

Title: What is the Relationship Between Dissociation and Self-Harming Behaviour in Adolescents?

Running title: Dissociation and Adolescent Self-Harm

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What is the Relationship Between Dissociation and Self-Harming Behaviour in Adolescents?

Deliberate self-harm in adolescents is an increasing clinical problem, but there is a limited understanding of the mechanisms causing or maintaining this behaviour. One proposed mechanism is that of dissociation. However, the role this mechanism may play is unclear: whilst some suggest that adolescents engage in self-harm to end the aversive experience of dissociation, others propose that self-harm is used to purposefully trigger a dissociative state to avoid emotional pain. This systematic review is the first to evaluate the available evidence regarding the relationship between dissociation and deliberate self-harm in adolescents (aged 18 or younger). Nineteen relevant studies were identified. These studies were limited by cross-sectional design and poor methods of measurement, but some important conclusions could be drawn. The majority of studies found a positive correlation between the severity of dissociation and the severity and frequency of deliberate self-harm in adolescents, and a small number of results suggest that dissociation mediates the relationship between childhood trauma and adolescent self-harm.

Key Practitioner Message:

- Current research shows a correlation between severity of dissociative experiences and severity and frequency of self-harming behaviour in adolescents.
- Practitioners should therefore seek to assess both phenomena when working with young people and include questions about dissociation in risk assessments.
- Interventions for self-harm in adolescents may benefit from incorporating techniques which manage or reduce dissociation.

Keywords: dissociation, self-harm, teens, adolescents, self-injury

What is the Relationship Between Dissociation and Self-Harming Behaviour in Adolescents?

Deliberate Self-Harm (DSH) is defined by the National Institute of Health and Clinical Excellence (NICE; 2013) as 'any act of self-poisoning or self-injury carried out by a person, irrespective of their motivation' (p. 6) and can include cutting, burning, pinching or ingesting harmful substances (self-poisoning), among other methods (NHS, 2018). There are many proposed functions of DSH, including autonomic functions (e.g. self-soothing; Hjelmeland et al., 2002), and social functions (e.g. communicating to others, maintaining boundaries with others; Klonsky & Glenn, 2009). Importantly, whilst Adolescent Deliberate Self-Harm (ADSH) can occur independently of suicidality (Hawton & James, 2005), DSH increases the risk of future suicide attempts (Hawton et al., 2015), and unnatural deaths in subsequent years (Morgan et al., 2017).

Hawton and James (2005) suggest that it is particularly difficult to know the exact prevalence of DSH among adolescents, as its relatively low lethality does not often result in presentation to medical services. Recently, however, there have been reports of an increase in rates of ADSH: by as much as 68% in adolescent females aged 13 to 16 between 2011 and 2014 (Morgan et al., 2017), and ChildLine have reported that 18,471 (20%) of their 92,891 counselling sessions in the year 2015/2016 related to self-harm (NSPCC, 2016). However, a recent review of currently available psychological interventions for ADSH (Labelle et al., 2015) reported a significant effect in only eight of fourteen identified studies. This indicates that improvement is required in the treatments available for young people engaging in DSH. Clarifying what mechanisms cause and maintain ADSH – and how they do this – is crucial for planning and developing treatment options.

One potential mechanism is that of dissociation, which gives rise to a wide variety of subjective experiences such as depersonalisation (experiences of the self as unreal or unfamiliar), derealisation (experiences of the external environment as unreal or unfamiliar), and emotional numbing (experience of affect as dulled or absent). Dissociation is defined by the DSM-5 (American Psychiatric Association; APA, 2013) as the ‘disruption of and/or discontinuity in the normal integration of consciousness, memory, identity, emotion, perception, body representation, motor control, and behaviour’ (p. 291), and is known to be a major feature of trauma responses, including in Post-Traumatic Stress Disorder (PTSD) (e.g. van der Hart et al., 2005).

Two competing proposals link dissociation to DSH. The first suggests that DSH may be used to purposefully trigger a dissociative episode, enabling avoidance of intolerable affect. This may be possible due to an autonomic ‘shut down’ response (Schauer & Elbert, 2010). The second proposed function states the opposite: that DSH is a strategy used to end a period of dissociation because of the distressing experience of feeling unreal or disconnected. Deliberate self-harm may therefore help to ‘generate’ feeling and reduce this sense of detachment (Klonsky, 2007, p. 229).

Therefore, both models propose that DSH is used to alter the person’s level of dissociation – either to induce it, or to escape from it. However, despite these models, and the demonstrated need for improved treatment options for youth DSH, there has not been a review to establish the role of dissociation in ADHS. Therefore, in order to contribute to a better understanding of the mechanisms of ADHS (and therefore future treatment development) this systematic review critically evaluated the available evidence in order to answer the question “what is the relationship between dissociation and self-harming behaviour in adolescents?”. In order to recognise the multiple possible non-suicidal functions of DSH, this review defines ADHS as self-inflicted

physical damage performed by someone aged 18 or under with any purpose other than the intention to die. Therefore, papers were excluded from the review where only suicidal acts of DSH are reported. The age range stated here incorporates children younger than 12 and 13 (the usual lower limit cut-off for studies of 'adolescents') due to the increasing evidence that children as young as seven may also engage in DSH behaviours (Barrocas, Hankin, Young & Abela, 2012).

Methods

The Ovid literature search engine was used, with Embase, PsychINFO, PsycARTICLES and Ovid Journals databases selected.

The following search terms were used:

Dissociation: *Dissociation; dissociative; derealisation; derealization; depersonalisation; depersonalization; numbing.* (Note that the wildcard "dissociat*" was not used as this returns many papers entitled "Dissociating... [X] and [Y]..." which are not in the dissociation or trauma literature).

Self-harm: "self harm*"; "self mutilation"; "self injur*"; "self mutilat*"; DSH; NSSI; cutting; burning; overdos*

Age-range: youth; "young people"; teen*; adolesc*; child*; "young adult**"

Only studies where DSH was the primary focus were included. Due to the occurrence of dissociation and DSH as symptoms of other disorders (and 'dissociation' used in other contexts, as above), search terms were limited to title, abstract and keywords of the paper, ensuring that a full-text search did not pick up irrelevant or secondary-focus uses of the terms. The references of the resulting papers were hand-searched for further relevant studies.

Inclusion Criteria

Included studies were written in English language with all participants aged 18 years or younger. Only quantitative research published in peer-reviewed journals was included.

There is a lack of clarity regarding the exact symptoms that fit under the definition of dissociation. Therefore, as well as dissociation itself, this review also included any studies which attempted to measure depersonalisation, derealisation or emotional numbing experiences, since these have been argued elsewhere to be dissociative in nature (Kennedy et al., 2013). Therefore, in this review, both dissociation and DSH are considered as transdiagnostic features, not as diagnostic terms. Due to the lack of research directly addressing dissociation, papers were included where dissociation was not the primary focus of the research question, but analysed as a secondary variable of interest.

Exclusion Criteria

Papers exploring dissociation or DSH in the context of substance misuse or medical complications were excluded, as these cannot reliably be demonstrated to feature psychogenic dissociation, and generalisation from such contexts may not be valid. There were no limits set regarding the earliest date of publication, and the search was closed on 27th July 2018.

Data Extraction

To ensure that relevant information was extracted and reported clearly, PRISMA checklists (Transparent Reporting of Systematic Reviews and Meta-Analyses; Moher et al., 2009), and the Cochrane Handbook (Higgins & Green, 2011)

were consulted. These documents informed the development of the data extraction tool. Both the PRISMA checklist and the Cochrane Handbook are guidelines for the structure and writing of evidence-based reviews, and state what information review authors should consider and report, where possible.

The quality of the reviewed papers was subjectively appraised by the lead author using prompts from the Cochrane Handbook (Higgins & Green, 2011), the Downs and Black checklist (a quality assessment tool; Downs & Black, 1998), and the Critical Appraisal Skills Programme's critical appraisal checklists (CASP, 2014). No formal quality assessment was undertaken, as most quality scales are designed for randomised controlled trials or intervention studies, and were therefore not suitable for the studies retrieved.

Results

Electronic database searches produced 287 results. During abstract screening, 150 studies were excluded: 100 because the study did not concern DSH or dissociation, and 50 because they were not in the format of a peer-reviewed published paper. Of the remaining 137 papers, a further 118 were excluded. In most cases the age range did not fit the inclusion criteria (N = 56). A total of 19 papers met inclusion criteria and are included in the current review (Figure 1).

[FIGURE 1]

Results are discussed in four sub-groups, divided by the population sampled (community, clinical, youth offending, and care). All papers are summarised in Table 1.

[TABLE 1]

Nearly half of the papers (eight out of 19) used samples from the community, primarily from educational establishments (N = 7). The key findings from these studies demonstrate that dissociation has a significant association with ADSH. Throughout these eight papers, more severe dissociation was repeatedly found to positively correlate with more severe ADSH (both in terms of frequency, method, and number of locations harmed on the body).

Additionally, two studies from community settings (Weierich & Nock, 2008; Zetterqvist et al., 2014) found that dissociation mediates the relationship between childhood abuse and ADSH, possibly in conjunction with depression or anxiety.

Six papers used samples from mental health patient populations: three used inpatient samples (Lüdtke et al., 2016; Radziwiłłowicz & Lewandowska, 2017a; Swenson et al., 2008), one recruited an outpatient sample (and compared against a control group from local schools; Zetterqvist et al., 2018) and one used a mixed sample of in- and out-patient respondents (Ohmann et al., 2008). Of these, the majority supported the findings of the previous group of papers, except Lüdtke et al. (2016), and Ohmann et al. (2008), who both state that dissociation is not a significant predictor of ADSH, implicating alexithymia, and trauma and depression, respectively.

Radziwiłłowicz and Lewandowska (2017a) focused on function rather than frequency of ADSH, and report a positive correlation between levels of dissociation and ADSH with the purpose of affect-regulation, establishing interpersonal boundaries, facilitating peer bonding, and generating feeling (i.e. anti-dissociation).

Three papers used samples from young offender populations recruited from juvenile detention centres (Table 1). Chaplo et al.'s (2015) and Matsumoto et al.'s

(2004) findings imply a specific role for dissociation as part of an emotion- or self-regulation process in ADHD, and Matsumoto et al. (2005) found that more severe dissociation is associated with engaging in multiple methods of ADHD. Chaplo et al. (2015) also support Weierich and Nock (2008) and Zetterqvist et al.'s (2014) suggestions that dissociation may be particularly important in the context of ADHD after childhood trauma (particularly childhood sexual abuse [CSA]).

Two studies (Cyr et al., 2005, and Lev-Wiesel & Zohar, 2014) used samples of young people in care or 'protective placement', and both support the majority of the previously discussed research. Cyr et al. (2005) expand on the previously discussed correlational findings with the addition of a nine-month follow-up. This demonstrated that changes in dissociation levels between time one and time two correlated with changes in levels of ADHD at time two.

Measurement of Key Concepts

Dissociation

Just over half of studies (N = 11) did not define what they meant by 'dissociation'. This may be an artefact of the research questions: most often, dissociation was one of many variables investigated in relation to ADHD, rather than the primary variable of interest (e.g. in Swenson et al., 2008). Of those that did offer some definition of dissociation (N = 8), conceptualisations varied, perhaps reflecting the general confusion in the field as to how best to define the concept. Chaplo et al.'s (2015) definition of dissociation (i.e. conceptualising it as 'the specific posttraumatic symptom of dissociation', p.274) highlights a particular example of this confusion: the confound between PTSD and dissociation.

Reflecting the overlap between trauma and dissociation five papers used PTSD or trauma scales to measure dissociation (Table 1). The vast majority of studies (N = 13) used a dissociation-specific measure, with most using the adolescent version of the dissociative experiences scale (Adolescent Dissociative Experiences Scale [ADES]; Armstrong et al., 1997) (N = 9). Radziwiłłowicz and Lewandowska (2017a) used the Ego Psychopathology questionnaire (Tyczyński & Wciórka, 2003), since the authors equate 'disturbances in experiencing the Self' with dissociation (Radziwiłłowicz & Lewandowska, 2017b, p. 288)

Deliberate Self-Harm

There was greater consistency in definitions of DSH. Many studies paraphrased the International Society for the Study of Self Injury (ISSS) definition of DSH ('deliberate, self-inflicted destruction of body tissue without suicidal intent'; ISSS, 2007). However, over half the studies (N = 12) did not use a validated measure of DSH, or used modified measures without sufficient detail for replication. As a result, the measures of DSH used in these studies have unknown psychometric properties. This is a severe limitation, since the data collected cannot be judged to be valid or reliable. Two studies used the Self-Injurious Thoughts and Behaviours Interview (SITBI; Nock et al, 2007) which has the most robust psychometric validation of all DSH scales used. In 16 of the other studies, severity of ADSH was measured by frequency and number of DSH locations on the body. However, other aspects could also have been considered, such as the riskiness of body location, or level of medical intervention required. One study, Radziwiłłowicz and Lewandowska (2017a) did not measure the severity or frequency, only levels of endorsement for various proposed functions of ADSH.

Methodology

All but one (Cyr et al., 2005) of the nineteen studies used a cross-sectional design that analysed data taken at a single time point. While a convenient design, the relative lack of longitudinal studies, and absence of experimental designs mean it is difficult to draw conclusions about causality. As a result, it is not possible to tell from these studies whether DSH is used to generate or to escape dissociation.

Cyr et al. (2005) use a longitudinal design which included a 9-month follow-up time-point. They state this was done 'on an exploratory basis' to identify 'psychological correlates of the persistence of self-mutilating behaviour' (p. 61). It is important to note that, whilst longitudinal in design, Cyr et al.'s (2005) results also cannot infer direction of causation due to their observational nature.

Analysis

Analysis used correlation or regression to test the relationship between ADSH and dissociation (N = 9), or ANOVA, t-tests, or Mann-Whitney U tests to determine differences between two groups (e.g. non-DSH vs. DSH) (N = 10).

Four studies included mediation analysis using regression (Chaplo et al., 2015; Rallis et al., 2012; Weierich & Nock, 2008; Zetterqvist, Lundh & Göran Svedin, 2014).

All mediation results found that dissociation mediates the relationship between a form of childhood abuse and the frequency of ADSH, or a particular function of ADSH (automatic or social, Zetterqvist, Lundh & Göran Svedin, 2014). Largely, dissociation was found to be an independent mediator, but in two papers, it acted in conjunction with another variable (emotional dysregulation, Chaplo et al., 2015; depression or anxiety symptoms, Zetterqvist & Göran Svedin, 2014).

Discussion

Seventeen of the 19 studies reviewed found a positive association between ADSH and dissociation. However, the quality of this evidence is limited by two key factors: the measures used, and the study designs. Where validated measures were used, these were not always as appropriate as they might be, limiting what conclusions may be drawn from the study's results. For instance, although assessing dissociation by using a subscale from a trauma measure is appropriate, it is less helpful than using a dissociation-specific measure. This is because a subscale is more limited in scope than a full measure, and may therefore omit important dissociative experiences. All 19 studies used a cross-sectional design, severely limiting what conclusions can be drawn about the role of dissociation in ADSH. Whilst some studies added mediation analyses, or used two time points (Cyr et al., 2005) to expand on the correlational findings in the field, these are nevertheless based on observational data and therefore still suffer the same limitations.

Theoretical Implications

In light of the current review, it is still not possible to determine whether ADSH is primarily used to *induce* or *escape* dissociation. Whilst Rallis et al. (2012) discuss their findings in terms of the hypothesis that DSH generates feeling (i.e. enables *escape* from dissociation) they do not consider the alternative hypothesis and how this may also explain their results. That is, their finding that dissociation correlates with the 'intrapersonal positive reinforcement' function of ADSH may be because DSH *induces* dissociation, and this is experienced as positively reinforcing since the alternative is emotional pain. The cross-sectional nature of all studies limits the ability of this review

to draw a conclusion about the sequence of events – which of ADSH or dissociation comes first, and under what circumstances.

The range of different scales used in these studies to measure dissociation perhaps reflects that the construct of dissociation is notoriously difficult to define (Nijenhuis and van der Hart, 2011). Therefore, whilst some have conceptualised dissociation as part of a trauma response, others have viewed it as a discrete construct which is distinct from (although closely related to) trauma; and Radziwiłłowicz and Lewandowska (2017a) used a scale which demonstrates their view that dissociation is best viewed as abnormal self-experience. Whilst disagreement in the field continues, it will be difficult to compare the results of studies which conceptualise and measure dissociation so differently. A consensus view of dissociation would therefore greatly aid future research into the role it plays in DSH presentations.

Clinical Implications

The positive correlation between ADSH and dissociation found in this review has implications for how clinicians work with young people presenting with one of these difficulties. If a young person presents with either dissociation or DSH, it may be clinically useful to also ask about the other construct, as this can reasonably be expected to be present too. Expanding on this, the severity of one may be a clue as to the severity of the other, and this may be helpful to consider during both psychological and risk assessments. The mediation analyses reported here indicate that this relationship is particularly important to consider in cases where there is known childhood abuse, since dissociation has been indicated by four separate studies to mediate the frequency of ADSH in adolescents with an abuse history (Chaplo et al.,

2015; Rallis et al., 2012; Weierich & Nock, 2008; Zetterqvist, Lundh & Göran Svedin, 2014).

Treatment development may also benefit from bearing these conclusions in mind. The results of this preliminary review imply that successful treatments for ADSH should also address dissociation, as well as considering the impact it may have upon intervention delivery. Indeed, the clinical utility of targeting dissociation has already been demonstrated by Myrick et al. (2012), who found that in a naturalistic study, 'self-destructive behaviour' reduced following treatment for dissociative disorders in a sample of 18 to 30 year olds. An expansion of this research into the adolescent age-range – with the specific objective of reducing ADSH – would be useful to clinicians working with these presentations.

Suggestions for Future Research

Future research would be aided by a better understanding of the constructs of DSH and dissociation. In the case of dissociation, a better understanding of how best to conceptualise – and therefore measure – this construct (as discussed above). And similarly in DSH, research would also be improved by a consensus on how best to measure ADSH, preferably with an appropriate and validated assessment tool. This would enable stronger conclusions to be drawn, since the literature is currently limited by the variation in how studies have evaluated ADSH, including using idiosyncratic and non-validated measures, and – in many cases – not stating which methods of ADSH have been included in their sample.

The prevalence of cross-sectional designs is also a limitation of the current research that should be addressed in future. The field would be particularly improved by consideration of experimental or manipulation design studies. These would require

a testable hypothesis, or even model of ADSH. An intervention study, perhaps expanding upon that by Myrick et al. (2012), as discussed above, would greatly contribute to addressing these limitations.

Conclusions

This is the first structured literature review to explore the role of dissociation in ADSH, and is therefore useful for appraising our current understanding of the connection between these two important and clinically challenging phenomena. On the basis of this review, it appears that ADSH and dissociation are positively correlated, such that adolescents with high dissociation scores should be expected to have more frequent and more severe ADSH, and vice versa. It is not possible from the current evidence base to determine the causal direction of the relationship between ADSH and dissociation.

A major strength of the current review is the consistency of the findings described by the included studies. Despite their limitations, there are only two papers which do not support the finding that more severe dissociation is associated with more severe DSH. This consistency is evident despite differences in the choice of measures, indicating that it may be considered a valid result. This review has also found that there is some limited evidence that dissociation plays a causal role in ADSH as part of an emotion-regulation process, and that this may be particularly important in young people who have a history of CSA. However, the evidence from which these conclusions are drawn are limited by measurement difficulties and reliance upon cross-sectional designs, reducing the quality and utility of the available evidence.

Clinicians should nevertheless be aware of the association between ADSH and dissociation, and be prepared to ask about one construct if it is clear that the other is present. Development of interventions for ADSH should also take this association into account, and may wish to incorporate techniques which aim to reduce dissociation.

Future research must address the limitations described here in order to expand on the current findings. Clarification of the construct of dissociation would be of particular benefit to future research.

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* Indicates a paper included in the literature review (Table 1).

Table 1.
Results table summarising all 19 papers included in the review.

<u>Citation</u>	<u>Population sampled</u>	<u>N</u>	<u>Age</u>	<u>Female %</u> <u>White %</u>	<u>Method</u>	<u>Dissociation measure</u>	<u>DSH measure</u>	<u>Comment on findings</u>
Cerutti, Manca, Presaghi & Gratz (2011) Italy	Community & Education: School students.	234	Female: 16.3 (1.7) Male: 16.7 (1.7)	49.2 <i>Not stated</i>	Cross-sectional. No follow-up.	ADES (Italian)	DSHI (translated into Italian by authors)	Dissociation is a 'robust clinical correlate' of DSH. Adolescents with a history of DSH have higher rates of dissociation than those who do not.
Chaplo, Kerig, Bennett & Modrowski (2015) USA	Young Offenders: Detention centre.	525	16.11 (1.31)	25.3 56.6	Cross-sectional. No follow-up.	ADES	Survey modified from LSASIC	Higher dissociation was associated with more reported episodes of DSH. Dissociation along with emotional dysregulation mediate the relationship between childhood abuse and DSH. DSH may be a self-regulation strategy.
Cyr, McDuff, Wright, Thériault & Cinq-Mars (2005) Canada	Care: Child Protection Services, recent CSA disclosure.	149 (66 at follow up)	14.3 (1.5)	100 <i>Not stated</i>	Cross sectional. Repeat at nine months.	TSCC	SDBI	Higher levels of DSH are associated with higher levels of dissociation. Decrease in dissociation (T1-T2) was the only predictor of decreased DSH (T1-T2).
Kiliç, Coşkun, Bozkurt, Kaya & Zoroğlu (2017) Turkey	Clinical: Outpatient and control group from local schools	207	<i>No sample mean</i> 11-18yrs	55.5% <i>Not stated</i>	Cross-sectional. No follow-up.	ADES	Self-report questionnaire developed by the authors.	Dissociation was found to have the highest impact on non-suicidal ADHS in a logistic regression analysis, across all diagnoses. Adolescents with diagnosis of Dissociative Disorder had significantly higher rates of DSH than other clinical and control groups.

<u>Citation</u>	<u>Population sampled</u>	<u>N</u>	<u>Age</u>	<u>Female %</u> <u>White %</u>	<u>Method</u>	<u>Dissociation measure</u>	<u>DSH measure</u>	<u>Comment on findings</u>
Laukkanen, Rissanen, Tolmunen, Kylmä & Hintikka (2013) Finland	Community & Education: School students.	440 (<i>same sample as Tolmunen et al., 2008</i>)	<i>Mean not stated</i> <i>Range: 13-18 years</i>	89.3 <i>Not stated</i>	Cross-sectional. No follow-up.	ADES	Questionnaire based on a qualitative study	Adolescents with high levels of dissociation were more likely to cut hidden areas of their body, and be experiencing more psychiatric symptoms than adolescents who cut on their arms. May also be associated with the function of 'relief from mental distress, and self-punishment'.
Lev-Wiesel & Zohar (2014) Israel	Care: Institutions for 'at-risk' adolescent girls	93	15.4 (1.49)	100 <i>Not stated</i>	Cross-sectional. No follow-up.	DES (Hebrew)	<i>Not stated</i>	Of the adolescents who engaged in DSH, those reporting CSA had higher levels of dissociation. Dissociation was higher among adolescents who engaged in DSH than those who did not, and was no different between those with and without CSA if they did not engage in DSH.
Lüdtke, In-Albon, Michel & Schmid (2016) Switzerland & Germany	Clinical: Inpatient	72	16.08 (1.29)	100 <i>Not stated</i>	Cross-sectional. No follow-up.	DES (German)	Author-developed structured interview to assess proposed DSM-5 criteria for NSSI Disorder	Dissociation is not a significant predictor of DSH, although there is a non-significant trend for adolescents who engage with DSH to have higher levels of dissociation than controls. Alexithymia significantly predicts NSSI Disorder.
Matsumoto, Yamaguchi, Chiba, Asami, Iseki & Hirayasu (2004) Japan	Young Offenders: Detention centre	201	16.8 (1.6)	11.4 <i>Not stated</i>	Cross-sectional. No follow-up.	ADES (Japanese)	Author-developed questionnaire	Adolescents who burn <i>and</i> cut themselves have higher dissociation scores than adolescents who engage in only one of these.

<u>Citation</u>	<u>Population sampled</u>	<u>N</u>	<u>Age</u>	<u>Female % White %</u>	<u>Method</u>	<u>Dissociation measure</u>	<u>DSH measure</u>	<u>Comment on findings</u>
Matsumoto, Yamaguchi, Chiba, Asami, Iseki & Hirayasu (2005) Japan	Young Offenders: Detention centre	<i>As Matsumoto et al. (2004)</i>			Cross-sectional. No follow-up.	<i>As Matsumoto et al. (2004)</i>		Adolescents who cut their arms – alone, or as well as their wrists – have higher levels of dissociation than those who cut only their wrists or not at all. The reasons given for arm cutting fit emotion regulation, whereas the reasons given for wrist-cutting were more instrumental.
Ohmann, Schuch, König, Blass, Fliri & Popow (2008) Austria	Clinical: Inpatient and outpatient	176	15.5 (1.3)	100 <i>Not stated</i>	Cross-sectional. No follow-up.	ADES (German)	<i>Not stated</i>	Dissociation is not a predictor of DSH. DSH is used to cope with trauma and depression, not dissociation, and is a learned response in the context of disrupted executive functioning. Dissociation is high in adolescents regardless of whether they engage in DSH.
Radziwiłłowicz & Lewandowska (2017a) Poland	Clinical: Inpatient	60	15.48 (1.19)	85% <i>Not stated</i>	Cross-sectional. No follow-up.	EPP	ISAS (Polish)	Dissociation correlates with functions of ADHS: affect regulation, interpersonal boundaries, anti-dissociation and peer bonding.
Rallis, Deming, Glenn & Nock (2012) USA	Community & Education: Posters in outpatient settings and community.	86	17.0 (1.9)	<i>Not stated</i> 73.3	Cross-sectional. No follow-up.	ADES	SITBI	Dissociation mediates the relationship between childhood abuse and DSH frequency. Dissociation is predictive of DSH with the function of generating feeling (i.e. dissociation is something to be escaped via DSH).

<u>Citation</u>	<u>Population sampled</u>	<u>N</u>	<u>Age</u>	<u>Female %</u> <u>White %</u>	<u>Method</u>	<u>Dissociation measure</u>	<u>DSH measure</u>	<u>Comment on findings</u>
Sho, Oiji, Konno, Toyohara, Minami, Arai & Seike (2009) Japan	Community & Education: School students	2498	<i>Not stated</i> <i>Range: 5th-12th grade</i>	<i>Not stated</i> <i>Not stated</i>	Cross-sectional. No follow-up.	ADES (Japanese)	Direct question with multiple choice answer	Dissociation accounted for a small amount of variance in DSH using a sharp object. DSH during pre-adolescence was predicted by depressive and dissociative tendencies.
Swenson, Spirito, Dyl, Kittler & Hunt (2008) USA	Clinical: Inpatient	288	14.91 (1.47)	64 72	Cross-sectional. No follow-up.	TSCC	Non-Suicidal Physical Self-Damaging Acts module of K-SADS-PL	Adolescents with more extensive degree of cutting showed more trauma-related dissociation. Because control group was also an inpatient sample, authors suggest that the relationship between dissociation and DSH is not a general artefact of psychological distress.
Tolmunen, Rissanen, Hintikka, Maaranen, Honkalampi, Kylmä & Laukkanen (2008) Finland	Community & Education: School students	3931	<i>Not stated</i>	<i>Not stated</i> <i>Not stated</i>	Cross-sectional. No follow-up.	ADES	Questionnaire based on a qualitative study	Dissociation correlated with current self-cutting, and history of other methods of DSH. Currently cutting adolescents had higher levels of dissociation than those with only historical cutting. The authors suggest that there may be a 'state-level entanglement' between dissociation and self-cutting.
Weierich & Nock (2008) USA	Community & Education: Posters in outpatient settings and community.	<i>As Rallis et al (2012)</i>			Cross-sectional. No follow-up.	PTSD module of K-SADS-PL	SITBI	Numbing and re-experiencing correlated with DSH. Numbing is involved in mediating the relationship between CSA and DSH.

<u>Citation</u>	<u>Population sampled</u>	<u>N</u>	<u>Age</u>	<u>Female % White %</u>	<u>Method</u>	<u>Dissociation measure</u>	<u>DSH measure</u>	<u>Comment on findings</u>
Zetterqvist, Göran Svedin, Fredlund, Priebe, Wadsby & Jonsson (2018) Sweden	Community & Education: School students	5839	17.97 (0.63)	54.9% <i>Not stated</i>	Cross-sectional. No follow-up	TSCC	One item from SITBI & similarly worded item to assess SASI	Higher levels of dissociation in ADSH groups, and significantly higher in the ADSH + SASI group, emphasising links to trauma and indicating potential re-enactment functions of ADSH.
Zetterqvist, Lundh & Göran Svedin (2014) Sweden	Community & Education: School students	816	<i>Not stated</i> Range: 15-17 years	<i>Not stated</i> <i>Not stated</i>	Cross-sectional. No follow-up.	TSCC	FASM (Swedish)	Dissociation and depression mediate between childhood abuse (sexual, emotional, or physical) and automatic (intrapersonal) functions of DSH. Dissociation and anxiety mediate between childhood physical abuse and social (interpersonal) functions of DSH.
Zoroğlu, Tuzun, Sar, Tutkun, Savas, Ozturk, Alyanak & Kora (2003) Turkey	Community & Education: School students	839	15.9 (1.8)	61.1 <i>Not stated</i>	Cross-sectional. No follow-up.	DES (Turkish)	Author-developed questionnaire	Adolescents reporting DSH have higher levels of dissociation. Regression analysis indicates dissociation as a predictor for DSH.
<i>Age:</i>	<i>Mean (Standard Deviation)</i>				ISAS	Inventory of Statements About Self Injury (Klonsky & Glenn, 2009)		
ADES	Adolescent Dissociative Experiences Scale, (Armstrong et al, 1997)				K-SADS-PL	Kiddie Schedule for Affective Disorders and Schizophrenia – Present and Lifetime Version, (Kaufman et al., 1997)		
CSA	Child Sexual Abuse				LSASIC	Lifetime Suicide Attempt Self-Injury Count, (Linehan & Comtois, 1996)		
DES	Dissociative Experiences Scale, (Bernstein & Putnam, 1986)				NSSI Disorder	Non-Suicidal Self-Injury Disorder (condition proposed for further consideration in DSM-5; APA, 2013)		
DSH	Deliberate Self-Harm				SASI	Sex as Self-Injury		
DSHI	Deliberate Self-Harm Inventory, (Gratz, 2001)				SDBI	Self-Destructive Behaviours Inventory, (Sadowski, 1995)		
EPP	Scharfetter's Ego Psychopathology questionnaire (Tyczyński & Wciórka, 2003)				SITBI	Self-Injurious Thoughts and Behaviours Interview, (Nock et al, 2007)		
FASM	Functional Assessment of Self-Mutilation, (Lloyd et al., 1997)				TSCC	Trauma Symptoms Checklist for Children, (Briere, 1996)		