



Depressive and Anxiety Symptoms in Relation to Self-harming Behaviour in Adolescence

Slavka Demuthova^{1*}, Andrej Demuth², and Sabina Chylova¹

¹ University of Ss. Cyril and Methodius in Trnava, Slovakia

² Comenius University in Bratislava, Slovakia

Abstract

Self-harming behaviour has shown an increasing trend in the population of adolescents and young adults over recent decades. Its high prevalence in both the clinical and non-clinical populations represents a serious threat to the physical and mental health of adolescents. To understand the causes and mechanisms of this unwanted phenomenon, as well as the possibilities of more effective treatment and assistance, relevant data must be obtained from many areas, including information on the overall mental health of self-harming adolescents. The aim of the work is to determine to what extent depressive and anxiety symptoms are related to self-harm and to verify the possibility of predicting self-harm based on the presence of depressive and anxiety symptoms. The study was carried out on a sample of 203 adolescents aged 15 to 19 years ($M=16.62$ years), 58.6% of whom were girls. The presence of depressive and anxiety symptoms detected using the Depression, Anxiety and Stress Scale 21 correlated, with statistical significance ($p < 0.001$), with the occurrence of self-harming behaviour as measured using the modified Self-Harm Inventory. Linear regression analysis showed that depressive symptoms (DS), as well as anxiety symptoms (AS) significantly ($p < 0.001$) predict the occurrence of self-harming behaviour ($R^2_{DS}=0.495$; $R^2_{AS}=0.466$). It can be stated that depressive and anxiety symptoms play a major role in the genesis and formation of self-harming behaviour in adolescents, which provides important information, particularly in the area of prevention of the occurrence and development of self-harming behaviour. In view of these findings, examining other comorbidities that occur simultaneously with self-harm in this population appears to be highly beneficial.

Keywords: self-harm, depressive symptoms, anxiety symptoms, adolescence, prediction

1. Introduction

The mental health of the young generation, as well as its protection and support are currently a serious challenge for experts from many fields of science, research, psychological and psychiatric practice. The negative effects of social changes and events are very sensitively reflected in the quality of life, well-being and mental health of those who are going through an

extremely difficult developmental period in their lives (Herpertz-Dahlmann et al., 2013). Developmental challenges in combination with adverse circumstances represent conditions for the increased incidence of risky behaviour and maladaptive coping mechanisms. Current research focused on the mental health of adolescents points to an evident rise in mental problems and diagnoses during adolescence (Lin & Guo, 2024). This negative trend is directing attention to uncovering the causes of psychological difficulties but also to the possibilities of more effective treatment and help. One example of a common and high-risk mental health issue that shows a rising tendency in adolescents and significantly interferes with the quality of life in all areas (psychological, somatic, social,...) is self-harming behaviour.

1.1 Self-harming Behaviour

Self-harm is a serious and highly prevalent negative phenomenon that occurs mainly during adolescence and emerging adulthood. It is defined as the intentional inflicting of pain (physical and/or psychological) with the primary aim of harming oneself, which most often serves as a maladaptive strategy for coping with psychological stress (Demuthova, 2023). Its consequences are serious not only in relation to the multiple and diverse injuries that self-harming individuals inflict on themselves, but also due to the negative impacts on their mental health. The issue of self-harm is relatively complex and appears to be associated with many other psychological difficulties (see, e.g., Jin et al., 2023; Guo et al., 2024), which need to be taken into account not only to understand the mechanisms of its origin, but also to explain its maintenance in a person's behavioural repertoire or in the process of professional intervention and treatment.

Experts point out several psychological problems associated with self-harm (for an overview, see, e.g., Demuthova & Demuth, 2025). These include eating disorders (Reas et al., 2023), gender dysphoria (Leon et al., 2021), affective disorders (Zhong et al., 2024), disruptive, impulse-control and conduct disorders (Gyori et al., 2021; Andrei et al., 2024), neurodevelopmental disorders (Balasz et al., 2018), trauma- and stressor-related disorders (Johnson & McKernan, 2021), somatic disorders (Gatta et al., 2022), sleep-wake disorders (Thapa & Yadav, 2024) and substance-related and addictive disorders (Guo et al., 2023). Despite this variety, certain patterns and common features can be identified in a number of diagnoses, which mainly indicate the presence of negative emotions, such as anger, anxiety, fear, sadness (Rothbart & Bates, 2006), frustration, boredom, shame, guilt, embarrassment (Rowe & Fitness, 2018) or rumination and hopelessness (Boschloo et al., 2013). In the context of negative emotionality present in adolescents who self-harm, depressive and anxiety symptoms come to the forefront.

1.2 Depressive Symptoms

Depressive symptoms are among the most frequently reported correlates of self-harm. They fit into the overall picture of a self-harming individual having a disturbed self-image with increased self-criticism, rumination and levels of hopelessness (Heath et al., 2016). Depressive symptoms comprise a wide range of adverse characteristics in the emotional, cognitive and behavioural domains. Individuals marked with increased levels of depression more often describe the presence of sadness, anxiety, guilt, hopelessness, worthlessness, helplessness and irritability (Arslanoglou et al., 2019) than those whose depression levels are within the norm. In the cognitive domain, depression is expressed by reduced cognitive capacity mainly due to massive preoccupation with negative emotions manifested, e.g., by deficits in working memory and executive and attentional functions (Kircanski et al., 2012; Rock et al., 2014). Depressed individuals are also characterised by several cognitive biases and distortions that are also typical for self-harming individuals – e.g., dichotomous thinking, catastrophising (Allen &

Hooley 2015; Hasking et al., 2017), a distorted self-image (Harman et al., 2021) or implicit associations (Glenn et al., 2017) associated, e.g., with intense self-criticism (Nagy et al., 2021) as well as suicidal ideation (Dickstein et al., 2015). The specific response of depressed individuals to environmental stimuli (behavioural area) is seen in various areas – e.g., an increased number of negative social interactions (Steger & Kashdan, 2009), anhedonia (Pizzagalli, 2014), overeating (Dygdon & Dienes, 2013) and others.

Research on the mutual associations between depressive symptoms and self-harm has yielded mixed results. The close connection between depression and self-harm on the level of correlational relations has been identified across many countries and cultures. Giletta et al. (2012) carried out research on adolescents in three different countries (Italy, the Netherlands and the USA) and found that higher levels of depressive symptoms were significantly associated with self-harm in all three countries. Studies focused on different national or ethnic groups have reported similar findings (Hamdan et al., 2022). Likewise, consistent findings are seen in studies confirming statistically significant differences in the intensity of depressive symptoms between adolescents who self-harm and those who do not (see, e.g., Serra et al., 2022). Research on the character of the relationship between depression and self-harm has not yielded such consistent results, however. As Başgöze et al. (2021) report, in some adolescents depression may develop first and self-harm later as a maladaptive coping strategy; in others may self-harming behaviour may develop first and then depressive symptoms that result from the psychological, interpersonal and/or biological consequences of repeated self-harm. Some individuals show a parallel development of self-harm and depressive symptoms, which together may result in other difficulties, including suicidal behaviour. Hu et al. (2024) monitored the relationship between the occurrence of depressive symptoms and self-harm over time and found that self-harm is connected with the future occurrence of depressive symptoms, but that depressive symptoms likewise predict the occurrence of self-harm. The results therefore point more to a reciprocal effect between non-suicidal self-injury (NSSI) and depressive symptoms in adolescence (Hu et al., 2024).

1.3 Anxiety Symptoms

Anxiety is one of the typical features of self-harming individuals (Klonsky et al., 2003; Hack & Martin, 2018; Lanfredi et al., 2021). Self-harmers often describe enduring feelings of tension as well as uncertain fears about the near or distant future. As a result of these states, they feel a strong need to get these unpleasant mental contents under control, which is one of the common reasons why such people resort to self-harm (Lloyd-Richardson et al., 2007; Hack & Martin, 2018). Favazza and Conterio assume that self-harming behaviour is a maladaptive way of coping with feelings of increasing tension and anxiety (Favazza & Conterio, 1989). Several studies have confirmed the association of self-harm and the occurrence of anxiety. Self-harming individuals differ from their non-self-harming peers in terms of anxiety levels, and anxiety levels are higher in current self-harmers than in non-self-harmers (Hack & Martin, 2018). Lanfredi et al. (2021) also found a higher level of anxiety in self-harming youth compared to their non-self-harming peers, and Perlman et al. (2018) consider anxiety to be a significant personality correlate of self-harmers. According to other studies (see, e.g., Klonsky et al., 2003), the presence of anxiety is even a much stronger predictor of self-harm than depression.

As with depressive symptoms, research is still needed to clarify the nature of the connection of anxiety with self-harm. One line of thought follows the assumption that self-harm arises as a consequence of the presence of anxiety disorders. For example, Wang and Eaton found that symptoms of generalised anxiety disorder may increase the risk of self-harm, which then serves as a way of coping with these difficulties (Wang & Eaton, 2023). The affective self-medication

model of self-harm and anxiety also assumes such a relationship, claiming that self-harm is used to alleviate negative affectivity or increased arousal caused by anxiety disorders, including generalised anxiety disorder. This model then perceives self-harm as a potential strategy for actively coping with stressful situations characterised by anxiety (Nixon et al., 2002). On the other hand, studies exist that show different results. Increased anxiety can – in contrast – prevent risky behaviour and reduce the likelihood of self-harm. Such a relationship could be confirmed, for example, by the study of Loh et al. who identified a negative correlation between anxiety and self-harm (Loh et al., 2013). The results of a study by McCoy et al. even raise the question to what extent the relationship between self-harm and anxiety is valid – their research sample did not confirm a higher incidence of anxiety in self-harming individuals compared to participants who did not engage in self-harm (McCoy et al., 2010).

2. Problem and Research Questions

It is clear from the results of the research conducted thus far that self-harming behaviour is associated with a number of other psychological issues that enter into its development and course and affect the success of treatment. The mutual relationships between self-harm and other mental difficulties show notable variability, which complicates the practical use of knowledge and stresses the need for additional research to gain a better understanding of the mechanisms and contributing factors of self-harm.

Depressive and anxiety symptoms stand out as particularly frequent among the variety of difficulties identified. Their relationship to self-harm has been shown to be significant in many studies, and a causal relationship has been confirmed in some of them, both in the direction predicting self-harm and as a consequence of self-harm. Other studies, however, suggest that there may be no connection between depressive and anxiety symptoms and self-harming behaviour, and still others can be found that, for example, did not identify anxiety symptoms as a risk factor, but rather as a protective factor for later self-harm.

It is therefore clear that research focused on monitoring the relationship between depressive symptoms and self-harm and anxiety symptoms and self-harm, as well as on analysing the nature of these relationships, is still needed. In the context of the uncertainties and the controversial results of previous studies, the following research questions were formulated:

- RQ 1: Is there a statistically significant relationship between the occurrence of depressive symptoms and self-harm in adolescents?
- RQ 2: Is there a statistically significant relationship between the occurrence of anxiety symptoms and self-harm in adolescents?
- RQ 3: To what extent do depressive symptoms predict self-harm in adolescents?
- RQ 4: To what extent do anxiety symptoms predict self-harm in adolescents?

3. Method

3.1 Measures

Data collection was carried out using an anonymous questionnaire consisting of three parts: 1/basic data about the participants (age – scale variable; gender – nominal variable), 2/ the modified Self-Harm Inventory (SHI – Sansone & Sansone, 2010) to determine the level of self-harm (scale variable) and 3/ the Depression, Anxiety and Stress Scale 21 (DASS-21 – Lovibond & Lovibond, 1995) to determine the level of depressive (scale variable) and anxiety (scale variable) symptoms.

3.1.1 Self-harming Behaviour

The SHI is a self-assessment scale for assessing the occurrence and frequency of forms of self-harm. It contains 22 statements in its original form (Sansone & Sansone, 2010) (“Have you ever intentionally, or on purpose, done any of the following:...”) mapping different forms of self-harming behaviour (e.g. “...Hit yourself?”, “...Abused alcohol?”, “...Abused prescription medication?”) and for some of them, the frequency, too. Based on research results on the prevalence of self-harm in Slovak adolescents using the SHI (see, e.g., Demuthova & Demuth, 2020), the original SHI questionnaire was modified in the following areas:

- in the instructions: the primary motive, to cause pain or harm to yourself, was emphasised (“Have you ever intentionally, or on purpose, done any of the following to harm yourself?”);
- in the list of forms of self-harm: for the purposes of data collection, three items were deleted from the original questionnaire (“... Driven recklessly on purpose?”, “...Been promiscuous” and “...Lost a job on purpose”), and the following items were added instead: “...Didn’t get enough sleep to hurt myself” and “...Intentionally over exercised to hurt myself”;
- in capturing the intensity of occurrence of individual forms of self-harm: the frequency of each form of self-harm was rated by the respondent on a scale of never (0 point) – rarely (1 point) – sometimes (2 points) – often (3 points).

The modified SHI thus mapped 20 forms of self-harm and their intensity on a 4-point scale (0 to 3); thus the score ranged from 0 to 60 points. The internal consistency of the modified SHI questionnaire in the studied sample of adolescents reached satisfactory values (Cronbach’s $\alpha = 0.923$).

3.1.2 Depressive and Anxiety Symptoms

Two scales from the Depression Anxiety and Stress Scale 21 (DASS-21) (Lovibond & Lovibond 1995) were used to determine the intensity of depressive and anxiety symptoms. The depression scale contains 7 items that monitor the degree of dysphoria, hopelessness, anhedonia and lack of interest. The anxiety scale also contains 7 items, and they focus on physiological reactions and the experience of situational anxiety. Respondents express how they identify with the statements regarding their experience during the past week on a 4-point scale, where 0 = not at all, 1 = sometimes yes, 2 = often yes, 3 = almost always. In both scales it was therefore possible to obtain from 0 to 21 points. Both scales were found to be internally consistent in the research sample – Cronbach’s α for anxiety symptoms reached a value of 0.884 and for depressive symptoms 0.932.

3.2 Subjects

Data obtained from a non-clinical sample of 203 participants, students aged 15 to 19 years (average age was 16.62 years – 16.60 for girls, 16.63 for boys), were used to answer the formulated research questions. The research sample had a higher representation of girls (N = 119; 58.6% of participants). The adolescents came from all over Slovakia; most of them (N = 139; 68.5% of the sample) attended grammar school, while the others (N = 64; 31.5%) attended secondary vocational schools.

3.3 Data Collection

Data on the participants, the level of self-harm, depressive symptoms and anxiety symptoms were obtained by means of an anonymous questionnaire. After providing informed consent, adolescents received a link for online data collection. They could discontinue or not complete the study at any time, without any consequences and especially without the possibility of

finding out who did so. Data collection was done via random selection based on the availability of participants in secondary school classes and their willingness to take part in the study.

3.4 Data Analysis

The data analysis was done in the statistical software IBM SPSS Statistics (Statistical Package for the Social Sciences), version 29.0.2.0. The Shapiro-Wilk test was used for determining the normality of the data distribution, and Spearman's non-parametric correlation was used to test for the statistical significance of correlations between the variables. The predictive power of depressive and anxiety symptoms on the measure of self-harm was found using linear regression. The statistical significance level was set at 0.05 for all calculations.

3.5 Ethical Approval

The research plan was approved by the Ethics Committee for Scientific Research of the Faculty of Arts at the University of Ss. Cyril and Methodius in Trnava, Slovakia, under registration number UCM-FF-EK 6/2023 and also approved by the Slovak Research and Development Agency of the Ministry of Education, Research, Development and Youth of the Slovak Republic. Data collection was voluntary and anonymous, and participants could discontinue it at any time. Since the research topic relates to mental health, participants could potentially be upset by the questions; therefore, as part of the informed consent, they were provided with the opportunity for professional consultations and were informed about the possibilities of using psychological help.

4. Results

In the monitored research sample, repeated self-harming behaviour occurred in 48.3% (N=98) of participants, which corresponds (see Demuthova, 2023) to the prevalence of self-harm identified in the studied population in recent years (45.2%). Given the fact that there are no norms for the DASS-21 for the Slovak adolescent population, data from the validation study by Henry and Crawford (2005) were used to compare the measured values of depressive and anxiety symptoms. The occurrence of depressive symptoms in the studied sample of adolescents (median=5) was higher with statistical significance than the data from the validation study (median=1) (see Table 1).

Table 1: One-Sample Wilcoxon Signed Rank Test for depressive symptoms

Total N	203
Test Statistic	15839.000
Standard Error	698.697
Standardised Test Statistic	11.012
Asymptotic Sig. (2-sided test)	<.001

Source: Authors.

Similarly, the One-Sample Wilcoxon Signed Rank Test for anxiety symptoms showed increased values in the research sample (median=5) compared with the validation study (median=1) by Henry and Crawford (2005) (see Table 2).

Table 2: One-Sample Wilcoxon Signed Rank Test for anxiety symptoms

Total N	203
Test Statistic	16960.500
Standard Error	734.013
Standardised Test Statistic	11.260
Asymptotic Sig. (2-sided test)	<.001

Source: Authors.

4.1 Research Question 1

RQ 1: Is there a statistically significant relationship between the occurrence of depressive symptoms and the rate of self-harm in adolescents?

To assess the suitability of using the test to determine the statistical significance of the correlation between the incidence of depressive symptoms and the rate of self-harm, the normality of the distribution of variables was tested using the Shapiro-Wilk test. The significance value ($p < 0.001$) in both variables testifies to the absence of a normal distribution, so the Spearman non-parametric correlation test was used to determine the strength of the correlation (see Table 3).

Table 3: Correlations between the rate of self-harm and depressive symptoms

		Correlations Self-harm Rate	
Spearman's rho	Depressive Symptoms	Correlation Coefficient	0.647**
		Sig. (2-tailed)	< 0.001
		N	203

Note: **Correlation is significant at the 0.01 level (2-tailed).

Source: Authors.

From the results it is clear that there is a statistically significant ($p < 0.001$), positive and moderately strong correlation ($\rho = 0.647$) between the occurrence of depressive symptoms and the rate of self-harm.

4.2 Research Question 2

RQ 2: Is there a statistically significant relationship between the occurrence of anxiety symptoms and the rate of self-harm in adolescents?

To assess the suitability of using the test for determining the statistical significance of the correlation between the occurrence of depressive symptoms and the rate of self-harm, the normality of the distribution of data related to anxiety symptoms was tested using the Shapiro-Wilk test. The significance value ($p < 0.001$) indicates the absence of a normal distribution; thus, the Spearman non-parametric correlation test was used to determine the strength of the correlation (see Table 4).

Table 4: Correlations between the rate of self-harm and anxiety symptoms

		Correlations Self-arm Rate	
Spearman's rho	Anxiety Symptoms	Correlation Coefficient	0.589**
		Sig. (2-tailed)	<0.001
		N	203

Note: **Correlation is significant at the 0.01 level (2-tailed).

Source: Authors.

From the results it is clear that there is a statistically significant ($p < 0.001$), positive and moderately strong correlation ($\rho = 0.589$) between the incidence of anxiety symptoms and the rate of self-harm.

4.3 Research Question 3

RQ 3: To what extent do depressive symptoms predict self-harm in adolescents?

Given the scale character of the variables self-harm and depressive symptoms, linear regression analysis was used to find out the predictive significance of depressive symptoms on the rate of self-harm (results are presented in Table 5).

Table 5: Results of linear regression analysis (depressive symptoms predict self-harm)

	Unstandardised Coefficients		Standardised Coefficients		
	<i>B</i>	<i>Std. Error</i>	<i>Beta</i>	<i>t</i>	<i>Sig.</i>
(Constant)	0.700	0.838		0.835	0.405
Anxiety symptoms	1.325	0.100	0.683	13.249	<0.001

Notes: Dependent Variable: Self-harm; $F = 197.396$; sig. <0.001; $R^2=0.495$

Source: Authors.

The values in Table 5 make it clear that the regression model is suitable for predicting self-harm, as the significance value is $p<0.001$. The value of the coefficient of determination indicates that depressive symptoms account for 49.5% of the variability in the incidence of self-harm.

4.4 Research Question 4

RQ 4: To what extent do anxiety symptoms predict self-harm in adolescents?

Table 6 presents the results of the linear regression analysis for determining the predictive significance of anxiety symptoms on the measure of self-harm. From the results it is clear that in the monitored research sample self-harm is caused by the presence of anxiety symptoms in 46.6% of respondents.

Table 6: Results of the linear regression analysis (anxiety symptoms predict self-harm)

	Unstandardised Coefficients		Standardised Coefficients		
	<i>B</i>	<i>Std. Error</i>	<i>Beta</i>	<i>t</i>	<i>Sig.</i>
(Constant)	0.700	0.838		0.835	0.405
Anxiety symptoms	1.325	0.100	0.683	13.249	<0.001

Notes: Dependent Variable: Self-harm; $F = 175.531$; sig. <0.001; $R^2=0.466$

Source: Authors.

5. Discussion

Monitoring of the mutual relationships between depressive symptoms and self-harm (RQ1 and RQ3) and anxiety symptoms and self-harm (RQ2 and RQ4) at the level of correlations (RQ1 and RQ2) as well as at the level of predictions (RQ3 and RQ4) showed that this is an area that requires attention. It is evident that both depressive and anxiety symptoms in a significant way enter into the mechanism of emergence and maintenance of self-harming behaviour in the repertoire of maladaptive reactions to psychological stress. The partial results linked to the responses to the formulated research questions can be interpreted on several levels, taking into consideration current knowledge in the field of self-harming behaviour.

5.1 Research Questions 1

The co-occurrence of depressive symptoms and self-harming behaviour is relatively frequent – for example, Niu et al. report that the incidence of depression in adolescents with non-suicidal self-harming behaviour was 94.76% (Niu et al., 2024), and it is also true that depressed individuals show a high frequency of self-harm (Parker et al., 2005; Wu et al., 2024). These

facts indicate the possibility that there is a connection between depressive symptoms and self-harming behaviour. Tracking the relationship between depressive symptoms and self-harming behaviour in our sample demonstrated the existence of a statistically significant, positive and moderately strong correlation between these variables. This means that with a rising level of depressive symptoms, the intensity of self-harming behaviour also rises. Several previous studies have arrived at similar results. For example, Peng et al. found in hospitalised young adults aged 18–32 years that the frequency of self-harm in the last week was positively correlated with depressive symptoms (Peng et al., 2023). What's more, Sadath et al. (2023) report that up to 37.8% of self-harmers were at the same time diagnosed with a major depressive disorder. Therefore, depression is clearly a common comorbidity of self-harm in the adolescent population.

The close correlation of the occurrence of depressive symptoms and self-harm can be interpreted in several ways; self-harm and depressive symptoms have many common characteristics both in the areas of emotionality and cognition. Both depressed and self-harming individuals show elevated levels of hopelessness (Faura-Garcia et al., 2024) and loneliness (Huang et al., 2023; Luo et al., 2023), and both diagnoses have low/thwarted belongingness (Chu et al., 2016), low self-esteem (Lei et al., 2024A) and low self-efficacy present (Kiekens et al., 2020; Li et al., 2024). Both depressed and self-harming individuals have a negative self-image (Fine et al., 1993; Lee et al., 2024), a higher incidence of dichotomous thinking (Kawabata et al., 2021; Bjärehed et al., 2025) and show more difficulties in problem solving (Ammerman et al., 2021; Noreen & Dritschel, 2022). Both groups are also characterised by catastrophic thinking (Lan et al., 2022), the building of negative scenarios (Bronstein et al., 2022; Barrocas et al., 2015), specific attentional focus (James et al., 2022; Goreis et al., 2024; Mennen et al., 2019) as well as difficulties with emotion regulation (Liu et al., 2023). Thus, there is a wide range of areas in which self-harm and depression may overlap, which opens up a number of possibilities for further research. The research of Niu et al. is an example of a deeper analysis of the sources and areas of mutual connection between depression and self-harm. With an analysis of the overlap of individual symptoms in clinical samples, the authors of that study showed that the central symptoms for both diagnoses that were: “feeling bad, failing or letting yourself or your family down”, and “little interest or pleasure” “feeling tired” (Niu et al., 2024). It would also similarly be possible to consider the above-mentioned common characteristics and look for common features between depression and self-harm within them.

5.2 Research Question 2

Within the second research question, a close, statistically significant association between the incidence of anxiety symptoms and the rate of self-harm with a moderately strong, positive correlation was identified – with increasing intensity of anxiety symptoms, the rate of self-harm also increases. The Depression Anxiety and Stress Scale 21 (DASS-21) used for determining the rate of anxiety symptoms monitors their occurrence in the experience during the past week (Lovibond & Lovibond, 1995). The occurrence of anxiety symptoms is basically monitored in two contexts – as a current setting (i.e., currently experienced anxiety, psychological state) or as a more permanent setting (i.e., as a long-term attitude, personality trait leading to overall anxiety experience). In the context of the state-trait anxiety dichotomy (Saviola et al., 2020), the monitoring of anxiety symptoms over the past week using the DASS-21 can be perceived somewhere between these poles – it is not necessarily a current state; however, on the other hand, a weekly period may not yet indicate a permanent focus of the personality. Research thus far conducted indicates that the association of self-harm with anxiety symptoms exists both at the level of anxiety as a state and at the level of anxiety as a trait.

Several studies have confirmed the association of anxiety symptoms and self-harming behaviour – e.g., Jiao et al. (2022) and Ulloa Flores et al. (2020) demonstrated their close connection in individuals already in adolescence, and Chartrand et al. (2012) report the existence of statistically significant correlations even in adulthood. Several studies have supported the above findings by showing statistically significant differences in the level of anxiety symptoms in individuals with and without self-harm (see, e.g. Daukantaitė et al., 2021; Kim et al., 2025). A current meta-analysis of studies in this regard was conducted by Shi et al. The analysis included 44,064 subjects and showed that the proportion of anxiety in the group of self-harmers was significantly higher than that in the non-self-harm group, and the difference between the groups was statistically significant (Shi et al., 2025).

The connection between anxiety symptoms and the occurrence of self-harm can be interpreted from several points of view. First, we can assume that the long-term cognitive, emotional or personality setting of the individual leads to a tendency to focus on negative stimuli from the environment or one's own thoughts and experiences, to attribute greater importance to them than to positive stimuli, and to anticipate that their occurrence will persist to the same or greater extent in the future, along with the current inability to avoid such stimuli or to process them effectively. Such a setting leads to constant anxiety, which in turn causes frequent and even chronic experiencing of negative, emotionally strong states. Therefore, a child and adolescent may purposefully seek situations that have the potential to suppress or alleviate anxious states. As a consequence of the high intensity and wide range of areas affected by persistent anxiety, the individual particularly chooses situations that are associated with intense experience and therefore have the potential to “quiet” their anxiety. Children and adolescents suffering from high levels of anxiety paradoxically engage in various forms of high-risk behaviour (Soleimani et al., 2017), including self-harm (Lanfredi et al., 2021). In the context of the above-mentioned, a second level can also be noted, which points to the fact that self-harm may be conditioned by the current experience of anxiety. In this case, anxiety is not a long-term trait, but a current, strong negative emotional state that the adolescent is trying to eliminate. Self-harm is thus a maladaptive, but very effective (see Demuthova, 2024) coping strategy. Third, the association of anxiety and self-harm can also be explained in the context of anxiety symptoms arising as a result of self-harming behaviour. Although self-harm is a conscious and intentional activity, thanks to its specific characteristics – e.g., addictiveness (see Demuthova, 2024) – it may not always be under control. Adolescents often suffer from remorse, shame, self-pity, anger, etc. at themselves after self-harming acts (Sheehy et al., 2019), which reflect fact that they themselves perceive self-harm as a failure. The experience of such failures causes anxiety about situations, problems, difficulties and circumstances that can potentially lead to self-harm.

5.3 Research Question 3

The monitoring of a possible predictive relationship between depression and self-harm was based on the assumption that depression, as a persistent negative emotion, has an immediate and significant impact on adolescents' self-harming behaviour (Lei et al., 2024B). It is clear from our results that depressive symptoms account for almost 50% of the variability in the incidence of self-harm. Several studies in the past have confirmed the possible dependence of the incidence of self-harm on the degree of present depression – e.g., depression mood is reported as the risk factor for NSSI by Hu et al. (2024), while Tang et al. (2022) found that depression can positively predict self-harm. Similarly, the results of Zhu and Shek indicate that depression is a positive concurrent and longitudinal predictor of self-harm (Zhu & Shek, 2023).

Depressive symptoms include a wide range of manifestations that significantly worsen the quality of life of an individual (especially his or her subjective experience), the ability to withstand psychological stress and solve problems, as well as the overall view of oneself and

the world around. These individuals feel to be unloved, a nuisance to those around them, which significantly affects their self-image. As a consequence of choosing predominantly maladaptive strategies for handling psychological stress, they often fail in crisis and stressful situations, feeling that their life is out of control (external locus of control – Khumalo & Plattner, 2019), which reinforces their belief in their own incompetence. This vicious circle then closes; individuals gain the impression that they deserve their experience and that it is their unchangeable fate. Depression is not only expressed by the above-mentioned cognitive biases; its most characteristic feature is that it is accompanied by extremely strong, often unbearably intense negative emotions. Due to its numerous functions (Klonsky, 2009), self-harm in this context offers itself as an effective strategy for coping with psychological stress and managing strong negative emotional experiences. Self-harm leads to covering up the present, unmanageable emotional pain that is beyond the individual's control with physical pain, the duration, intensity and even the very presence of which the individual can dictate. This results in obtaining substitute control and a temporary escape from psychological suffering. Self-harm can thus serve as a maladaptive, but effective strategy for managing depressive symptoms, and this includes protection against suicide (injury instead of attempted suicide), which is often present in the case of depressive disorders.

In interpreting the results, the possibility can also be considered that the predictive power of depressive symptoms towards self-harming behaviour is based on a more complex relationship. In this regard, Gao et al. demonstrated in a study of children that depressive symptoms longitudinally mediated the relationship between stressful life events and self-harm (Gao et al., 2020). Wei et al. came to similar conclusions in their study of adolescents, when they reported that stressful life events were linked to adolescent self-harm in part because of adolescent depression (Wei et al., 2022). According to Jiang et al. (2021), depressive symptoms work as a mediator in the association between rejection sensitivity and self-harm, or based on the results of Bauducco et al. depressive symptoms mediate the longitudinal link between insomnia symptoms and later self-harm (Bauducco et al., 2025). The conclusions of these studies point to the need for a broader exploration of the relationship between depressive symptoms and self-harm, with the inclusion of other important variables that have the potential to provide important data on the mechanisms of origin, reinforcement or maintenance of self-harming behaviour in an individual's repertoire of reactions to psychological stress.

5.4 Research Question 4

Similarly as in the case of depressive symptoms, regression analysis of data obtained from a sample of adolescents showed that anxiety symptoms can be considered significant predictors of self-harming behaviour. Thus, in this context, consideration of a model that assumes the existence of a mechanism that in anxious individuals or in individuals experiencing current anxiety leads to the activation of actions that suppress anxiety symptoms at least for a certain time is also valid in this case. Several such studies can be found in the scientific literature, the results of which support the conclusions that anxiety symptoms predict self-harm. According to Zhao et al. (2024), anxiety has a strong positive predictive effect on the frequency of self-harming behaviour. Even with anxiety symptoms and their predictive power regarding the occurrence of self-harming behaviour, it is possible to consider that this relationship may not be direct but may operate through mediators. For example, Bock et al. (2021) ascertained that the relation of anxiety to non-suicidal self-harm is indirect through mindfulness. This then opens up (as in the case of depressive symptoms) the need to explore other variables that may enter – either as mediators or moderators – into the mutual relationship between anxiety symptoms and self-harm.

5.5 Limits and Suggestions for the Further Study

The main aim of this study was to explore the relationship between depressive and anxiety symptoms and self-harm in adolescents. Upon interpreting the results pointing to the predictive power of symptoms several suggestions emerged. Within the limits of the study, it is necessary to emphasise the fact that the research was conducted on a relatively small and demographically narrow sample of 203 participants, which restricts the extent to which the findings can be extrapolated to the broader population. The sample consisted predominantly of grammar school students, a group that may differ in important ways from students attending vocational, technical, or specialized secondary schools. Grammar school students often experience different academic demands, social environments, and psychosocial stressors, which may influence both the prevalence and nature of self-harming behavior. These contextual factors could shape personality development and coping strategies in ways not captured across other school types. As a result, the conclusions drawn—while statistically significant—may reflect the characteristics of this specific subgroup rather than those of the wider adolescent or student population. Future studies should therefore include larger and more demographically diverse samples, selected through randomized or stratified procedures, to improve external validity and allow for a more nuanced understanding of the studied phenomena across different educational and social contexts.

Another limit connected to the characteristics of the research sample is the higher representation of females (58.6%). It is known from the scientific literature that girls generally internalise more; therefore, in this context an increased incidence of depressive and anxiety symptoms can be observed in them than in boys (Bauducco et al., 2025). What's more, it appears that several results may be characteristic mainly for females – e.g., Lundh et al. found that depressive symptoms stand as a risk factor for increased self-harm in girls (Lundh et al., 2011). Similarly, anxiety has a stronger positive predictive effect on the self-harm frequency in females than in males (Zhao et al., 2024). In future research, we thus recommend maintaining a balanced ratio between males and females, or including gender in the analyses as a moderator of the relationship between the observed symptoms and self-harm.

It is evident from the results that there is a strong positive correlation between depressive and anxiety symptoms and self-harm. Subsequent regression analysis monitored the predictive power of these symptoms for the occurrence of self-harming behaviour; however, there is also research that shows that this relationship can be the opposite, or even mutual – for example, Faura-Garcia et al. (2024) found that NSSI predicts increased depressive symptoms, but that depressive symptoms also predict NSSI. In this context, it would be suitable to test predictive relationships in the reverse direction and explore the possibility that self-harm is a cause of depressive and/or anxiety symptoms. Monitoring other moderating and mediating factors may also be beneficial.

5.6 Outcomes for Practice

The findings of the study offer several practical implications that are relevant for both clinical and educational contexts. First and foremost, the identification of key psychological characteristics associated with self-harming behavior in adolescents—particularly high vulnerability to internalizing problems and emotional instability—highlights the need for early screening and targeted psychological interventions. In clinical practice, professionals working with adolescents should systematically assess not only current self-harming behavior but also underlying depressive and anxiety symptoms. Given the significant predictive value of internalized symptoms, the implementation of therapeutic programs focused on improving

affect regulation and cognitive restructuring (e.g., emotion-focused therapy or cognitive-behavioral therapy) appears particularly beneficial (Kang et al., 2024; Vafaeinejad et al., 2024).

In educational settings, especially in grammar schools which constituted the predominant context of the present research sample, the results emphasize the importance of implementing universal mental health promotion programs that reduce stigma, raise awareness, and support help-seeking behavior. While grammar school students may benefit from strong academic support systems, they may also experience heightened pressure to achieve, perfectionistic tendencies, and intense fear of failure—factors that could differentiate them from students in vocational or technical schools, where academic stress might be lower but other types of social or structural disadvantages may be more prevalent. Thus, school psychologists, counselors, and educators should not adopt a one-size-fits-all model; rather, they should develop tailored prevention strategies that reflect the unique psychosocial dynamics of each educational environment.

Moreover, the results suggest the need for interdisciplinary cooperation in addressing self-harming behavior among adolescents. Interventions should ideally involve collaboration between clinical psychologists, educators, parents, and—in some cases—child protection or social services. Mental health professionals could benefit from training that focuses on identifying self-harming behaviors and associated risk profiles, particularly in school-aged populations, where early signs may be subtle. At the same time, preventive efforts should be complemented by educational programs for teachers and parents, improving their ability to recognize warning signs (e.g. depressive and anxiety symptoms) and respond constructively and empathetically. Supporting adolescents' mental health and reducing the incidence of self-harming behavior thus requires a systemic approach rooted in early detection, school-based prevention, and individualized therapeutic care.

6. Conclusion

Self-harming is a highly prevalent phenomenon that mainly occurs during adolescence. Efforts to reduce its incidence and intervene effectively in the case of affected individuals require an understanding of the mechanisms of its emergence and maintenance in the repertoire of undesirable forms of behaviour, in addition to the identification of factors and variables that may enhance its occurrence. From the research results it is evident that self-harm is closely associated with the occurrence of anxiety and depressive symptoms, which have also been identified as significant predictors of self-harming behaviour in adolescence.

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References

- Allen, K. J., & Hooley, J. M. (2015). Inhibitory control in people who self-injure: evidence for impairment and enhancement. *Psychiatry research*, 225(3), 631–637. <https://doi.org/10.1016/j.psychres.2014.11.033>
- Ammerman, B. A., Sorgi, K. M., Fahlgren, M. K., Puhalla, A. A., & McCloskey, M. S. (2021). An experimental examination of interpersonal problem-solving in nonsuicidal self-injury: A pilot study. *Journal of psychiatric research*, 144, 146–150. <https://doi.org/10.1016/j.jpsychires.2021.09.005>
- Andrei, L. E., Efrim-Budisteanu, M., Mihailescu, I., Buică, A. M., Moise, M., & Rad, F. (2024). Non-Suicidal Self-Injury (NSSI) Patterns in Adolescents from a Romanian Child Psychiatry Inpatient Clinic. *Children (Basel, Switzerland)*, 11(3), 297. <https://doi.org/10.3390/children11030297>
- Arslanoglou, E., Banerjee, S., Pantelides, J., Evans, L., & Kiosses, D. N. (2019). Negative Emotions and the Course of Depression During Psychotherapy in Suicidal Older Adults With Depression and Cognitive Impairment. *The American journal of geriatric psychiatry : official journal of the American Association for Geriatric Psychiatry*, 27(12), 12871–295. <https://doi.org/10.1016/j.jagp.2019.08.018>
- Balazs, J., Györi, D., Horváth, L. O., Mészáros, G., & Szentiványi, D. (2018). Attention-deficit hyperactivity disorder and nonsuicidal self-injury in a clinical sample of adolescents: the role of comorbidities and gender. *BMC psychiatry*, 18(1), 34. <https://doi.org/10.1186/s12888-018-1620-3>
- Barrocas, A. L., Giletta, M., Hankin, B. L., Prinstein, M. J., Abela, J. R. Z. (2015). Nonsuicidal Self-Injury in Adolescence: Longitudinal Course, Trajectories, and Intrapersonal Predictors. *Journal of Abnormal Child Psychology*, 43, 369–380. <https://doi.org/10.1007/s10802-014-9895-4>
- Başgöze, Z., Wiglesworth, A., Carosella, K. A., Klimes-Dougan, B., & Cullen, K. R. (2021). Depression, Non-Suicidal Self-Injury, and Suicidality in Adolescents: Common and Distinct Precursors, Correlates, and Outcomes. *Journal of psychiatry and brain science*, 6(5), e210018. <https://doi.org/10.20900/jpbs.20210018>
- Bauducco, S. V., Tilton-Weaver, L., Gradisar, M., Hysing, M., & Latina, D. (2025). Sleep trajectories and frequency of non-suicidal self-injury in adolescents: a person-oriented perspective over two years. *Scientific reports*, 15(1), 1734. <https://doi.org/10.1038/s41598-025-85779-5>
- Bjärehed, J., Grenner, H., Pavlovic, S., & Nilsson, M. (2025). It is harder for me: A thematic analysis of lived experience of self-care, and its relationship with self-injurious behaviors in psychiatric patients. *Qualitative research in medicine & healthcare*, 8(Suppl 1), 12544. <https://doi.org/10.4081/qrmh.2024.12544>
- Bock, R. C., Berghoff, C. R., Baker, L. D., Tull, M. T., & Gratz, K. L. (2021). The relation of anxiety to nonsuicidal self injury is indirect through mindfulness. *Mindfulness*, 12(8), 2022–2033. <https://doi.org/10.1007/s12671-021-01660-2>
- Boschloo, L., Vogelzangs, N., van den Brink, W., Smit, J. H., Beekman, A. T., & Penninx, B. W. (2013). The role of negative emotionality and impulsivity in depressive/anxiety disorders and alcohol dependence. *Psychological medicine*, 43(6), 1241–1253. <https://doi.org/10.1017/S0033291712002152>

- Bronstein, M. V., Everaert, J., Kummerfeld, E., Haynos, A. F., & Vinogradov, S. (2022). Biased and inflexible interpretations of ambiguous social situations: Associations with eating disorder symptoms and socioemotional functioning. *The International journal of eating disorders*, 55(4), 518–529. <https://doi.org/10.1002/eat.23688>
- Chartrand, H., Sareen, J., Toews, M., & Bolton, J. M. (2012). Suicide attempts versus nonsuicidal self-injury among individuals with anxiety disorders in a nationally representative sample. *Depression and anxiety*, 29(3), 172–179. <https://doi.org/10.1002/da.20882>
- Chu, C., Rogers, M. L., & Joiner, T. E. (2016). Cross-sectional and temporal association between non-suicidal self-injury and suicidal ideation in young adults: The explanatory roles of thwarted belongingness and perceived burdensomeness. *Psychiatry research*, 246, 573–580. <https://doi.org/10.1016/j.psychres.2016.07.061>
- Daukantaitė, D., Lundh, L. G., Wångby-Lundh, M., Claréus, B., Bjärehed, J., Zhou, Y., & Liljedahl, S. I. (2021). What happens to young adults who have engaged in self-injurious behavior as adolescents? A 10-year follow-up. *European child & adolescent psychiatry*, 30(3), 475–492. <https://doi.org/10.1007/s00787-020-01533-4>
- Demuthova, S. (2023). *Self-Harming Behavior in Adolescent Age*. Peter Lang.
- Demuthova, S. (2024). Sebaopškodovanie ako problem v školskom prostredí [Self-harm as a problem in the school environment]. *Manazment školy v praxi*, 19(11), 18–22.
- Demuthova, S., & Demuth, A. (2020). Self-harm in adolescence as maladaptive coping. *Brain : broad research in artificial intelligence and neuroscience*, 11(2), 37-47, <https://doi.org/10.18662/brain/11.2Sup1/92>
- Demuthova, S., & Demuth, A. (2025). Mental problems in the context of self-harming behaviour (A review study). In: *Proceedings of the 5th International Conference on Research in Psychology* (Vol. 2, No. 1, pp. 1–17), Diamond Scientific publishing. <https://doi.org/10.33422/icrpconf.v2i1.763>
- Dickstein, D. P., Puzia, M. E., Cushman, G. K., Weissman, A. B., Wegbreit, E., Kim, K. L., Nock, M. K., & Spirito, A. (2015). Self-injurious implicit attitudes among adolescent suicide attempters versus those engaged in nonsuicidal self-injury. *Journal of child psychology and psychiatry, and allied disciplines*, 56(10), 1127–1136. <https://doi.org/10.1111/jcpp.12385>
- Dygdon, J. A., & Dienes, K. A. (2013). Behavioral excesses in depression: a learning theory hypothesis. *Depression and anxiety*, 30(6), 598–605. <https://doi.org/10.1002/da.22111>
- Faura-Garcia, J., Calvete, E., & Orue, I. (2024). Longitudinal Associations Between Nonsuicidal Self-Injury, Depressive Symptoms, Hopelessness, and Emotional Dysregulation in Adolescents. *Archives of suicide research : official journal of the International Academy for Suicide Research*, 28(3), 800–814. <https://doi.org/10.1080/13811118.2023.2237075>
- Favazza, A. R.& Conterio, K. (1989). Female habitual self-mutilators. *Acta psychiatrica Scandinavica*, 79(3), 283–289. <https://doi.org/10.1111/j.1600-0447.1989.tb10259.x>
- Fine, S., Haley, G., Gilbert, M., & Forth, A. (1993). Self-image as a predictor of outcome in adolescent major depressive disorder. *Journal of child psychology and psychiatry, and allied disciplines*, 34(8), 1399–1407. <https://doi.org/10.1111/j.1469-7610.1993.tb02098.x>

- Gao, Y., Wang, H., Liu, X., Xiong, Y., & Wei, M. (2020). Associations between stressful life events, non-suicidal self-injury, and depressive symptoms among Chinese rural-to-urban children: A three-wave longitudinal study. *Stress and health : journal of the International Society for the Investigation of Stress*, 36(4), 522–532. <https://doi.org/10.1002/smi.2954>
- Gatta, M., Angelico, C., Rigoni, F., Raffagnato, A., & Miscioscia, M. (2022). Alexithymia and Psychopathological Manifestations Centered on the Body: Somatization and Self-Harm. *Journal of Clinical Medicine*, 11(8), 2220. <https://doi.org/10.3390/jcm11082220>
- Giletta, M., Scholte, R. H., Engels, R. C., Ciairano, S., & Prinstein, M. J. (2012). Adolescent non-suicidal self-injury: a cross-national study of community samples from Italy, the Netherlands and the United States. *Psychiatry research*, 197(1-2), 66–72. <https://doi.org/10.1016/j.psychres.2012.02.009>
- Glenn, J. J., Werntz, A. J., Slama, S. J., Steinman, S. A., Teachman, B. A., & Nock, M. K. (2017). Suicide and self-injury-related implicit cognition: A large-scale examination and replication. *Journal of abnormal psychology*, 126(2), 199–211. <https://doi.org/10.1037/abn0000230>
- Goreis, A., Pfeffer, B., Hajek Gross, C., Klinger, D., Oehlke, S. M., Zesch, H., Claes, L., Plener, P. L., & Kothgassner, O. D. (2024). Attentional Biases and Nonsuicidal Self-Injury Urges in Adolescents. *JAMA network open*, 7(7), e2422892. <https://doi.org/10.1001/jamanetworkopen.2024.22892>
- Grogans, S. E., Hur, J., Barstead, M. G., Anderson, A. S., Islam, S., Kim, H. C., Kuhn, M., Tillman, R. M., Fox, A. S., Smith, J. F., DeYoung, K. A., & Shackman, A. J. (2024). Neuroticism/negative emotionality is associated with increased reactivity to uncertain threat in the bed nucleus of the stria terminalis, not the amygdala. *bioRxiv : the preprint server for biology*, 2023.02.09.527767. <https://doi.org/10.1101/2023.02.09.527767>
- Guo, X., Wang, L., Li, Z., Feng, Z., Lu, L., Jiang, L., & Zhao, L. (2024). Factors and pathways of non-suicidal self-injury in children: insights from computational causal analysis. *Frontiers in public health*, 12, 1305746. <https://doi.org/10.3389/fpubh.2024.1305746>
- Guo, Z., Liu, Y., Wang, C., Li, S., Yu, L., Wu, W., You, X., Zhang, Y., Teng, Z., & Zeng, Y. (2023). Exploring the association of addiction-related genetic factors with non-suicidal self-injury in adolescents. *Frontiers in psychiatry*, 14, 1126615. <https://doi.org/10.3389/fpsyt.2023.1126615>
- Gyori, D., Farkas, B. F., Horvath, L. O., Komaromy, D., Meszaros, G., Szentivanyi, D., & Balazs, J. (2021). The Association of Nonsuicidal Self-Injury with Quality of Life and Mental Disorders in Clinical Adolescents-A Network Approach. *International journal of environmental research and public health*, 18(4), 1840. <https://doi.org/10.3390/ijerph18041840>
- Hack, J., & Martin, G. (2018). Expressed Emotion, Shame, and Non-Suicidal Self-Injury. *International journal of environmental research and public health*, 15(5), 890. <https://doi.org/10.3390/ijerph15050890>
- Hamdan, S., Apter, A., & Levi-Belz, Y. (2022). Non-suicidal Self-Injury Among Adolescents From Diverse Ethnocultural Groups in Israel: The Association With Sleep Problems and Internet Addiction. *Frontiers in psychiatry*, 13. <https://doi.org/10.3389/fpsyt.2022.899956>
- Harman, G., KIAMOVICH, D., Morales, A. M., Gilbert, S., Barch, D. M., Mooney, M. A., Feldstein Ewing, S. W., Fair, D. A., & Nagel, B. J. (2021). Prediction of suicidal ideation

- and attempt in 9 and 10 year-old children using transdiagnostic risk features. *PloS one*, 16(5), e0252114. <https://doi.org/10.1371/journal.pone.0252114>
- Hasking, P., & Whitlock, J., Voon, D., & Rose, A. (2017). A cognitive-emotional model of NSSI: using emotion regulation and cognitive processes to explain why people self-injure. *Cognition & emotion*, 31(8), 1543–1556. <https://doi.org/10.1080/02699931.2016.1241219>
- Heath, N. L., Carsley, D., De Riggi, M. E., Mills, D., & Mettler, J. (2016). The Relationship Between Mindfulness, Depressive Symptoms, and Non-Suicidal Self-Injury Amongst Adolescents. *Archives of suicide research : official journal of the International Academy for Suicide Research*, 20(4), 635–649. <https://doi.org/10.1080/13811118.2016.1162243>
- Henry, J. D., & Crawford, J. R. (2005). The short-form version of the Depression Anxiety Stress Scales (DASS-21): construct validity and normative data in a large non-clinical sample. *The British journal of clinical psychology*, 44(Pt 2), 227–239. <https://doi.org/10.1348/014466505X29657>
- Herpertz-Dahlmann, B., Bühren, K., & Remschmidt, H. (2013). Growing up is hard: mental disorders in adolescence. *Deutsches Arzteblatt international*, 110(25), 432–440. <https://doi.org/10.3238/arztebl.2013.0432>
- Hu, R., Peng, L. L., Du, Y., Feng, Y. W., Xie, L. S., Shi, W., Jia, P., Jiang, L. H., & Zhao, L. (2024). Reciprocal effect between non-suicidal self-injury and depressive symptoms in adolescence. *Frontiers in public health*, 11, 1243885. <https://doi.org/10.3389/fpubh.2023.1243885>
- Huang, X., Liu, H., Lan, Z., & Deng, F. (2023). The Effect of Loneliness on Non-Suicidal Self-Injury Behavior in Chinese Junior High School Adolescents: A Moderated Mediation Model. *Psychology research and behavior management*, 16, 1831–1843. <https://doi.org/10.2147/PRBM.S410535>
- James, K. M., Miskovic, V., Woody, M. L., Owens, M., Connolly, E., & Gibb, B. E. (2022). Attentional capture by angry faces in girls who self-injure: Evidence from steady state visual evoked potentials. *Suicide & life-threatening behavior*, 52(6), 1149–1158. <https://doi.org/10.1111/sltb.12909>
- Jiang, Y., Ren, Y., Liu, T., & You, J. (2021). Rejection sensitivity and adolescent non-suicidal self-injury: Mediation through depressive symptoms and moderation by fear of self-compassion. *Psychology and psychotherapy*, 94 Suppl 2, 481–496. <https://doi.org/10.1111/papt.12293>
- Jiao, T., Guo, S., Zhang, Y., Li, Y., Xie, X., Ma, Y., Chen, R., Yu, Y., & Tang, J. (2022). Associations of depressive and anxiety symptoms with non-suicidal self-injury and suicidal attempt among Chinese adolescents: The mediation role of sleep quality. *Frontiers in psychiatry*, 13, 1018525. <https://doi.org/10.3389/fpsy.2022.1018525>
- Jin, M. K., Wang, X. Y., Wang, R. X., Cheng, S. Y., Yang, S. Y., Zhang, S. L., & Lv, S. B. (2023). A systematic review and meta-analysis of factors related to non-suicidal self-injury among Chinese adolescents. *Psychiatry research*, 326, 115329. <https://doi.org/10.1016/j.psychres.2023.115329>
- Johnson, B. N., & McKernan, L. (2021). Co-Occurring Trauma and Non-Suicidal Self-Injury Among People With Chronic Pain: A Systematic Review. *Current pain and headache reports*, 25(11), 70. <https://doi.org/10.1007/s11916-021-00984-x>

- Kang, S., Zoh, S. M., & Hur, J. W. (2024). Evaluation of an App-based brief Cognitive Behavioral Therapy for individuals with Nonsuicidal Self-injury. *European Psychiatry*, 67(Suppl 1), S552. <https://doi.org/10.1192/j.eurpsy.2024.1146>
- Kawabata, T., Abe, N., & Wakai, T. (2021). The Effects of Dichotomous Thinking on Depression in Japanese College Students. *Journal of Educational and Developmental Psychology*, 11(1), 28–36. <https://doi.org/10.5539/jedp.v11n1p28>
- Khumalo, T., & Plattner, I. E. (2019). The relationship between locus of control and depression: A cross-sectional survey with university students in Botswana. *The South African journal of psychiatry : SAJP : the journal of the Society of Psychiatrists of South Africa*, 25, 1221. <https://doi.org/10.4102/sajpsychiatry.v25i0.1221>
- Kiekens, G., Hasking, P., Nock, M. K., Boyes, M., Kirtley, O., Bruffaerts, R., Myin-Germeys, I., & Claes, L. (2020). Fluctuations in Affective States and Self-Efficacy to Resist Non-Suicidal Self-Injury as Real-Time Predictors of Non-Suicidal Self-Injurious Thoughts and Behaviors. *Frontiers in psychiatry*, 11, 214. <https://doi.org/10.3389/fpsy.2020.00214>
- Kim, H.-s., Seo, Y.-w., Lee, Y., Lee, C. M., Kim, D. H., Kim, M., & Lim, M. H. (2025). Non-Suicidal Self-Injury in College Students: Differences Between the Subject Group and Comparison Group. *Psychiatry International*, 6(1), 9. <https://doi.org/10.3390/psychiatryint6010009>
- Kircanski, K., Joormann, J., & Gotlib, I. H. (2012). Cognitive Aspects of Depression. Wiley interdisciplinary reviews. *Cognitive science*, 3(3), 301–313. <https://doi.org/10.1002/wcs.1177>
- Klonsky, E. D., & Glenn, C. R. (2009). Assessing the functions of non-suicidal self-injury: Psychometric properties of the Inventory of Statements About Self-injury (ISAS). *Journal of psychopathology and behavioral assessment*, 31(3), 215–219. <https://doi.org/10.1007/s10862-008-9107-z>
- Lan, Z., Pau, K., Yusof, H. M., Zhao, Q., Liang, F., & Huang, X. (2022). Influence of adolescents' tendency to catastrophise on non-suicidal self-injury behaviour: A moderated mediation model. *Frontiers in psychology*, 13, 936286. <https://doi.org/10.3389/fpsyg.2022.936286>
- Lee, J. S., Kim, S., Lee, J. H., Kim, J. W., Yoo, J. H., Han, D. H., Hwang, H., Choi, C. H., & Seo, D. G. (2024). A latent profile analysis on adolescents' Non-Suicidal Self-Injury related to intrapersonal and interpersonal factors. *Child and adolescent psychiatry and mental health*, 18(1), 120. <https://doi.org/10.1186/s13034-024-00801-4>
- Lei, H., Xiong, J., Rao, Y., Zhu, T., & Zhang, X. (2024A). Relationships among self-esteem, depression and self-injury in adolescents: a longitudinal study. *Frontiers in public health*, 12, 1406283. <https://doi.org/10.3389/fpubh.2024.1406283>
- Lei, H., Yang, Y., Zhu, T., Zhang, X., & Dang, J. (2024B). Network analysis of the relationship between non-suicidal self-injury, depression, and childhood trauma in adolescents. *BMC psychology*, 12(1), 234. <https://doi.org/10.1186/s40359-024-01729-2>
- Leon, K., O'Bryan, J., Wolf-Gould, C., Turell, S. C., & Gadomski, A. (2021). Prevalence and Risk Factors for Nonsuicidal Self-Injury in Transgender and Gender-Expansive Youth at a Rural Gender Wellness Clinic. *Transgender health*, 6(1), 43–50. <https://doi.org/10.1089/trgh.2020.0031>

- Li, X., Xia, B., Shen, G., Dong, R., Xu, S., & Yang, L. (2024). The interplay of depressive symptoms and self-efficacy in adolescents: a network analysis approach. *Frontiers in psychology*, 15, 1419920. <https://doi.org/10.3389/fpsyg.2024.1419920>
- Lin, J., & Guo, W. (2024). The Research on Risk Factors for Adolescents' Mental Health. *Behavioral sciences (Basel, Switzerland)*, 14(4), 263. <https://doi.org/10.3390/bs14040263>
- Liu, J., Li, J. T., Zhou, M., Liu, H. F., Fan, Y. Y., Mi, S., & Tang, Y. L. (2023). Non-suicidal self-injury in adolescents with mood disorders and the roles of self-compassion and emotional regulation. *Frontiers in psychiatry*, 14, 1214192. <https://doi.org/10.3389/fpsyt.2023.1214192>
- Lloyd-Richardson, E. E., Perrine, N., Dierker, L., & Kelley, M. L. (2007). Characteristics and functions of non-suicidal self-injury in a community sample of adolescents. *Psychological medicine*, 37(8), 1183–1192. <https://doi.org/10.1017/S003329170700027X>
- Loh, C., Teo, Y. W., & Lim, L. (2013). Deliberate self-harm in adolescent psychiatric outpatients in Singapore: prevalence and associated risk factors. *Singapore medical journal*, 54(9), 491–495. <https://doi.org/10.11622/smedj.2013170>
- Lovibond, S. H., & Lovibond, P. F. (1995). *Manual for the Depression Anxiety Stress Scales* (2nd. Ed.). Sydney: Psychology Foundation.
- Lundh, L. G., Wångby-Lundh, M., Paaske, M., Ingesson, S., & Bjärehed, J. (2011). Depressive symptoms and deliberate self-harm in a community sample of adolescents: a prospective study. *Depression research and treatment*, 2011, 935871. <https://doi.org/10.1155/2011/935871>
- Luo, M. (2023). Social Isolation, Loneliness, and Depressive Symptoms: A Twelve-Year Population Study of Temporal Dynamics. *The journals of gerontology. Series B, Psychological sciences and social sciences*, 78(2), 280–290. <https://doi.org/10.1093/geronb/gbac174>
- McCoy, K., Fremouw, W., & McNeil, D. W. (2010). Thresholds and tolerance of physical pain among young adults who self-injure. *Pain research & management*, 15(6), 371–377. <https://doi.org/10.1155/2010/326507>
- Mennen, A. C., Norman, K. A., & Turk-Browne, N. B. (2019). Attentional bias in depression: understanding mechanisms to improve training and treatment. *Current opinion in psychology*, 29, 266–273. <https://doi.org/10.1016/j.copsyc.2019.07.036>
- Nagy, L. M., Shanahan, M. L., & Baer, R. A. (2021). An experimental investigation of the effects of self-criticism and self-compassion on implicit associations with non-suicidal self-injury. *Behaviour research and therapy*, 139, 103819. <https://doi.org/10.1016/j.brat.2021.103819>
- Niu, S., Yin, X., Pan, B., Chen, H., Dai, C., Tong, C., Chen, F., & Feng, X. (2024). Understanding Comorbidity Between Non-Suicidal Self-Injury and Depressive Symptoms in a Clinical Sample of Adolescents: A Network Analysis. *Neuropsychiatric disease and treatment*, 20, 1–17. <https://doi.org/10.2147/NDT.S443454>
- Nixon, M. K., & Cloutier, P. F., & Aggarwal, S. (2002). Affect regulation and addictive aspects of repetitive self-injury in hospitalized adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry*, 41(11), 1333–1341. <https://doi.org/10.1097/00004583-200211000-00015>

- Noreen, S., & Dritschel, B. (2022). In the here and now: Future thinking and social problem-solving in depression. *PloS one*, 17(6), e0270661. <https://doi.org/10.1371/journal.pone.0270661>
- Parker, G., Malhi, G.S., Mitchell, P.B., Kotze, B., Wilhelm, K., & Parker, K. (2005). Self-harming in depressed patients: pattern analysis. *The Australian and New Zealand journal of psychiatry*, 39(10), 899–906. <https://doi.org/10.1080/j.1440-1614.2005.01662.x>
- Peng, B., Liao, J., Li, Y., Jia, G., Yang, J., Wu, Z., Zhang, J., Yang, Y., Luo, X., Wang, Y., Zhang, Y., & Pan, J. (2023). Personality characteristics, defense styles, borderline symptoms, and non-suicidal self-injury in first-episode major depressive disorder. *Frontiers in psychology*, 14, 989711. <https://doi.org/10.3389/fpsyg.2023.989711>
- Perlman, G., Gromatsky, M., Salis, K. L., Klein, D. N., & Kotov, R. (2018). Personality Correlates of Self-Injury in Adolescent Girls: Disentangling the Effects of Lifetime Psychopathology. *Journal of Abnormal Child Psychology*, 46(8), 1677–1685. <https://doi.org/10.1007/s10802-018-0403-0>
- Pizzagalli, D. A. (2014). Depression, stress, and anhedonia: toward a synthesis and integrated model. *Annual review of clinical psychology*, 10, 393–423. <https://doi.org/10.1146/annurev-clinpsy-050212-185606>
- Reas, D. L., Wisting, L., & Lindvall Dahlgren, C. (2023). Co-occurrence of nonsuicidal self-injury and eating disorder pathology in adolescents. *The International journal of eating disorders*, 56(2), 439–445. <https://doi.org/10.1002/eat.23826>
- Rock, P. L., Roiser, J. P., Riedel, W. J., & Blackwell, A. D. (2014). Cognitive impairment in depression: a systematic review and meta-analysis. *Psychological medicine*, 44(10), 2029–2040. <https://doi.org/10.1017/S0033291713002535>
- Rothbart, M. K., & Bates, J. E. (2006). Social, emotional, and personality development. In Damon W & Lerner R (Eds.), *Handbook of child psychology* (Vol. 6, pp. 99–166). John Wiley & Sons, Inc.
- Rowe, A. D., & Fitness, J. (2018). Understanding the Role of Negative Emotions in Adult Learning and Achievement: A Social Functional Perspective. *Behavioral sciences (Basel, Switzerland)*, 8(2), 27. <https://doi.org/10.3390/bs8020027>
- Sadath, A., Troya, M. I., Nicholson, S., Cully, G., Leahy, D., Ramos Costa, A. P., Benson, R., Corcoran, P., Griffin, E., Phillip, E., Cassidy, E., Jeffers, A., Shiely, F., Alberdi-Páramo, Í., Kavalidou, K., & Arensman, E. (2023). Physical and mental illness comorbidity among individuals with frequent self-harm episodes: A mixed-methods study. *Frontiers in psychiatry*, 14, 1121313. <https://doi.org/10.3389/fpsyg.2023.1121313>
- Sansone, R. A., & Sansone, L. A. (2010). Measuring self-harm behavior with the self-harm inventory. *Psychiatry*, 7(4), 16–20.
- Saviola, F., Pappaianni, E., Monti, A., Grecucci, A., Jovicich, J., & De Pisapia, N. (2020). Trait and state anxiety are mapped differently in the human brain. *Scientific reports*, 10(1), 11112. <https://doi.org/10.1038/s41598-020-68008-z>
- Serra, M., Presicci, A., Quaranta, L., Caputo, E., Achille, M., Margari, F., Croce, F., Marzulli, L., & Margari, L. (2022). Assessing Clinical Features of Adolescents Suffering from Depression Who Engage in Non-Suicidal Self-Injury. *Children (Basel, Switzerland)*, 9(2), 201. <https://doi.org/10.3390/children9020201>

- Sheehy, K., Noreen, A., Khaliq, A., Dhingra, K., Husain, N., Pontin, E. E., Cawley, R., & Taylor, P. J. (2019). An examination of the relationship between shame, guilt and self-harm: A systematic review and meta-analysis. *Clinical psychology review*, 73, 101779. <https://doi.org/10.1016/j.cpr.2019.101779>
- Shi, J., Gao, P., Zhou, B., & Huang, Z. (2025). A meta-analysis of the relationship between anxiety and non-suicidal self-injury based on knowledge graphs. *Frontiers in psychiatry*, 15, 1493823. <https://doi.org/10.3389/fpsy.2024.1493823>
- Soleimani, M. A., Pahlevan Sharif, S., Bahrami, N., Yaghoobzadeh, A., Allen, K. A., & Mohammadi, S. (2017). The relationship between anxiety, depression and risk behaviors in adolescents. *International journal of adolescent medicine and health*, 31(2), /j/ijamh.2019.31.issue-2/ijamh-2016-0148/ijamh-2016-0148.xml. <https://doi.org/10.1515/ijamh-2016-0148>
- Steger, M. F., & Kashdan, T. B. (2009). Depression and Everyday Social Activity, Belonging, and Well-Being. *Journal of counseling psychology*, 56(2), 289–300. <https://doi.org/10.1037/a0015416>
- Tang, W. C., Lin, M. P., Wu, J. Y., Lee, Y. T., & You, J. (2022). Mediating role of depression in the association between alexithymia and nonsuicidal self-injury in a representative sample of adolescents in Taiwan. *Child and adolescent psychiatry and mental health*, 16(1), 43. <https://doi.org/10.1186/s13034-022-00477-8>
- Thapa, S., & Yadav, D. K. (2024). Role of sleep problem on suicidal behaviour and non-suicidal self-injury among adolescents in Pokhara, Nepal. *PloS one*, 19(9), e0305221. <https://doi.org/10.1371/journal.pone.0305221>
- Ulloa Flores, R. E., Mayer Villa, P. A., de la Peña Olvera, F., Palacios Cruz, L., & Victoria Figueroa, G. (2020). DSM-5 Non-Suicidal Self-Injury Criteria in a Clinical Sample of Self-Harming Mexican Adolescents. Lesiones autoinfligidas con fines no suicidas según el DSM-5 en una muestra clínica de adolescentes mexicanos con autolesiones. *Revista Colombiana de psiquiatria (English ed.)*, 49(1), 39–43. <https://doi.org/10.1016/j.rcp.2018.04.002>
- Vafaeinejad, Z., Mirzaian, N., Zamanpour, Z., Shabannejad, A., & Abbasian, A. (2024). The Effectiveness of Cognitive-Behavioral Therapy on Improving the Quality of Life of Adolescents Engaging in Non-Suicidal Self-Injury. *Journal of Adolescent and Youth Psychological Studies*, 5(8), 122–129. <https://doi.org/10.61838/kman.jayps.5.8.14>
- Wang, M., & Eaton, N. R. (2023). Linking non-suicidal self-injury to psychopathology: The utility of transdiagnostic and DSM-based models. *Journal of affective disorders*, 332, 55–63. <https://doi.org/10.1016/j.jad.2023.03.075>
- Wei, C., Li, Z., Ma, T., Jiang, X., Yu, C., & Xu, Q. (2022). Stressful life events and non-suicidal self-injury among Chinese adolescents: A moderated mediation model of depression and resilience. *Frontiers in public health*, 10, 944726. <https://doi.org/10.3389/fpubh.2022.944726>
- Wu, Y., Zhang, Y., Wang, C., & Huang, B. (2024). A meta-analysis on the lifetime and period prevalence of self-injury among adolescents with depression. *Frontiers in public health*, 12, 1434958. <https://doi.org/10.3389/fpubh.2024.1434958>
- Zhao, Y., Zhao, X., Zhou, Y., & Liu, L. (2024). Self-injury functions mediate the association between anxiety and self-injury frequency among depressed Chinese adolescents: sex

- differences. *Frontiers in psychiatry*, 15, 1378492. <https://doi.org/10.3389/fpsyt.2024.1378492>
- Zhong, R., Wang, Z., Zhu, Y., Wu, X., Wang, X., Wu, H., Zhou, J., Li, X., Xu, G., Pan, M., Chen, Z., Li, W., Jiao, Z., Li, M., Zhang, Y., Chen, J., Chen, X., Li, N., Sun, J., Zhang, J., ... Fang, Y. (2024). Prevalence and correlates of non-suicidal self-injury among patients with bipolar disorder: A multicenter study across China. *Journal of affective disorders*, 367, 333–341. <https://doi.org/10.1016/j.jad.2024.08.231>
- Zhu, X., & Shek, D. (2023). The predictive effect of depression on self-injury: Positive youth development as a moderator. *Applied Research in Quality of Life*, 18(6), 2877–2894. <https://doi.org/10.1007/s11482-023-10211-x>