviours, compared to 29.5\% \((506)\) who only experienced one type of maltreatment.

Regression analyses: Predicting NSSI expression following polyvictimization. In order to further examine the significant relationship, a binary logistic regression analysis was employed to predict the probability that a participant who experienced polyvictimization would engage in NSSI expression. For the 4,616 youth, the presence of the following variables as predictors were used: direct-only NSSI, indirect-only NSSI, and both direct and indirect NSSI, sex (covariate), and age at the time of assessment (covariate). A test of the full model, in block 2, against a constant-only model, in block 0, revealed a significant relationship, indicating that the
aforementioned predictor variables together differentiate between youth who engage in
behaviours related to NSSI expression (2898) from those who do not engage (1718; \( \chi^2 (5) = 58.697, p< 0.000 \)).

Cox and Snell’s \( R^2 \) and Nagelkerke’s \( R^2 \) indicated that between 13% to 17% of the variance in the engagement of NSSI expression can be explained in block 2. The full model correctly identified 62.8% of the cases; however, the Wald test statistic of significance found that of the predictor variables, direct-only NSSI and direct and indirect NSSI did not make a significant contribution \((p > 0.05)\). The Exp(B) value demonstrated that youth were 1.43 times more likely to engage in indirect NSSI when they have experienced polyvictimization, compared to those who did not engage in NSSI expression.

**Research Question Five**

An examination to whether differences in expression exist between males and females and their NSSI expression (e.g. direct, indirect, and both forms) was undertaken. A chi-square analysis was conducted and revealed a clinically significant association between biological sex and NSSI expression \((\chi^2 (2) = 217.7, p<0.000)\). 574 reported engaging in direct-only (182 male, 392 female), 1,469 indirect-only (730 males, 739 female), and 1,103 in both direct and indirect (321 male, 782 female) forms of NSSI expression. Results revealed a clinically significant relationship and determined that sex was significantly associated with NSSI expression.

In order to test this association, a multinomial logistic regression was run to examine the presence of NSSI expression (direct-only, indirect-only, direct and indirect) from sex and age. Results determined that the full model was statistically significant \((p < 0.000)\), and was able to reliably distinguish between those participants who engaged in direct-only NSSI, indirect-only NSSI, direct and indirect NSSI, and those who did not engage in NSSI (reference category; \( \chi^2 (6) \))
A goodness of fit model was evidenced by non-statistically significant results on a Pearson Chi-square test ($\chi^2(3) = 5.483, p = .140$).

Results related to direct-only NSSI expression indicated that men were 0.39 times less likely to engage in direct-only forms compared to women ($p < 0.000$). Moreover, related to age in the model, youth between the ages of 12-15 were 0.80 times less likely to engage in direct NSSI than those who were between the ages of 16-18 ($p < .05$). See Table 4.

Table 4.  
Regression Results: Direct-Only NSSI Expression

<table>
<thead>
<tr>
<th>Predictor</th>
<th>B</th>
<th>Wald chi-square</th>
<th>Odds ratio Exp(B)</th>
<th>95% confidence interval</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (12-15)</td>
<td>-0.227</td>
<td>4.31</td>
<td>0.797</td>
<td>[.643, .987]</td>
<td>0.038</td>
</tr>
<tr>
<td>Age (16-18)</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
</tr>
<tr>
<td>Male</td>
<td>-0.943</td>
<td>81.230</td>
<td>0.389</td>
<td>[.317, .478]</td>
<td>0.000</td>
</tr>
<tr>
<td>Female</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
</tr>
</tbody>
</table>

Note. Reference Category is: No NSSI.

Results related to indirect-only NSSI expression indicated that there was no significant difference between males and females in indirect NSSI ($p > 0.05$); however, youth who experienced maltreatment and were between the ages of 12-15 were found to engage in indirect-only NSSI forms of expression 0.28 times less than those youth between the ages of 16-18 ($p < 0.000$). See Table 5.

Table 5.  
Regression Results: Indirect-Only NSSI Expression

<table>
<thead>
<tr>
<th>Predictor</th>
<th>B</th>
<th>Wald chi-square</th>
<th>Odds ratio Exp(B)</th>
<th>95% confidence interval</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (12-15)</td>
<td>-1.292</td>
<td>257.443</td>
<td>0.275</td>
<td>[.235, .322]</td>
<td>0.000</td>
</tr>
<tr>
<td>Age (16-18)</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
</tr>
<tr>
<td>Male</td>
<td>-0.060</td>
<td>0.613</td>
<td>0.941</td>
<td>[.809, 1.095]</td>
<td>0.434</td>
</tr>
<tr>
<td>Female</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
</tr>
</tbody>
</table>

Note. Reference Category is: No NSSI.
Results related to direct and indirect NSSI expression indicated that there was a significant difference between males and females ($p > 0.000$), with males engaging in both forms of NSSI expression .38 times less than females. Moreover, youth between the ages of 12-15 were found to engage in direct and indirect NSSI expression .96 times less than those youth between the ages of 16-18 ($p < 0.000$). See Table 6.

Table 6. Regression Results: Direct and Indirect NSSI Expression

<table>
<thead>
<tr>
<th>Predictor</th>
<th>$B$</th>
<th>Wald chi-square</th>
<th>Odds ratio</th>
<th>95% confidence interval</th>
<th>$p$ value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (12-15)</td>
<td>-1.115</td>
<td>165.084</td>
<td>0.328</td>
<td>[.276, .389]</td>
<td>0.000</td>
</tr>
<tr>
<td>Age (16-18)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>-0.961</td>
<td>123.322</td>
<td>0.383</td>
<td>[.323, .453]</td>
<td>0.000</td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. Reference Category is: No NSSI.

Discussion

The developmental period of adolescence, in which feelings of independence begin to arise, is a particularly vulnerable period for engagement in maladaptive behaviours (Hilt, 2008). One behaviour that is prevalent amongst adolescents, particularly those who have experienced childhood maltreatment, is the engagement in NSSI (Serafini et al., 2017). While research has examined the interplay of childhood maltreatment and NSSI – primarily direct NSSI behaviours – little research has examined whether youth who have experienced childhood maltreatment express their NSSI in unique ways. As such, the present study aimed to include those who have experienced either singular forms of maltreatment or polyvictimization, and how they express their NSSI: direct (e.g. cutting, self-hitting, picking, etc.), indirect (e.g. sexual promiscuity, substance use, etc.), or a combination of both forms of expression (i.e. direct and indirect). Using the interRAI ChYMH, a mental health assessment tool that is currently utilized by several
agencies that service children and youth, analyses were conducted in order to further explore this gap in the literature.

**Main Findings and Relevance to Previous Research**

This study found that a total of 4,616 youth in a clinical sample aged 12-18 reported experiencing childhood maltreatment (30% of the entire sample); this proportion was consistent with prior studies that examined youth with histories of childhood maltreatment (West, 2019; Edwards et al., 2003). More specifically, the rates of childhood maltreatment (sexual abuse, psychical abuse, and witnessing domestic violence) were consistent with those reported in the most recent Canadian Incidence Study of Reported Child Abuse and Neglect (CIS; Trocmé et al., 2010). Nonetheless, the rates of emotional abuse in the current study were much greater than those reported in the CIS report, with 63% of youth denoting experiences of emotional abuse, making it the most commonly reported form of childhood maltreatment in this sample. By contrast, neglect has been found to be the most common form of maltreatment in other research (Trocmé et al., 2010). It is important to note, however, that prevalence rates for all forms of childhood maltreatment vary within the literature based on the population from which the sample is extrapolated (e.g. 3% to 36% for sexual abuse; Brown, 2018; Afifi, 2011; Finkelhor, 1994).

The role of parental involvement/dependence should also be considered when interpreting the results related to the prevalence of neglect. While there is ample literature to suggest long-term implications after experiencing neglect, higher rates of neglect are often found to be associated with younger children (National Research Council, 2014). This can be explained by the fact that they require a higher level of dependence on parents to not only provide basic safety, emotional, and physical health needs, but parents also serve as a buffer to stressful situations (National Research Council, 2014). As such, children are at an increased risk of
experiencing neglect when parents cannot adequately carry out these responsibilities, and as a result, can become increasingly vulnerable. In a study conducted by Fast, Trocmé, Fallon, and Ma (2014), a secondary analysis using the data from the Canadian Incidence Study of Reported Child Abuse and Neglect (CIS; Trocmé et al., 2010) was conducted to compare rates of maltreatment across adolescents to preschool-aged children. In the original sample (Trocmé et al., 2010), child neglect was found to be the most common reason for investigation into childhood maltreatment, encompassing 40% of all investigations; however, secondary analyses support the result of the present study, as adolescents (12-15) were shown to have the lowest reported investigations compared to children. In particular, adolescent investigations were more likely to be related to physical abuse, sexual abuse, and emotional maltreatment, with fewer investigations being conducted related to neglect or exposure to domestic violence (Fast et al., 2014).

While there are several assessment tools, including the ChYMH, used to derive prevalence rates that are nationally representative of Canada, efforts have not yet been finalized - hence contributing to the variability of results (Afifi, 2011). In addition to the differences in expected proportions of childhood maltreatment, one other possible explanation for the lower rate of neglect compared to the heightened rate of emotional abuse could be the interpretation of the questions within the ChYMH. Previous literature indicates that neglect is one of the most challenging forms of maltreatment to define, as it encompasses a wide-range of “failure-to-care” experiences (Wekerle et al., 2018). As such, a number of neglect-related areas, all important in their own right, have been developed, including but not limited to: health or mental health neglect, custodial neglect, abandonment, hygienic neglect, safety neglect, emotional neglect, etc. Based on the items that best correlated with the literature, and past studies that examined neglect
using the same standardized mental health assessment tool (e.g. ChYMH; West, 2018; Gomez, 2014), neglect was comprised of emotional, physical, and safety neglect. It is important to consider, however, that due to the difficulty in defining neglect, clinicians may have misinterpreted which item to rate if they are unsure of the differences between emotional neglect and emotional abuse.

In addition to the prevalence of childhood maltreatment within the current study, rates of polyvictimization (e.g. two or more forms of maltreatment) were higher than those previously reported (West, 2019; Brown, 2018; Trocmé et al., 2010). It is important to consider that the rates reported by Trocmé and colleagues (2010) in the CIS report may not be as accurate due to the length of time between the publication and the results of the current study. In addition, the current study’s reported prevalence rate can also be explained by the increasing support in the literature that typically less than 10% of childhood maltreatment cases involve single victimization (Edwards, et al., 2003). In particular, Cyr and colleagues (2014) conducted one of the first life-time prevalence studies in Canada to examine the rate of polyvictimization in youth and found that 42% of their sample of youth who experienced maltreatment experience more than one form.

Taking into respect the current youths’ experiences of childhood maltreatment, whether singular or multiple forms, the overall rate of NSSI corroborates with previous literature; however, comparative to some studies, the results boast higher rates of expression. While results relating to general NSSI involvement supported the research question, engagement in direct-only NSSI expression (12.5%) was lower than reported averages examining responses in similar populations (33.1%; West, 2019). There are several explanations to why direct-only NSSI
expression involvement was much lower compared to rates of indirect-only and both forms of 
NSSI expression among youth with histories of maltreatment.

Similar to the aforementioned prevalence of childhood maltreatment, NSSI rates 
commonly reported in the literature vary based on population (e.g. community vs clinical). In 
respect to general studies examining NSSI in clinical populations, the prevalence rate in the 
current study for direct-only NSSI related behaviours (e.g. cutting) still falls within the broad 
range (10-30%; Grandclerc et al., 2016). One explanation for the decreased prevalence of direct-
only NSSI could be attributed to the current study’s aim to investigate NSSI expression, which 
led to categorizing NSSI into three distinct categories – direct-only NSSI, indirect-only NSSI, 
and both direct and indirect NSSI. With investigation into forms of NSSI expression being a 
novel area of research, it is difficult to compare prevalence rates, as those existing are most often 
attributed to NSSI behaviours in line with direct-only forms of expression (e.g. cutting, self-
hitting, self-burning, picking, etc.).

Moreover, accounting for interaction effects across expression forms could also explain 
this lowered rate of direct-only NSSI. Due to the introduction of the “both direct and indirect 
NSSI” category, a number of youth who engage in direct NSSI would not be included in the 
direct-only category if they also engaged in indirect NSSI behaviours - thus explaining the large 
proportion of youth who engage in both forms of expression, and low proportion of youth in the 
direct-only NSSI category.

The high prevalence of indirect NSSI expression can also be explained by strong 
comorbidity between each of the sub-categories of indirect NSSI (e.g. substance use, eating 
disorder symptomatology, sexual promiscuity, and risky behaviours). For example, according to 
Oshri and colleagues (2012), youth who engage in substance use are at a heightened risk for
entering into sexual relationships at an earlier age, having multiple partners, and are more likely to not use condoms or other contraceptives compared to their non-substance use counterparts. Likewise, several researchers draw on important connections between early adverse experiences, increased risky behaviours (e.g. criminal activity, gang involvement), and substance use, as well as strong comorbidity between eating disorder symptomatology and substance use (Kubik, Docherty, and Boxer, 2019; Yoon, Snyder, and Yoon, 2019; Widom, 2017).

Finally, it is important to note that there were discrepancies between the number of items used to construct the direct and indirect NSSI categories, which could have influenced responses. For instance, the indirect variable of NSSI was comprised of four different sub-categories, each with several potential items available for response (total of 17 items). Contrary, youth only responded to two items in regard to determining direct NSSI expression. While each variable was constructed based on empirical evidence, the number of available indirect-only NSSI items could have influenced the prevalence of this form of expression amongst youth in the study, as there was a higher chance that one of those items could be selected.

Within the study, it was important to investigate whether or not there was an association between youth who had experienced childhood maltreatment and their participation in NSSI expression (e.g. direct-only, indirect-only, and both direct and indirect). As expected, and in line with previous research (West, 2019; Baiden et al., 2017; Armiento, Hamza, Stewart, & Leschied, 2016), the study demonstrated that there was a strong interaction, supporting that youth who had experienced some form of maltreatment during childhood were more likely to have engaged in one of the three forms of NSSI expression than those youth who did not experience maltreatment.
According to the Theory of Developmental Trauma, engagement in NSSI can serve various functions, primarily as a coping strategy to alleviate negative affect for youth who have experienced significant trauma (Klonsky, 2007). As it relates to primarily direct-only NSSI, Nock and Prinstein (2004) found that regulation, including both engagement in decreasing (e.g. numbing/dissociation) and increasing (e.g. experience feeling/pain) emotional or physiological experiences, was often cited by youth engaging in NSSI behaviours. While research has not explored these functions as it relates to indirect NSSI forms of expression generally, previous literature has examined particular sub-categories found under indirect NSSI expression, and have discovered similar responses in youth who engage in substance use (Kemmis, Wanigaratne, & Ehntholt, 2017), eating disorder symptomatology (Racine & Horvath, 2018), risky behaviours, and sex promiscuity (Stappenbeck, 2016; French & Dishion, 2003). In addition to functions related to increasing and decreasing emotional or physiological states, control is often cited as an explanation for NSSI engagement amongst those who have experienced significant trauma (Smith, Kouros, & Meuret, 2014). Often as an effort to suppress or avoid intrusive thoughts or memories, control can foster into a maladaptive coping strategy for youth due to the reinforcement of avoidance behaviours, thus strengthening the association (Smith, Kouros, & Meuret, 2014).

In addition to the general interaction between NSSI forms of expression and childhood maltreatment, subsequent analyses were conducted to determine the association between NSSI expression and each type of maltreatment separately. The findings indicated that each form of maltreatment, except witnessing domestic violence, exhibited that youth with histories of maltreatment where more likely to engage in NSSI expression, and supported previous literature (West, 2019; Brown et al., 2018; Serafini et al., 2017; Armiento, Hamza, Stewart, & Leschied,
2016). The lack of findings related to witnessing domestic violence in the present study was in contrast to past literature that has found a significant association between NSSI and youth with histories of witnessing domestic violence (Armiento, Hamza, Stewart, & Leschied, 2016; Lamers-Winkelman, Schipper, & Oosterman, 2012). It is important to consider that the lack of variability between witnessing domestic violence comparable to the other forms of maltreatment may have influenced results, due to the high level of maltreatment exposure reported by participants.

According to Howard and colleagues (2002), those youth who have witnessed domestic violence may express themselves differently than those who experience more direct forms of maltreatment (e.g. physical, sexual, and emotional abuse). Previous studies that have indicated a significant association between NSSI and youth with early childhood experiences of witnessing domestic violence have only been conducted as such exposure is related to direct NSSI behaviours (e.g. cutting, burning, etc.; Baiden, Stewart, & Fallon, 2017; Armiento, Hamza, Stewart, & Leschied, 2016). As such, it is possible that the inclusion of indirect forms of NSSI could have skewed the results and can explain the lack of association between these two variables.

**Biological Sex and Age**

In regard to biological sex (e.g. male and female) and age of youth who had a history of childhood maltreatment, it was proposed that there would be differences across NSSI expression, as inferred by the existing literature that supports gender and age differences across types of maltreatment (Baiden, Stewart, & Fallon, 2017). Findings for the present study revealed that in all categories of NSSI expression (e.g. direct, indirect, and both direct and indirect), engagement in NSSI tended to increase with age, with youth aged 16-18 reporting higher rates compared to
those between the ages of 12-15. These results are reflective of past research that identified strong relationships between older youth and direct-only NSSI related behaviours (West, 2019; Armiento, Hamza, Stewart, & Leschied, 2016; Claes et al., 2015; Harrison, 2015).

While the area of indirect NSSI is novel with respect to research with youth who have experienced maltreatment, the sub-categories used to construct the variable of indirect NSSI have been well studied within the literature. For instance, with respect to substance use, almost half (40%) of older adolescents (e.g. 15-19) have engaged in binge drinking and 80% participate in recreational drinking patterns (Canadian Centre on Substance Abuse, 2007). Moreover, eating disorder symptomatology, including behaviours related to anorexia nervosa and bulimia nervosa often emerge around the age of 16 (Gadalla, & Piran, 2007), with sexual and other risky behaviours (e.g. gambling, gang-related involvement, etc.) being most prevalent around mid- to late-adolescence (e.g. Curry et al., 2018; Rahman et al., 2012).

The ratio of males to females was relatively even within the sample, with results indicating significant differences between males and females who engaged in direct-only or both direct and indirect forms of NSSI expression, and females engaging more often than males in both categories; however, no biological sex differences were found in relationship to indirect-only forms of NSSI expression. The results of the study both support and contradict previous explorations, as research has indicated that females are more likely to engage in direct-only NSSI behaviours (West, 2019; Hamza et al., 2012). However, additional studies have suggested that there are no sex differences among youth who engage in NSSI (Hilt, Nock, Lloyd-Richardson, & Prinstein, 2008). Regardless, as it relates to studies that have failed to find gender differences, it is important to consider that males may be less likely to disclose engagement in NSSI due to fear of mental health stigmatization (Harrison, 2015).
In regard to the results pertaining to differences among males and females in the direct-only and both direct and indirect categories of NSSI expression, one possible explanation for the reported findings may relate to differences in emotional regulation. According to Nolen-Hoeksema (2012), emotional regulation is different between males and females; females were found to ruminate and internalize their thoughts, whereas males are suggested to engage in more avoidance and suppression behaviours (e.g. substance use). While there is additional evidence to support that males are more likely to engage in substance use than females, the lack of difference between males and females regarding indirect-only forms of NSSI expression can possibly be explained by the proportion of males and females who participate in each sub-category of indirect NSSI.

Similar to substance abuse, reckless behaviours including gang involvement, criminal activity, reckless driving, etc. are found to be more prevalent amongst males (vs. females) who have experienced maltreatment (Kubik, Docherty, & Boxer, 2019; Nolen-Hoeksema, 2012; Rahman et al., 2012). In contrast to females, while male engagement in eating disorder symptomatology is a prevalent issue, it is vastly understudied. As such, under-reporting on behalf of males may have influenced trends in the eating disorder literature that suggest that females (vs. males) who have experienced maltreatment tend to engage in behaviours more commonly related to anorexia nervosa, and bulimia nervosa (Murray et al., 2017; Gadalla, & Piran, 2007). Sexual promiscuity, including risky sex engagement (e.g. lack of contraception, increased involvement in sex work, one-night stands) and increased risk of teenage pregnancy, are more common amongst females who have experienced maltreatment (Negriff, Schneiderman, & Trickett, 2015; Hillis et al., 2001). However, increased sexual promiscuity following maltreatment is also reported amongst males, with a higher number of sexual partners reported
compared to females who have also experienced maltreatment (Negriff, Schneiderman, & Trickett, 2015). As such, the variability amongst females and males in each of the categories may help to explain the lack of difference between gender in regard to indirect-only NSSI expression. However, it is important to consider for each of the sub-categories of indirect NSSI that, whether intentional or not, perceived gendered and social expectations may also play a part in either the under- or over- reporting of males and females (Fisher, 2013).

*Polyvictimization*

The present study reinforced results from previous literature regarding the importance of the inclusion and acknowledgment of youth who have experienced polyvictimization in research, as a significant association among youth with experiences of polyvictimization and NSSI expression was found. In addition to these results, regression analyses in the full model revealed that polyvictimization reliably differentiated between youth who engage in behaviours related to NSSI expression and their non-NSSI counterparts. Since literature supports that maltreatment rarely exists in isolation (Finkelhor, Ormrod, Turner, & Hamby, 2005), it was speculated that due to the increased number of maltreatment experiences, these youth would engage in both forms of NSSI expression comparative to single forms. However, findings suggested that polyvictimization was only able to significantly predict engagement in indirect-only NSSI behaviours.

While individuals who experienced polyvictimization did engage more frequently in both forms of NSSI expression, compared to those with singular cases of maltreatment, the lack of findings may be explained by the uneven number of potential items available for response, as there were fewer direct-only NSSI related items. Moreover, while not examined in the study, the type of maltreatments that are experienced together may have had an impact on the results. For
instance, within the study, it was found that witnessing domestic violence was not significantly correlated with any forms of NSSI expression; as such, if many of the youth who had experienced polyvictimization indicated witnessing domestic violence as one of their forms of maltreatment, it may have had an impact on the results. While this explanation is hypothetical in nature, given that a small amount of research has been conducted to better understand polyvictimization, future research should look ahead to see if different combinations of maltreatments may have divergent outcomes on NSSI expression.

**Limitations and Future Directions**

The present study’s limitations are acknowledged. Firstly, while the sample was large and used a mental health assessment tool with demonstrated psychometric properties, the sample was limited to youth who were accessing mental health care in tertiary and community services within the province of Ontario. As such, the results of the study may not be generalizable across other provinces or the general (non-clinical) population, as all youth were either accessing inpatient or outpatient services through agencies specializing in complex mental health needs. In addition, it is important to recognize that random sampling techniques were not utilized; instead, youth were selected based on a convenience sampling method. Moreover, only consenting youth who were referred to the mental health agencies within the sample were included in the study and may not be representative of all individuals who utilize the services at-large. Looking forward, future research should aim to replicate findings in a clinical sample of youth across Canada, outside of Canada, and from the community youth mental health population. Similarly, while research investigating NSSI expression is still in its infancy, exploring cross-cultural differences should be considered in future research.
In regard to data collection and analysis, it is important to recognize that the data used during this study was collected over a number of years and is cross-sectional in nature. As such, the results may not accurately represent the current state of a client’s engagement in NSSI or the number of forms of maltreatment that they have experienced to-date due to the collection method. Similarly, directions of causality cannot be drawn between forms of NSSI expression and childhood maltreatment, but rather, only associations can be inferred.

The decision to focus primarily on NSSI expression was twofold, as 1) there are recent efforts being made to distinguish NSSI behaviours from SSI in the DSM-5 (APA, 2013), and 2) recent literature has supported that, in addition to direct NSSI behaviours, there are indirect forms that are damaging to the body and are used as maladaptive coping strategies (St. Germain and Hooley, 2012; Walsh, 2006). As a result of conducting this novel research investigating expression of NSSI, there are minimal prevalence rates that the current study could compare its findings to, as most documented rates of NSSI are based on behaviours that correlate with direct-only NSSI, let alone those examining expression amongst youth with histories of maltreatment. Therefore, additional studies are warranted to gain a better understanding of differences between NSSI expression in general and across different populations.

It is important to note that the current study only specifically examined youth who engaged in direct and indirect forms of NSSI expression, and not those with a history of suicidal self-injury (SSI). Therefore, the results of these studies may not be generalizable with past research that has investigated NSSI and SSI. Given that a plethora of research considers direct NSSI behaviours as a risk factor for SSI engagement (Muehlenkamp, Xhunga, & Brausch, 2019; Preyde et al., 2012), additional research (e.g. longitudinal) should be implored to investigate if
expression of NSSI differs over the developmental period of adolescents, and to examine the unknown relationship between differing NSSI forms of expression and SSI.

With respect to the ChYMH, while self-report tools are one of the most common ways to assess for NSSI behaviours by children, youth, and parents, recall biases (e.g. underreporting) can be present in these retrospective assessments (Swannell et al., 2014). Research demonstrates that caregivers often under-report, or fail to disclose both maltreatment (Shaffer et al., 2008) and NSSI behaviours (Nock, Holmberg, Photos, & Michel, 2007) as they are often memories associated with high levels of traumatic stress. While the reliability of retrospective self-reports is a challenge across research in general, as studies rely on participants to report the most truthful and accurate answers as possible, it is important to consider that some systematic form of bias may be influencing the results of the study. In order to try and mitigate the impact of biased reporting, the current study utilized multiple sources within the general assessment tool (e.g. school teachers, clinical reports, parent reports, client reports). Therefore, if conflicting information is present, it is the assessors’ responsibility to use their clinical judgement to determine the most accurate response. However, as mentioned in respect to selecting the most appropriate answer (e.g. emotional neglect vs. emotional abuse), while training is delivered to each clinician in order to promote standardized delivery of the ChYMH, clinician bias may influence the results.

One benefit to using the ChYMH as the mental health assessment tool is that algorithms can be identified based on results from the assessment, which can trigger CAPs (Collaborative Action Plans; Stewart, Celebre, Hirdes, & Poss, 2020). Designed to incorporate evidence-informed practice and recommendations for intervention once the assessment is complete, CAPs can assist in the interpretation of information and determine key issues based on results. For
instance, the guidelines for when children and youth score high on suicidality or purposeful self-harm, provided by the interRAI ChYMH, is to construct an immediate safety plan, which can involve the support of family and peers (Stewart, Celebre, Hirdes, & Poss, 2020). However, similarly to the limitations stated earlier regarding the construction of variables, these CAPs were not designed to separate NSSI from SSI behaviours, let alone identify distinctions between forms of NSSI expression; regardless, in conjunction with their clinical judgement, practitioners can still benefit from the use of CAPs to properly assess and develop care plans.

Limitations regarding pre-collected data also posed difficulty in the construction of variables of interest and what they aimed to measure. For instance, the current study was unable to gain information about the duration, frequency, and severity of both the experiences of childhood maltreatment (e.g. neglect, sexual abuse, physical abuse, emotional abuse, and witnessing domestic violence), as well as the various forms of NSSI expression (e.g. direct-only, indirect-only, and both direct and indirect), since the standardized assessment tool did not offer such options. Rather, due to the dichotomous nature of the questions, the current study only had the ability to determine whether or not forms of NSSI expression and childhood maltreatment were present. Future studies should aim to examine if differences in the severity, frequency, and duration of childhood maltreatment influence the likelihood of engagement in NSSI expression, and other serious physical and mental health consequences (Klonsky, 2007).

Finally, and as previously mentioned, there were discrepancies between the number of items that were available for response to inform participation in indirect forms of NSSI expression, compared to direct forms of NSSI. Since there was not a standardized item within the ChYMH that represents indirect NSSI involvement, a number of items were identified to fit within each sub-category (e.g. substance abuse, eating disorder symptomatology, sexual
promiscuity, and risky behaviours). As such, there were a total of 17 available items for participants to be identified as having engaged in some form of indirect NSSI, whereas direct NSSI expression was only determined by responses to two items. In addition to the discrepancies between the number of available responses, unlike indirect NSSI, there was an inability to break down the various behaviours associated with direct NSSI (e.g. cutting, self-hitting, burning, picking, etc.). Future analyses to identify if particular associations occur between certain forms of maltreatment and behaviours associated with either direct or indirect NSSI is warranted, as a better understanding between certain behaviour engagement and its association to a particular experience of maltreatment can help inform early prevention practices.

**Research and Clinical Significance**

Notwithstanding these and other possible limitations, the present study provides novel information about the emerging area of NSSI expression as it relates to youth who have experienced maltreatment, and has important implications for mental health research and practice. In particular, the study both validates previous research that suggests that maltreatment is a risk factor for NSSI engagement, but extends beyond the current literature by providing compelling new evidence that there are different ways that NSSI can be expressed among youth with histories of maltreatment. Despite increasing research regarding the role of direct forms of NSSI, the study lends support to the notion that even more subtle forms of NSSI are ever present amongst youth who have experienced maltreatment, and supports additional research within the area.

In response to the findings, clinicians should be advised to account for risk factors such as sex and age when considering prevention and intervention strategies for youth, as the current study indicated partial gender differences across NSSI expression. Moreover, even though the
present study suggested that there were no significant differences across males and females in relation to indirect behaviours of NSSI expression, the gender distribution across the four sub-categories (e.g. substance abuse, risky behaviours, sexual promiscuity, eating disorder symptomatology) is important when considering prevention and intervention strategies for at-risk adolescents.

Based on this evidence, it is important for clinicians and mental health service providers to understand that the risks of engagement in maladaptive behaviors such as NSSI may be compounded by experiences of maltreatment. As such, evidence supports the integration of a trauma-informed approach during assessment and treatment of youth who self-injure, as consideration for both current and previous maltreatment is essential to the therapeutic process (Asarnow & Mehlum, 2019). Moreover, findings from the current study suggest that not only should clinicians take into account the type of maltreatment experienced by their clients, as certain forms of maltreatment are more strongly associated with NSSI engagement (e.g. neglect, emotional abuse, physical abuse, sexual abuse), but also exploration into the number of maltreatment experiences (e.g. polyvictimization) is essential, given the high proportion of youth who experience more than one form of maltreatment.

Supported by the results, and reinforced by the Theory of Developmental Trauma, polyvictimization can have an overwhelming impact on later-life functioning (Klonsky, 2007). While research is warranted to investigate the long-term effects between polyvictimization and NSSI expression, as well as examining if different combinations of maltreatments have varying effect of NSSI engagement, previous studies have identified difficulties in emotional regulation across youth who have experienced complex trauma and engaged in direct NSSI. While coping strategies can be beneficial to the promotion of healthy functioning, especially after a significant
trauma such as childhood maltreatment; they can also be maladaptive and lead to poor emotional regulation (e.g. suppression of thoughts, control, etc.; Brereton, & McGlinchey, 2019). As such, since these experiences of maltreatment can be associated with intrusive thoughts and memories, clinicians can draw upon past literature that has promoted the use of therapeutic approaches such as Cognitive Behavioural Therapy (CBT) and Dialectical Behavioural Therapy (DBT) as effective modalities to support exposure to mindfulness approaches and challenging intrusive thoughts related to NSSI engagement (Lang & Sharma-Patel, 2011).

**Summary**

No study had yet addressed whether the expression of NSSI (direct vs. indirect vs. direct/indirect) differed among youth who had a history of childhood maltreatment. Since childhood maltreatment has unique effects on later-life functioning as established by the Theory of Developmental Trauma (Van der Kolk, 2005), it was important to determine if the expression of NSSI differed within this unique population of adolescents. As a result of the study, critical information has underpinned the association between childhood maltreatment and NSSI expression (direct-only, indirect-only, and direct and indirect), with over 50% of participants reported experiencing more than one form of maltreatment (e.g. polyvictimization). Of those youth who experienced maltreatment, emotional abuse was the most commonly reported form, with results suggesting that the most common behaviours associated with NSSI were related to indirect-only forms of expression (e.g. substance use, eating disorder symptomatology, risky behaviours, and sexual promiscuity). In addition, the study was the first to identify an association between polyvictimization and the three dimensions of NSSI expression, and was able to significantly predict engagement in indirect-only NSSI behaviours. Furthermore, while results suggest that engagement within all three forms of NSSI expression within the sample was most
strongly present in late adolescents and by females, no gender differences existed among those youth who engaged in indirect-only forms of expression.

In conclusion, despite the aforementioned limitations, developing a better understanding of the varying ways in which NSSI can be expressed among youth with histories of maltreatment holds implications for future research to build upon, such as identifying additional risk and protective factors that influence this association. Moreover, for clinicians working with such populations, it is hoped that consistency in knowledge regarding NSSI expression can help inform prevention and intervention strategies to mitigate immediate and long-term consequences.
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Appendix

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