Title

From childhood trauma to self-harm: An investigation of theoretical pathways among female prisoners

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Childhood trauma and self-harm in female prisoners

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Abstract

Background. Despite empirical evidence suggesting complex associations between childhood trauma and self-harm, there is a dearth of research investigating this in the female prison population. The current study explored pathways to self-harm following childhood trauma, by investigating the mediating roles of Post-traumatic Stress Disorder (PTSD) symptoms, emotion regulation, and dissociation, in this relationship, within a sample of 89 female prisoners. **Methods.** Cross-sectional, interview-format, questionnaire study within a female prison population. Measures of childhood trauma, self-harm, PTSD, emotion regulation, and dissociation were administered. **Results.** The majority of the sample (58.4%) reported history of self-harm. Bootstrapped mediation analyses indicated an indirect effect of emotion regulation on the relationship between childhood trauma and self-harm. An indirect effect was also found for PTSD arousal/ reactivity cluster of symptoms. Multiple mediation analyses revealed interactional effects were present for emotion regulation and arousal/reactivity, and emotion regulation and dissociation, respectively. **Conclusion.** Self-harm is highly prevalent among female prisoners. Interventions promoting emotion regulation and addressing arousal/reactivity symptoms following traumatisation may provide an effective way of addressing this problem.

Keywords: Self-injurious behaviour, child abuse, emotion regulation, posttraumatic stress disorders, prisons.

Key Practitioner Messages:

- Self-harm is highly prevalent amongst female prisoners, occurring in 58.4% of this sample.
- Emotion regulation and the arousal/reactivity symptom cluster of PTSD were found to mediate the relationship between childhood trauma and self-harm, both independently and simultaneously. Emotion regulation and dissociation were found to interactionally mediate this relationship.
- Strategies targeting emotion dysregulation and hyperarousal symptoms, amongst female prisoners who have experienced childhood trauma, may be helpful in reducing self-harming behaviours.

Introduction

Self-harming behaviour is a major concern among female prisoners, with reported lifetime prevalence rates of 46%, and yearly prevalence rates of 20-24% in England and Wales (Hawton, Linsell, Adenijt, Sariaslan, & Fazel, 2014; Vollm & Dolan, 2009). Several prison-related and individual factors may contribute to this problem. According to the UK HM Inspectorate of Prisons (2007), female prisoners have complex mental health needs, which are often connected to histories of abuse, and are exacerbated by the impact of imprisonment. Due to prison locations, female prisoners are more likely to live away from their families compared to men, leaving them more vulnerable to mental health issues (Royal College of Psychiatrists, 2010). Finally, despite the high prevalence, prison officers have been reported to require more training and support to understand the functions and treatment needs of self-harm among female prisoners (MacDonald, 2013; Kenning et al, 2006).

The Commission on Women Offenders in Scotland (2012) highlighted self-harm as a critical problem in this population, and one of the main challenges facing prison staff. Meanwhile, the Corston Report (Home Office, 2007) suggested that the prison service is ill-equipped to manage self-harm as there are limitations to therapeutic options in this environment, and proposed that affected female offenders be diverted to healthcare settings instead. Self-harm is detrimental to society as well as the individual, as it is related to violent behaviour towards others, therefore it is essential that we increase our understanding of self-harm among female prisoners (De Vogel, De Vries, de Kalmthout, & van Place, 2011).

Childhood trauma is common amongst female prisoners, and, having been consistently linked with self-harm in the literature, it is key to understanding self-harm in this population (Klonsky & Moyer, 2008). Rates of trauma amongst female prisoners have been reported at 94.3% for any trauma, and 31.2% and 26.2% for childhood sexual and non-sexual abuse, respectively.

PTSD rates are accordingly high, with 40.2% of female prisoners affected, compared with 12.5% of males (Komarovskaya, Loper, Warren, & Jackson, 2011). An interview study with 60 female prisoners reported that 10% directly related their near-lethal self-harming behaviours to childhood sexual abuse (Marzano, Fazel, Rivlin, & Hawton, 2011).

A meta-analysis, encompassing 43 studies, investigated the association between childhood sexual abuse and self-harm. Only a small association was established, which became negligible or disappeared when controlling for psychiatric risk factors, such as dissociation, alexithymia, and depression (Klonsky & Moyer, 2008). These findings suggest there may not be a direct link from childhood trauma to self-harm, but rather a complex relationship between trauma, intervening psychiatric issues, and self-harm. PTSD, emotion regulation, and dissociation are of particular interest as mediators, owing to their high prevalence in the female prison population, and the empirical evidence suggesting complex relationships between these variables, childhood trauma and self-harm.

Yates posits three pathways via which childhood trauma may lead to self-harm (Yates, 2009). The regulatory pathway occurs via damage to emotion-processing, resulting from childhood maltreatment. The subsequent unhealthy emotional states of emotional dysregulation, or dissociation from feelings, may lead to self-harm as a coping strategy and a method of emotional expression. The reactive pathway occurs via physiological hyperarousal arising from maltreatment, where the child has not learnt sufficient skills to moderate this arousal. Self-harm is therefore used to moderate this arousal. Finally, the representational pathway emphasises the insecure attachment arising from maltreatment, which may lead to an individual believing themselves unworthy of care, and using self-harm as a self-punishing strategy. A systematic review of the functions of self-harm indicates support for these pathways, as emotion regulation was found to be the most common function, with self-punishment, dissociation, help-seeking, and resistance of suicidal urges also supported (Klonsky, 2007). A

review of the literature indicates several studies which may provide evidence for the regulatory pathway, such that emotion regulation and dissociation demonstrate mediating functions (e.g. Gordon et al, 2015; Batey, May, & Andrade, 2010). Meanwhile, studies investigating PTSD symptoms, including hyperarousal, as a mediator, may provide incidental support for a reactive pathway (Shenk, Noll, & Casserly, 2010). The representational pathway is not within the scope of the current study.

Previous research, amongst adolescents, has supported the mediating role of PTSD symptoms in the relationship between childhood maltreatment and self-harm (Shenk et al, 2010). One longitudinal study examining pathways to self-harm, in 455 women at age 25, found that childhood sexual abuse was an indirect risk factor for self-harm, as it predicted victimisation which in turn predicted self-harm (Nada-Raja & Skegg, 2011). Victimisation and PTSD together predicted self-harm more strongly than victimisation alone, thereby providing further support for an indirect effect of child abuse and self-harm via PTSD. One study has demonstrated a mediation effect of two specific symptom clusters: re-experiencing and avoidance (Weierich & Nock, 2008). The arousal/reactivity symptom cluster has not been independently associated with this relationship, although this may be of relevance to the proposed reactive pathway, whereby self-harm is used to moderate arousal (Yates, 2009). There is a dearth of research in the female prison population, where the high incidence of PTSD makes this a worthwhile target of investigation.

Emotion regulation, as the foremost function of self-harm, is another potential mediator, and is central to the proposed regulatory pathway. This effect has been demonstrated among women with bulimia, wherein emotion regulation mediated the relationship between childhood sexual and emotional abuse and later self-harm (Gordon et al, 2015). Specific components of emotion regulation (alexithymia, distress tolerance and negative urgency) were also found to mediate the relationship between potentially traumatic events and borderline personality symptoms, of

which self-harm is one, in a student sample (Gaher, Hofman, Simons, & Hunsaker, 2013). Furthermore, self-harm is more prevalent in those with higher trait emotional dysregulation (Andover & Morris, 2014).

Dissociation may also be relevant to the regulatory pathway (Yates, 2009). Whilst disturbances to emotion regulation may result in uncontrollable emotion, as above, it may also result in numbing of emotion, leading to a dissociated state. Self-harm may then be used to combat the dissociative state, or, alternatively, may occur because awareness of danger is impaired in the dissociative state (Low, Jones, Macleod, Power, & Duggan, 2000; Rodriguez-Srednecki, 2001). This pathway was investigated within a sample of fifty women detained in a high secure hospital (Swannell et al, 2012). Using path analysis, it was found that sexual abuse predicts dissociation, which in turn predicts self-harm. In another study, both dissociation and alexithymia were found to mediate the relationship between childhood maltreatment and self-harm in a sample of 11,423 adults (Batey et al, 2010), while one longitudinal study has demonstrated that self-harm is significantly predicted by both childhood sexual abuse and dissociation, within a sample comprising 70 women with histories of childhood sexual abuse, and 70 female comparisons who were similar in age, ethnicity, and socioeconomic status (Noll, Horowitz, Bonano, Trickett, & Putnam, 2003). Finally, one study sampling 101 Turkish male prisoners reported high dissociation to be significantly associated with childhood abuse (Akyuz, Kugu, Sar, & Dogan, 2007), but no studies have investigated the mediating role of dissociation in the prison population.

With regard to female prisoners, it has been found that childhood trauma is significantly more prevalent among those who self-harm, than those who don't (Roe-Sepowitz, 2007). However, despite the weight of empirical evidence, as discussed above, there is a surprising lack of research investigating the indirect effects of PTSD, emotion regulation, and dissociation, on self-harm, in the female prison population. One study investigating these issues in incarcerated

women demonstrated, using structural equation modelling, that there exists a pathway from childhood sexual abuse to maladaptive coping, via self-blame, PTSD, and emotion dysregulation (Johnson & Lynch, 2013). However, the maladaptive coping outcomes which found support in this model were denial-disengagement and self-blame. Self-harm was tested as an outcome but did not find support, and the authors suggested this may relate to reluctance to disclose self-harm in a prison environment.

Aims of the Study

The current study aims to explore two of Yates' theoretical pathways from childhood trauma to self-harm in the female prison population, specifically investigating the mediating functions of PTSD symptoms, in accordance with the reactive pathway, and emotion regulation and dissociation, in accordance with the regulatory pathway. This is the first study to examine these pathways to self-harm in a female prison sample.

Materials and Methods

Participants

On average, the population of the female prison from which participants were recruited is 378. A total of 100 prisoners were invited to participate, representing 26.5% of the population. Of these, 11 declined, therefore 89 prisoners participated in this study. Only participants who were able to cope with the demands of the interview, and met the inclusion criteria, were invited to participate. Inclusion and exclusion criteria are described as follows.

Inclusion Criteria: Being willing to participate voluntarily and to give written consent, serving a sentence of at least six months, if on medication having been on a stable dose for at least six weeks, aged between 18-65 years old. Exclusion Criteria: Suicidal ideation or intent, history

of psychosis, current major depressive episode as the primary cause of concern, presence of known learning disability, or deemed too emotionally or physically frail to participate.

Procedure

Ethical approval for the study was sought from, and granted by, the relevant NHS Committee, the Scottish Prison Service Access and Ethics Committee and the Ethics Committee of Edinburgh Napier University.

Special Registrars in Psychiatry (SPRs), in consultation with prison health care staff, identified potential participants for the study who potentially met inclusion and exclusion criteria. Prison health care staff then introduced the study to potential participants, and confirmed their willingness to be approached by SPRs. Participants were informed that participation or non-participation in the study would not affect their routine care and management. Participants were also informed of their rights: declining participation or withdrawing from the study at any stage, and making a complaint.

Following a period of at least 24 hours a member of the research team met with participants to provide more information about the study, answer any questions, and to ask if they were still interested in taking part. After informed consent was obtained, the following assessments were administered by the SPRs. Due to literacy demands in this population, these were undertaken in an interview format, where appropriate for the individual.

Measures

Childhood Trauma Questionnaire (CTQ; Bernstein & Fink, 1998).

CTQ is a 28-item self-report questionnaire that assesses history of childhood sexual, physical and emotional abuse and physical and emotional neglect. Respondents are asked to rate the

frequency with which they experienced each of the 28 items during their childhood on a 5 point scale ranging from “never true” to “very often true”.

PTSD Checklist (PCL-5; Weathers et al, 2013).

The PCL-5 is a self-report 20 item standardised questionnaire which assesses DSM 5 post-traumatic symptoms (e.g. intrusive memories). Participants respond in a 5 point scale, ranging from not at all, to extremely, how much the specific symptom was a problem to them over the past month.

Difficulties in Emotion Regulation (DERS; Gratz & Roemer, 2004).

DERS is a 36 item self-report measure which assesses multiple aspects of emotional dysregulation. Participants rate how often they experience each of the items on a 5 point scale from “almost never” to “almost always”.

Dissociative Experiences Scale (DES II; Bernstein & Putnam, 1986).

The DES is a 28 item self-report measure which assesses the frequency of dissociative experiences, excluding those under the influence of drugs or alcohol. Participants rate items on how often they happen to them, in increments of 10%, from 0% to 100% of the time.

Self-Harm

The dichotomous item “Have you ever deliberately self-harmed?” was used to assess self-harm. Participants who answered “yes” were also asked to report any methods of self-harm they identified in their histories.

Analysis

To test the relationships between the measures listed above a series of chi-square, t-test, correlational and mediation analyses were conducted. The Process Macro for SPSS (Hayes,

2013) was used for the mediation analyses. PTSD, emotion regulation, and dissociation were tested as mediators, with childhood trauma as the predictor, and self-harm as the outcome variable. Examination of the bootstrapped (1,000 iterations) confidence intervals and the Sobel test p value allowed the determination of the presence of any indirect effects. Each of the mediators were first tested individually, then any significant mediators were entered into a multiple mediation analysis. Emotion regulation and dissociation were also entered into a multiple mediation analysis to test Yates' regulatory pathway (Yates, 2009).

Results

Demographic and historical information

The mean age of participants was 34.52 years and the majority were British (96.6%). The majority were parents (71.9%) and single (71.9%), and were unemployed at the time of offence (80.9%). Most had secondary level qualifications (58.4%), while some had an undergraduate qualification (7.9%). The majority were taking psychotropic medication (59.6%) and had psychiatric input prior to imprisonment (57.3%), while 70.8% had used illicit drugs. Finally, participants had been sentenced for an average of 5.15 years (SD= 5.03), and 58.0% of participants had a violent index offence, while offences related to drugs and to theft were also prevalent.

Childhood Trauma and Self-harm

Most participants (n=52; 58.4%) reported a history of self-harm. Among those who self-harmed, the most prevalent method reported was cutting (n=43; 82.7%), followed by overdosing (n= 25; 48.1%), then hanging/strangulation (n=6; 11.5%), and scratching (n=6; 11.5%). Other infrequently reported methods included: burning (n= 3; 5.8%), hair-pulling (n= 2; 3.8%), jumping in the river (n=1; 1.9%), and inhaling car exhaust fumes (n=1; 1.9%).

A total of 76 (85.4%) of participants reported some form of childhood trauma, with 55.1% reporting multiple forms. The most common trauma reported was emotional neglect (78.7%), followed by emotional abuse (77.5%), physical neglect (65.2%), physical abuse (59.6%) and sexual abuse (50.6%). All trauma types were more prevalent in self-harmers than non-self-harmers. Chi-square analyses were undertaken to determine the relationships between childhood trauma and self-harm (Table 1). Significant associations were exhibited for emotional abuse, χ^2 (1) = 8.58, *V*= .311, p= .003, and sexual abuse, χ^2 (1) =4.52, *V*= .227, p=.034, whilst associations with emotional neglect, physical neglect and physical abuse did not reach significance. Additionally, a chi-square test was conducted to test for an association between self-harm and violent offending, but this did not reach statistical significance, χ^2 (1) = 3.13, *V*= .187, p= .077.

Table 1 here

PTSD, Emotion Regulation, and Dissociation.

Table 2 provides means and standard deviations for scores on the measures of interest. A total of 58.4% of participants met criteria for DSM 5 PTSD, while 37.8% met criteria for clinically significant levels of dissociation, according to DES (Frischholz et al, 1990). There is no clinical cut-off score for the DERS, although it is reported that a mean score of 100-105, as exhibited by this sample, corresponds to that of a PTSD population, and is considerably higher than the general population mean of 75-80 (Gratz & Tull, 2010). Significant differences were observed between the groups of self-harmers and non-self-harmers in PCL-5, DES and DERS scores, such that self-harmers scored significantly higher on each measure.

Table 2 here

Correlation analyses were undertaken to examine the associations between childhood trauma and PCL-5, DES and DERS. CTQ total scores correlated significantly with PCL-5 (r= .596,

p<.001), DERS (r= .518, p<.001), and DES (r= .229, p=.049). Thus, associations were confirmed between childhood trauma, self-harm, and the measures of PCL-5, DES and DERS.

Individual Mediation Analyses

To explore the mediating role of PTSD symptoms, emotion regulation, and dissociation, on the relationship between childhood trauma and self-harm, a series of individual and multiple mediation analyses were undertaken. Individual mediation analyses were undertaken using PCL-5, DERS, and DES as mediators (Table 3). The predictor variable was CTQ total score and the outcome variable was self-harm. Bootstrapping was used to estimate the effects using 1,000 randomly generated samples: if the 95% confidence interval does not contain zero, a mediation effect is presumed to occur. Sobel tests were used to confirm the presence of mediation effects, where p<.05.

DERS was found to mediate the relationship between CTQ and SH (indirect effect=.016, 95% CI=.005-.033, p=.017). PCL-5 appeared to be approaching a mediation effect which was not confirmed by bootstrapped confidence intervals (indirect effect=.012, 95% CI=.000-.030, p=.069). The subscales of PCL-5 were entered as mediators to examine any distinct effects. It was found that the "alterations in arousal and reactivity" subscale significantly mediated the relationship between CTQ and SH (indirect effect=.014, 95% CI= .004-.031, p=.021), while the remaining subscales did not. DES did not demonstrate a mediation effect.

Table 3 here

Multiple Mediation Analyses

DERS and PCL-5 arousal/reactivity were entered into a multiple mediation analysis (Table 4), assessing the mediating effect of both variables simultaneously. This pair of variables was found to mediate the relationship between CTQ and self-harm (indirect effect=.023, 95% CI=

.008-.043). Within the model, neither DERS nor PCL-5 arousal/reactivity made a significant independent contribution, whilst controlling for the other.

Figure 1 here

To test Yates' proposed regulatory pathway, encompassing both emotion regulation and dissociation, a multiple mediation analysis was undertaken assessing the mediating effect of both variables simultaneously (Table 5). This pair of variables was found to mediate the relationship between CTQ and self-harm (indirect effect=.015, 95% CI= .002-.036). Within the model, neither DERS nor DES made a significant independent contribution, whilst controlling for the other.

Table 4 here

Figure 2 here

Discussion

The current study aimed to investigate a series of conceptual pathways from childhood trauma to self-harm amongst female prisoners, specifically investigating the mediating roles of PTSD, emotion regulation, and dissociation. This was achieved through a series of mediation analyses, revealing that emotion regulation and the arousal/reactivity symptom cluster of PTSD have an indirect effect on the relationship between childhood trauma and self-harm, and that emotion regulation and dissociation together have an indirect effect on this relationship. These findings provide support for the proposed regulatory and reactive pathways, as well as a potential interactional pathway (Yates, 2009). Furthermore, high prevalence rates were found for childhood trauma exposure (85.4%), DSM-5 PTSD (58.4%), and self-harm (58.4%), within this sample, and these findings, taken alone, are important, as they show the extreme mental health needs of female prisoners. We also found that all types of trauma exposure, as well as

symptoms of PTSD, dissociation, and emotion regulation problems, were more prevalent among those who self-harmed.

Our main findings concern the mediation analyses. It is surprising that dissociation and total PCL-5 score did not demonstrate individual mediation effects, considering the findings of previous studies. Previous research reporting a mediation effect for PTSD used measures pertaining to DSM-IV PTSD (e.g. Weirich & Nock, 2008). The lack of effect in the current study may therefore be partially attributable to using the criteria for DSM-5 PTSD, which include three additional symptoms (persistent and distorted blame of self or others; persistent negative emotional state; reckless or destructive behaviour) and no longer use one criterion from DSM-IV (fear, helplessness, or horror right after the trauma). Furthermore, dissociation has most commonly been associated with sexual abuse (e.g. Noll et al, 2003), so perhaps the inclusion of childhood trauma more generally, in the current study, has masked a specific relationship with sexual abuse and self-harm. The female prison population has not previously been studied in this regard, so it may also be the case that different associations exist here.

Our finding that emotion regulation mediates the relationship between childhood trauma and self-harm, amongst incarcerated females, corroborates findings from studies in psychiatric samples (Gordon et al, 2015). This provides support for a regulatory pathway to self-harm, wherein emotion regulation difficulties are a result of childhood trauma, and emotion regulation is a function of self-harm. Our finding that dissociation and emotion regulation demonstrate a multiple mediation effect in this relationship provides further support for the regulatory pathway. This pathway highlights the role of self-harm as a tool for managing and expressing intense emotion, where skills for communicating this through language and relationships are lacking, and also accounts for the use of self-harm to disrupt dissociation (Yates, 2009). The regulatory pathway has been highlighted as particularly important for clinical intervention, as it accounts for disturbances to emotion regulation, which has been

shown to be the primary function of self-harm, and therefore represents a key target for intervention (Lang & Sharma-Patel, 2011).

It is interesting that the arousal/reactivity symptom cluster displayed a mediating function, considering the previous findings that re-experiencing and avoidance, only, functioned as mediators (Weierich & Nock, 2008). The change in criteria for the PTSD avoidance symptom cluster may partially account for this discrepancy. The arousal/ reactivity cluster of symptoms fits conceptually with Yates' proposed reactive pathway, whereby hyperarousal arising from maltreatment leads to self-harm. Although we measured behavioural expressions of arousal in accordance with PTSD symptoms, these are likely to be determined by underlying neurobiological arousal mechanisms, as discussed by Yates (2009). Future research examining these neurobiological mechanisms in the context of self-harm would be helpful in understanding this pathway further.

Our multiple mediation analysis was significant for the pair of variables: emotion regulation, and PCL arousal/reactivity. However, neither of the two variables contributed significantly independently to the effect, whilst controlling for the other. This indicates there may be a complex association amongst emotion regulation and PCL arousal/reactivity, and their contribution to self-harming behaviour. In reviewing Yates' pathways, Lang and Sharma-Patel (2011) propose that the pathways may act synergistically, and our findings support this view. As discussed, the average emotional dysregulation in this sample is comparable to that of a PTSD population, according to the DERS (Gratz & Tull, 2010). This evidences the severe deficits the female prison population demonstrates in emotion regulation, and also suggests that deficits in emotion regulation are associated with PTSD symptoms. Hyperarousal symptoms have been found to be significantly correlated with DERS scores, but literature on the interaction between these symptoms in the context of self-harm is scarce (Tull, Barrett, McMillan, & Roemer, 2007). However, a pathway from childhood sexual abuse to other forms

of maladaptive coping, via PTSD and emotion regulation has been modelled among incarcerated women (Johnson & Lynch, 2013). The pathway to self-harm arising from our multiple mediation analysis builds on this finding, but is also potentially useful for addressing the widespread problem of self-harm within this population. Our findings supports the existence of co-existing reactive and regulatory pathways, and indicates that the interaction of arousal/reactivity and emotion dysregulation symptoms may predict self-harming behaviour, with greater accuracy than either alone.

The importance of these conceptual pathways lies in translating them into intervention, with the goal of reducing self-harm. Emotion regulation difficulties and arousal/reactivity symptoms, both individually and in combination, present opportunities for intervention among those at a higher risk for self-harm. Evidence-based therapies, including Dialectal Behavioural therapy (DBT), trauma-focussed Cognitive Behavioural Therapy (CBT), and Acceptance and Commitment Therapy all acknowledge emotion regulation strategies as key skills in reducing self-harm (Lang & Sharma-Patel, 2011). Two studies which analysed the changes in self-harm pre and post- treatment (Acceptance-based emotion regulation therapy and CBT, respectively) both found that this change was mediated by change in emotion regulation, thus this is an element of treatment which effectively reduces self-harm (Gratz & Tull, 2010; Slee, Spinhoven, Garnefski, & Arensman, 2008).

Hyperarousal has been less well investigated as a mechanism in self-harm interventions, but Yates (2009) suggests that pharmacotherapeutic interventions may be effective for the arousal symptoms contributing to self-harm. One study related the affective arousal symptoms of Borderline Personality Disorder to underlying neurobiological systems, and tested for changes in both self-reported arousal and BOLD (Blood Oxygen Level Dependent) responses after treatment with DBT (Schnell & Herpertz, 2007). It was found that both neural reactivity and self-reported arousal decreased after treatment. As DBT therefore appears to effect change in

both emotion regulation and arousal, it may be of use in approaching the co-existing reactive and regulatory pathways to self-harm, as proposed in the current study. It has also been conducted successfully in the prison setting, where a decrease in self-harming behaviour was observed (Nee & Farman, 2005). Even in the absence of formal therapy, promoting improvements in emotion regulation skills, and reductions in arousal symptoms, may help female prisoners to reduce their use of self-harm as a coping strategy.

This study has several limitations, including a cross-sectional methodology which does not allow for causal conclusions to be drawn. However, the focus on childhood trauma ensures the chronology of events matches the proposed pathways, while an interview format enhances reliability and validity of retrospective reports. Self-harm was entered as a dichotomous outcome variable only, and did not account for variance in type, severity or recurrence of the behaviours. Self-report assessments were administered in the context of an interview to overcome issues in literacy and concentration in this population. The study focusses on a highly specific population, which is limited in size, and these results are therefore not generalizable outside of the incarcerated female population. Finally, this study focussed on a specific set of explanatory factors, but we acknowledge there are many other potential precursors and motivations for self-harming behaviour in a prison setting, including a manipulative motivation (Dear, Thomson, and Hills, 2000).

Further research is needed on the correlates and risk factors of self-harm among female prisoners, to corroborate these findings and increase understanding of this problem. Future research should explore pathways from specific traumas, particularly emotional and sexual abuse, to self-harm, as different traumatic experiences may initiate different pathways to self-harming behaviours. It would also be extremely worthwhile to investigate the representational pathway as proposed by Yates (2009), whereby feelings of low self-worth and self-blame, arising from insecure attachment, may exert an indirect effect on self-harm.

With more than half of our sample engaging in self-harm, this is clearly an issue for the prison service. The findings from previous research, conducted in England, that some prison officers have limited understanding of the reasons for self-harm amongst female prisoners, indicate that more training is needed to facilitate management of this complex problem (Kenning et al, 2006). Strategies targeting emotion regulation and hyperarousal have the potential to reduce self-harm in prisoners. In conclusion, these findings provide key insights into the mental health of female prisoners, particularly in relation to childhood trauma and self-harm. This study is the first to investigate a conceptual pathway from childhood trauma to self-harm via emotion regulation and hyperarousal, and our endorsement of this pathway should be of relevance to the treatment of self-harm.

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Table 1 Prevalence of childhood trauma and comparison of self-harmers and non-self-harmers.

Type of Trauma	Total n (%)	SH (n=52) n (%)	Non-SH (n=37) n (%)	χ^2
Emotional Abuse	69 (77.5)	46 (88.5)	23 (62.2)	χ^2 (1) = 8.58 **
Physical Abuse	53 (59.6)	35 (67.3)	18 (48.6)	χ^2 (1) = 3.13
Sexual Abuse	45 (50.6)	31 (59.6)	14 (37.8)	χ^2 (1) = 4.52*
Emotional Neglect	70 (78.7)	44 (84.6)	26 (70.3)	χ^2 (1) = 2.65
Physical Neglect	58 (65.2)	37 (71.2)	21 (56.8)	χ^2 (1) = 1.97
Multiple Traumas	49 (55.1)	32 (61.5)	17 (45.9)	χ^2 (1) = 2.12

Note: SH= Self-Harmers, Non-SH= Non Self-Harmers.

* p<.05, ** p<.01

Table 2 Means (SDs) of continuous variables and comparison between self-harmers and non-self-harmers.

Measure	Total (n=89)	SH (n=52)	Non-SH (n=37)	T-test
PCL-5	39.41 (21.06)	44.22 (19.77)	32.72(21.24)	t (84)= -2.58*
Intrusion	9.29 (6.33)	10.44 (6.21)	7.69(6.22)	t (84)= -2.02*
Avoidance	4.37 (2.63)	4.54 (2.34)	4.14(3.01)	t (63.57)= -.67
Arousal/ Reactivity	11.19 (6.63)	13.02 (6.40)	8.64(6.15)	t (84) = -3.18**
Mood/ Cognition	14.57 (7.88)	16.24 (7.49)	12.25(7.92)	t (84) = -2.38*
DERS	100.23(32.57)	108.47(30.98)	86.77(31.02)	t (77)= -3.02**
DES	23.75 (19.39)	27.59 (19.83)	16.22(16.38)	t (72)= -2.47*

Note: SH= Self-Harmers, Non-SH= Non Self-Harmers.

* p<.05, ** p<.01

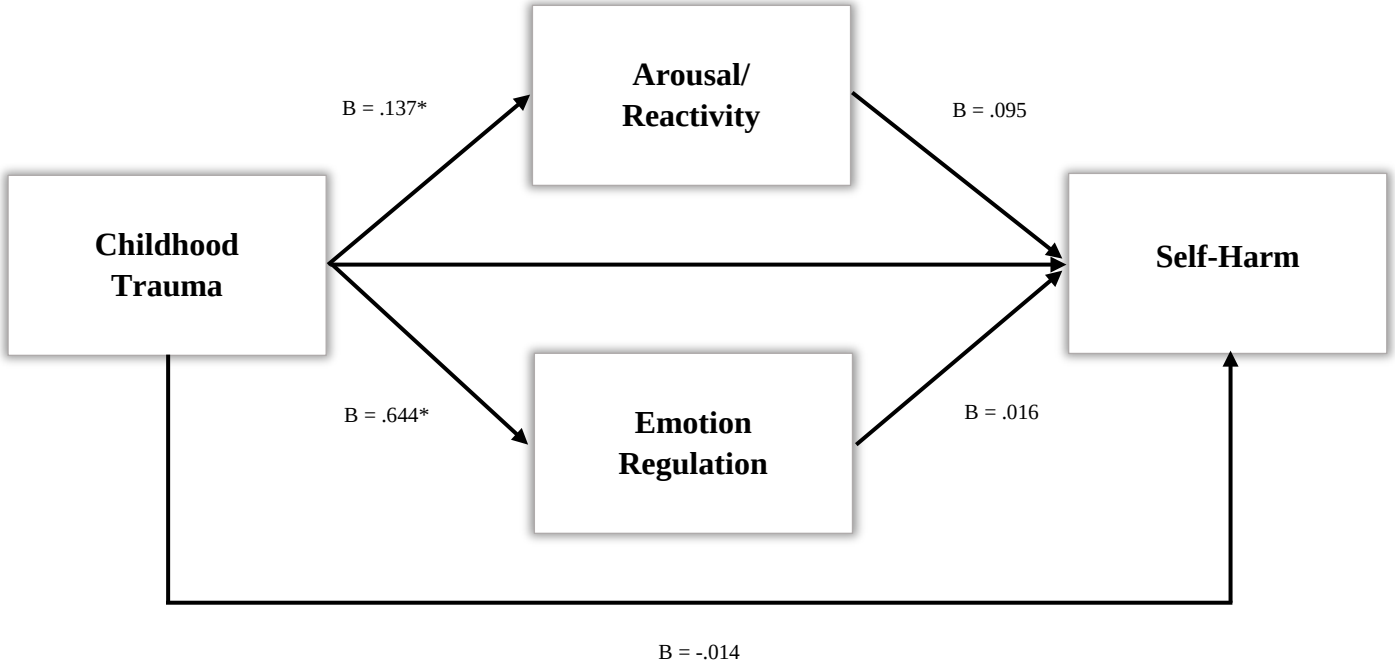
Table 3 Individual mediation analyses with bootstrapped confidence intervals.

Mediating Variable	Total Effect	Direct Effect	Indirect effect	Bootstrapped 95% CI	Sobel test for indirect effect
PCL-5 Total	.014	.001	.012	.000-.030	p=.069
PCL-5 Intrusion	.014	.006	.007	-.003- .225	p=.197
PCL-5 Avoidance	.014	.014	.000	-.009-.010	p=.998
PCL-5 Arousal/Reactivity	.014	.000	.014	.004-.031	p=.021
PCL-5 Mood/Cognition	.014	.004	.010	-.001-.260	p=.105
DERS	.008	-.007	.016	.005-.033	p=.017
DES	.006	.000	.006	.000-.021	p=.158

Table 4 Multiple mediation analysis including DERS and PCL-5 arousal/reactivity with bootstrapped confidence intervals

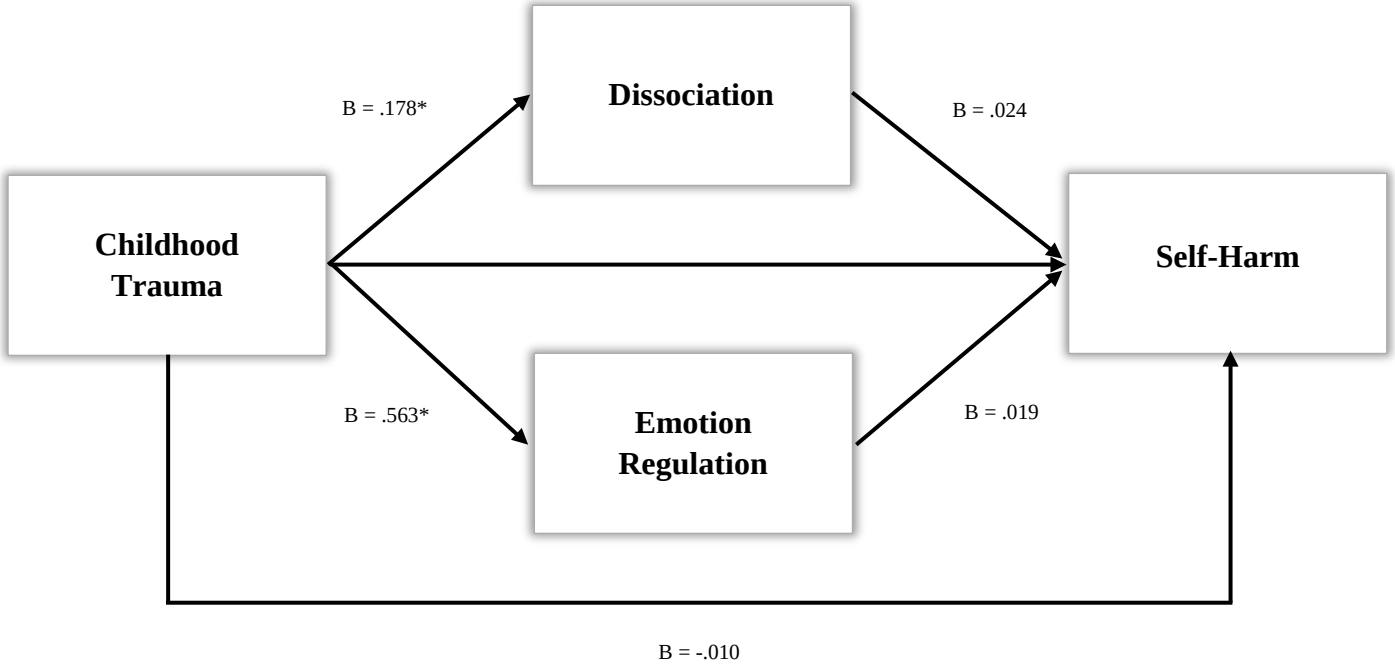
Mediating Variable	**Total effect**	**Direct effect**	**Indirect effect**	**Bootstrapped 95% CI**	**Sobel test for indirect effect**
Total	.008	-.014	.023	.008-.043	
DERS			.010	-.006-.030	p=.197
PCL-5 arousal/reactivity			.013	-.004-.033	p=.128
Multiple mediation analysis including DERS and DES with bootstrapped confidence intervals					
Total	.005	-.010	.015	.002-.036	
DERS			.011	-.005-.030	p=.132
DES			.004	-.002-.023	p=.312

Figure 1 Multiple Mediation model of PCL-5 arousal/reactivity and emotion regulation.



Note: *p<.05

Figure 2 Multiple Mediation model of dissociation and emotion regulation.



Note: *p<.05