Self-injury among adolescents

Supplementary materials

September 2021

SELF-INJURY MEASURES

Non-suicidal self-injury (SELF-INJURY)

At ages 14–15 (Wave 6, 2014) and 16–17 (Wave 7, 2016), the LSAC K cohort study children were asked to respond 'Yes' or 'No' to:

During the past 12 months:

- **Have you thought about hurting yourself on purpose (e.g. by taking an overdose of pills, or by cutting or burning yourself)? (self-injury thoughts)**
- **Have you hurt yourself on purpose in any way (e.g. by taking an overdose of pills, or by cutting or burning yourself)? (self-injury behaviour)**

From this, two variables were derived:

A. Patterns of self-injury over time, which included four groups:

1. NONE – those who do not report self-injury at either age
2. START – those who report self-injury at age 16-17 but not at 14-15
3. STOP – those who report self-injury at age 14-15 but not at 16-17
4. REPEAT – those who report at least one instance of self-injury at each age.

B. Any self-injury reported between 14 and 17: coded 'yes' if respondents reported engaging in self-injury in the last 12 months at age 14-15, 16-17 or both. Given that the question is about the last 12 months, but participants are followed up every 24 months, there may be some instances of self-injury not captured in these data.

OTHER MEASURES

Socio-economic position (SEP)

The socio-economic position of LSAC children was derived from parents' income, education level and occupational status. A z-score was created for the socio-economic position among all families. From this, three categories were created: Lowest 25%, Middle 50% and Highest 25% of socio-economic position.

Area of residence

The remoteness area indicator used was the Australian Statistical Geography Standard (ASGS) remoteness structure that divides Australia into five classes of remoteness on the basis of a measure of relative access to services (major city, inner regional, outer regional, remote and very remote). Categories for outer regional, remote and very remote were combined into a single category 'outer regional/remote'.

Language other than English spoken at home

When the LSAC K cohort study children were aged 14–15 (Wave 6, 2014), a parent or guardian indicated whether or not the study child spoke a language other than English at home.

Language background was coded 0 (English only) or 1 (language other than English spoken at home). There were 12.5% of participants who indicated they speak a language other than English at home.

Same-sex attraction

When LSAC K cohort study children were aged 14–15 (Wave 6, 2014), they were asked, 'Which of these statements best describes your sexual feelings at this time in your life?'

1. I'm attracted only to girls
2. I'm attracted only to boys
3. I'm attracted to girls and boys
4. I'm not sure who I am attracted to
5. I don't feel any attraction to others.

Boys who responded (2) or (3) and girls who responded (1) or (3) were coded as same-sex attracted (1). All others were coded not same-sex attracted (0). The percentage of teenagers in this sample who were same-sex attracted was 4.5%.

Emotional and behavioural problems

Parents reported on their child's emotional and behavioural problems at ages 4–5, 6–7, and 8–9 by completing the Strengths and Difficulties Questionnaire (SDQ).[1] At ages 10-11, 12-13, and 14-15, study children reported on their emotional and behavioural problems using the SDQ self report. Three of the five subscales of the SDQ were used: emotional problems, peer problems and conduct problems.[2] Each subscale contains five items that are rated from 0 'not true' to 2 'certainly true'. Scores for each subscale range from 0-10, with higher scores indicating a higher level of difficulties.

Angry parenting

Angry parenting was measured using items from the National Longitudinal Survey of Children and Youth (NLSCY, Cycle 3, 1998-1999).[3] Four items, including 'Of all the times you talk to this child about his/her behaviour, how often is this disapproval?' and 'How often do you feel you are having problems managing this child in general?', were rated from 1 'Never/almost never' to 5 'All the time'. The mean of the four items was used in the analysis, with higher scores indicating more frequent angry parenting.

Parental mental health

Parental mental health was assessed using the Kessler 6 Psychological Distress Scale (K6)[4] in all waves from age 4-5 (Wave 1; 2004) to age 14-15 (Wave 6; 2014). The K6 is a self-report measure of non-specific psychological distress consisting of six questions about anxiety and depressive symptoms experienced during the previous four weeks. Items are rated on a five-point scale from 0 'None of the time' to 4 'All of the time'.

Total scores range from 0–24, with higher scores indicating higher distress.

1 Goodman, R. (1997). The Strengths and Difficulties Questionnaire: A research note. *Journal of Child Psychology and Psychiatry, and Allied Disciplines, 38*, 581–586.

2 Separate problem scales from the SDQ provide detailed information on which area of social-emotional problems could be associated with self-injury. Previous research has shown that internalising problems, as well as conduct problems, are risk factors for self-injury, while ADHD is not (see for example, Fox, K. R., Franklin, J. C., Ribeiro, J. D., Kleiman, E. M., Bentley, K. H., & Nock, M. K. (2015). Meta-analysis of risk factors for nonsuicidal self-injury. *Clinical Psychology Review, 42*, 156-167. doi:https://doi.org/10.1016/j.cpr.2015.09.002)

3 Statistics Canada. (2000). *National Longitudinal Survey of Children and Youth (NLSCY) Cycle 3 survey instruments: parent questionnaire*. Ottawa, Canada.

4 Kessler, R. C., Andrews, G., Colpe, L. J., Hiripi, E., Mroczek, D. K., Normand, S.-L. et al. (2002). Short screening scales to monitor population prevalences and trends in non-specific psychological distress. *Psychological Medicine, 32*(6), 959–976.

Social functioning

Social functioning was assessed using the relevant subscale of the Paediatric Quality of Life Inventory[5] at age 12-13 (Wave 5, 2012), which includes five items. Items are rated from 0 ‘Never’ to 4 ‘Always’. Subscale scores are transformed to range from 0–100, with higher scores indicating better social functioning.

Early alcohol consumption

LSAC participants were asked at age 12–13 (Wave 5, 2012) if they had ever had an alcoholic drink. Early alcohol consumption was coded 0 (Never) or 1 (Yes, just a few sips, Yes, I have had fewer than 10 alcoholic drinks or Yes, I have had 10 or more alcohol drinks).

Depressive symptoms

Depressive symptoms at age 14-15 (Wave 6, 2014) were measured in LSAC K cohort study children using the 13-item Short Mood and Feelings Questionnaire.[6] Sum scores ranged from 0–26 with higher scores reflecting a greater level of depression. Depressive symptoms were coded 0 (sum score less than 8) or 1 (sum score 8 or higher, indicating elevated depressive symptoms).

Anxiety symptoms

Symptoms of anxiety at age 14-15 (Wave 6, 2014) were measured using the short-form Spence Anxiety Scale,[7] which includes eight items. Each item is rated from 1 ‘Never’ to 4 ‘Always’, and a total score is derived. Higher scores indicate elevated anxiety symptoms.

Bullying victimisation

At ages 14–15 (Wave 6, 2014) the LSAC K cohort study children were asked to respond ‘Yes’ or ‘No’ to:

Since last year:

1. Someone hit or kicked me on purpose
2. Someone grabbed or shoved me on purpose
3. Someone threatened to hurt me
4. Someone threatened to take my things
5. Someone said mean things to me or called me names
6. Someone tried to keep others from being my friend
7. Someone did not let me join in what they were doing
8. Someone used force to steal something from me
9. Someone hurt me or tried to hurt me with a weapon
10. Someone stole my things to be mean to me
11. Someone forced me to do something I didn’t want to do.

A binary variable for bullying victimisation in the past year was created: 0 (No to all items) or 1 (Yes, to one or more items).

5 Varni, J.W., Seid, M. & Kurtin, P.S. (2001). PedsQL 4.0: Reliability and Validity of the Pediatric Quality of Life Inventory Version 4.0 Generic Core Scales in Healthy and Patient Populations. *Medical Care, 39*(8), 800-812.

6 Angold, A., Costello, E. J., Messer, S. C., Pickles, A., Winder, F., & Silver, D. (1995). Development of a short questionnaire for use in epidemiological studies of depression in children and adolescents. *International Journal of Methods in Psychiatric Research, 5*, 237–249.

7 Spence, S. H. (1998). A measure of anxiety symptoms among children. Behaviour Research and Therapy, 36(5), 545–566; Spence, S. H., Barrett, P. M., & Turner, C. M. (2003). Psychometric properties of the Spence Children’s Anxiety Scale with young adolescents. *Journal of Anxiety Disorders, 17*(6), 605–625.

Peer relationships

At age 14-15 (Wave 6, 2014) peer relationships were assessed using the Inventory of Parent and Peer Attachment (IPPA),[8] specifically the Trust and Communication subscales. These subscales measure: 1) Trust, which refers to the adolescents' trust that peers understand and respect their needs and are supportive; and 2) Communication, which refers to adolescents' perceptions that peers are sensitive and responsive to their emotional states. Items are rated on a Likert scale of 1–5, with higher scores indicating poorer relationships on that subscale. Binary scores were created by dividing total scores by one standard deviation above the mean as 'low trust/communication', and the remaining scores as 'high'.

Temperament

Temperament at age 14-15 (Wave 6, 2014) was measured using the School-Age Temperament Inventory (SATI),[9] and covers three domains: introversion, reactivity and persistence. Each domain contains four questions, rated from 1 'Never' to 5 'Always'. Items were summed to create a score on each of the domains.

Sleep

At age 14–15 (Wave 6, 2014), LSAC children were asked about their sleep quantity and quality in the past month. The question regarding sleep quantity was: 'During the last month, do you think you usually got enough sleep?'.

The question regarding sleep quality was: 'During the last month, how well do you feel you have slept in general?'

Self-rated sleep quantity was coded 0 ('just enough' or 'plenty') or 1 ('not quite enough' or 'not nearly enough'). Self-rated sleep quality was coded 0 ('very well' or 'fairly well') or 1 ('fairly badly' or 'very badly'). A total of 18.3% reported poor sleep quantity, and 9.1% reported poor sleep quality at age 14-15.

Parenting style

The Parenting Style Inventory II[10] was used to assess parenting behaviours at age 14–15 (Wave 6, 2014). It consists of three subscales of five items each, namely: Autonomy-granting, Demandingness, and Responsiveness. Items are rated from 1 'Strongly agree' to 5 'Strongly disagree'. Both mothers and fathers responded to these questions, and subscales were marked as either maternal or paternal. If information was only available from one parent (mother or father), only those subscales were used in analyses.

Parent closeness

At age 14–15 (Wave 6, 2014), the LSAC K cohort study children were asked how close they felt to their:

1. Mum
2. Dad
3. Mum or dad who lives elsewhere (if applicable)

with the following response options: 'Very close', 'Quite close', 'Not very close', and 'Not close at all'.

Children were classified as 'Close to at least one parent' if they responded 'Very close' or 'Quite close' to either their mum or dad or a parent living elsewhere, or 'Not close to at least one parent' if they responded 'Not very close' or 'Not close at all' to both parents, or a single parent if no other information was available. Ninety-five per cent reported being close to at least one parent.

These questions were adapted from the Adolescent Survey of the Longitudinal Study of Separated Families.[11]

8 Armsden, G. C., & Greenberg, M. T. (1987). The inventory of parent and peer attachment: Individual differences and their relationship to psychological well-being in adolescence. *Journal of Youth and Adolescence, 16*(5), 427–454.

9 McClowry, S. G. (1995). The development of the School-Age Temperament Inventory. *Merrill-Palmer Quarterly, 41*, 271–285.

10 Darling, N., & Toyokawa, T. (1997). *Construction and validation of the Parenting Style Inventory II (PSI-II)*. doi: 10.13140/RG.2.2.22528.87048

11 Kaspiew, R., Gray, M., Weston, R., Moloney, L., Hand, K., Qu, L., & the Family Law Evaluation Team. (2009). *Evaluation of the 2006 family law reforms*. Melbourne: Australian Institute of Family Studies.

School characteristics

At age 14–15 (Wave 6, 2014) type of school for all participants was classified as:

- Government/public
- Catholic
- Independent/private
- Not in school

School size was calculated from linked MySchool data on total number of enrolments in 2013/14 (when children were 14–15 years of age). This was recoded into quantiles, to create groups of 'smallest 25%', 'middle 50%', and 'largest 25%' school size.

Linked MySchool data were used to create a categorical variable that included response options: 0 'Co-ed', 1 'Girls only', 2 'Boys only'.

Grade repetition

This variable was derived from parents' reports on the child's grade repetition over the school years up to age 14–15 (yes/no).

School belonging

School belonging was measured using the Psychological Sense of School Membership (PSSM) scale.[12] At age 14–15, LSAC K cohort study children were asked to rate 12 statements on a five-point scale, ranging from 1 'Not true at all' to 5 'Completely true'. Items included 'People here notice when I'm good at something'; 'The teachers here respect me' and 'I wish I were in a different school'. Scores ranged from 0–60, with higher scores indicating a greater psychological sense of school belonging. Scores were divided into quartiles, and a binary variable was derived: low school belonging (lowest quartile) and 'higher school belonging' (upper three quartiles).

ADDITIONAL RESULTS

Thoughts of self-injury are more strongly related to behaviours in girls

There is a lot of overlap between thoughts and acts of self-injury, and thoughts of self-injuring often, but not always, precede acts of self-injury. In line with this, those young people with thoughts of self-injury at 14–15 were much more likely to report self-injury behaviour at 16–17 (23%).

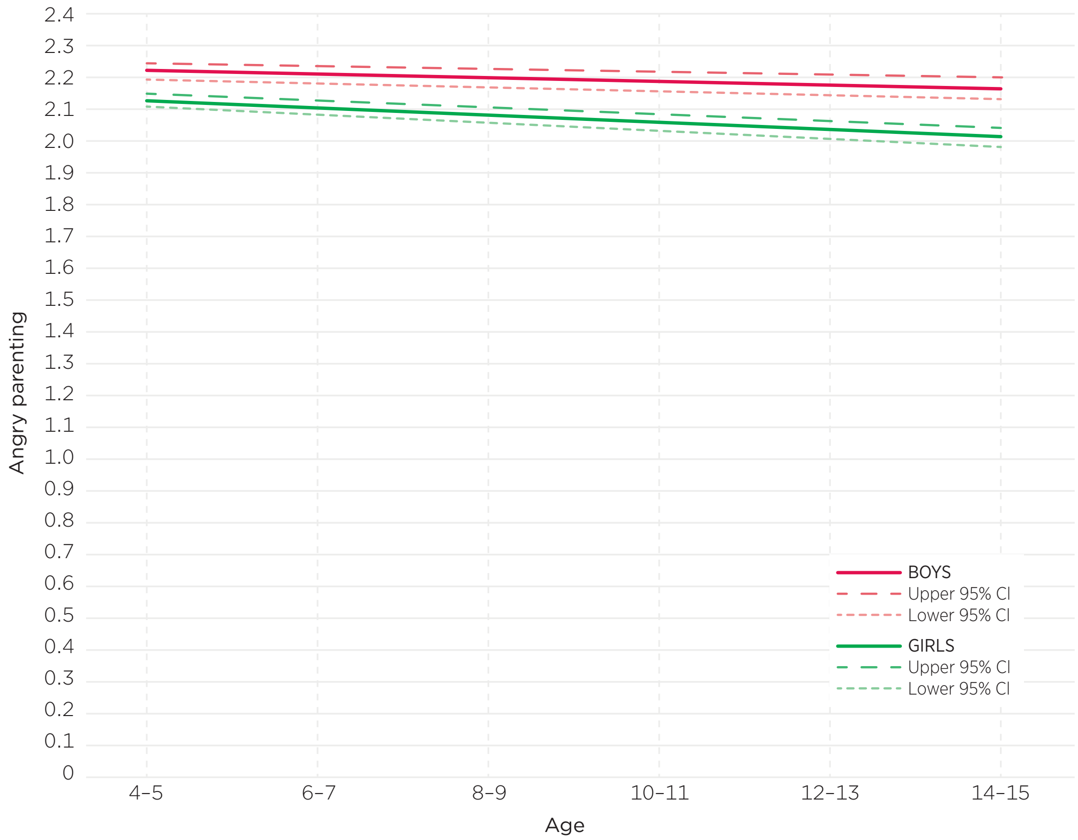
Importantly, this effect was stronger in girls than in boys. Specifically, 27% of girls who had only thought, but not acted, of self-injury at 14–15 reported self-injury behaviour at 16–17, compared to 14% of boys. Similarly, self-injury behaviour (in the absence of self-injury thoughts) at 14–15 was more strongly associated with self-injury behaviour at 16–17 in girls (40%) than boys (25%).

LGCM trajectories

Changes over time on a number of indicators are modelled from ages 4–5 to 14–15 using Latent Growth Curve Models (LGCM). The following graphs show how parents' and the child's wellbeing and parenting changed over time, by the child's sex. There are some differences in trajectories over time between girls and boys (e.g. SDQ emotional difficulties, angry parenting).

12 Goodenow, C. (1993). The psychological sense of school membership among adolescents: Scale development and educational correlates. *Psychology in the Schools, 30*(1), 79–90.

Figure S1: LGCM trajectories for angry parenting, emotional difficulties, parents' mental health, and peer problems



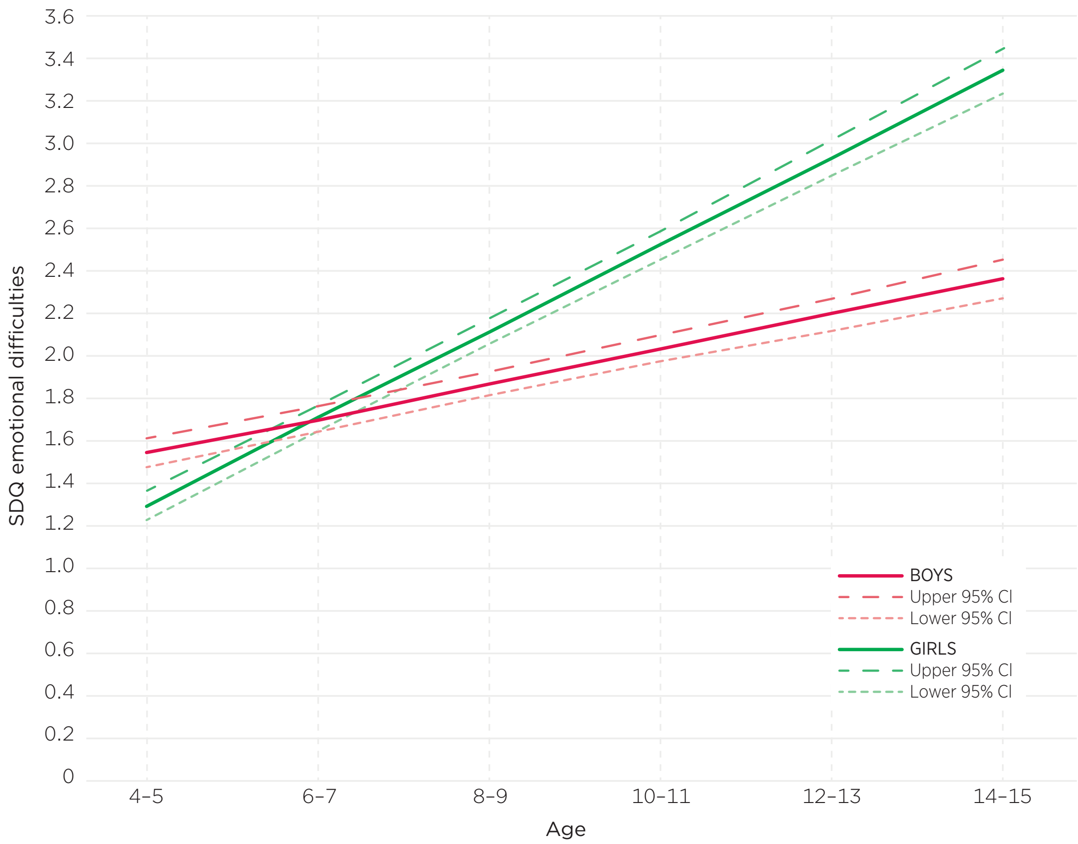
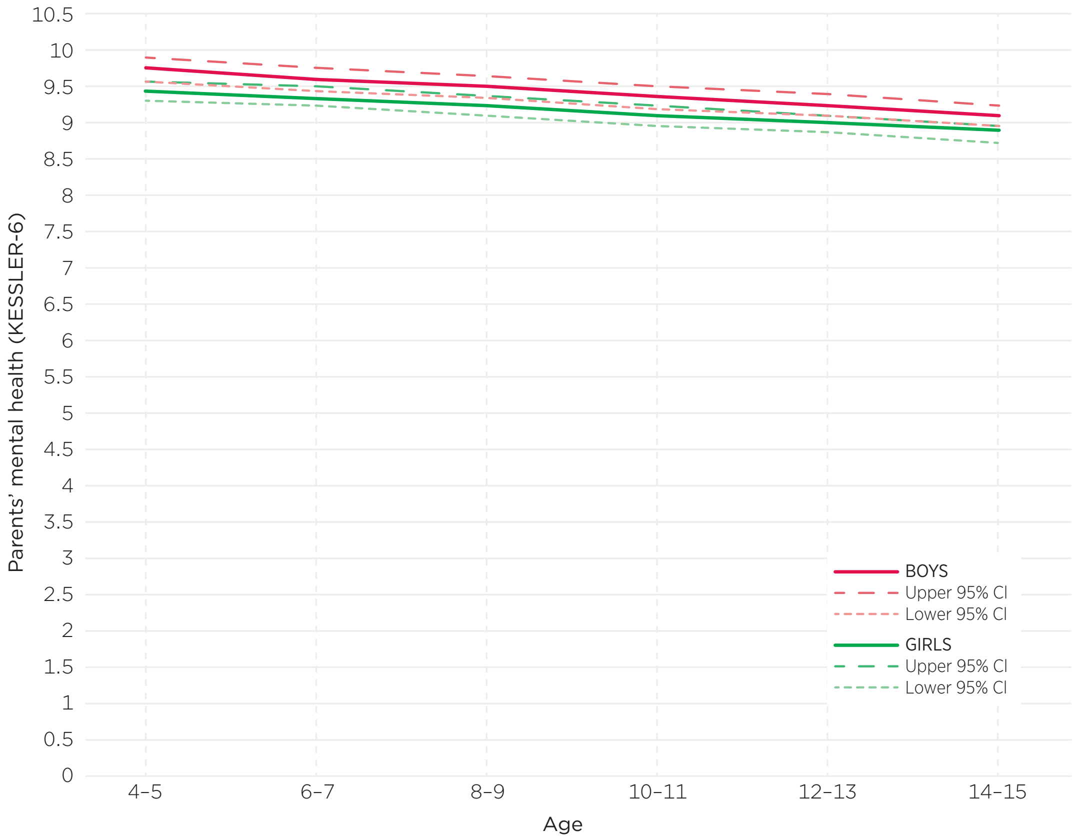
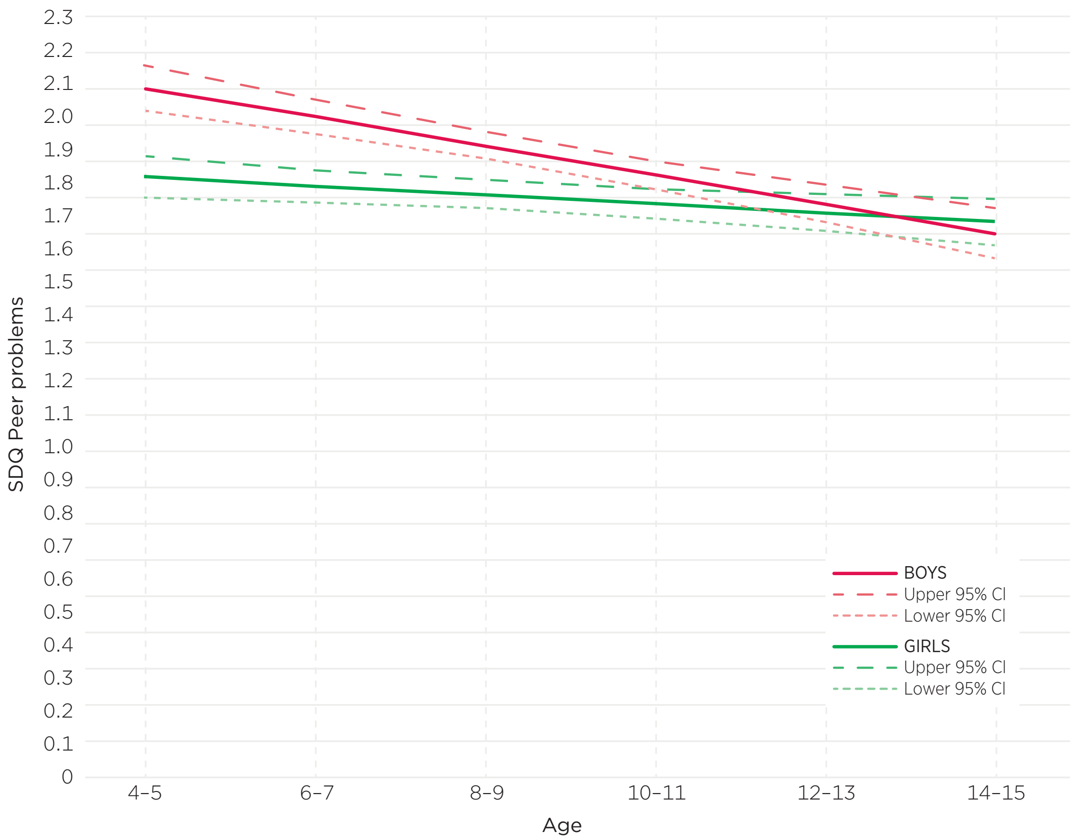


Figure continued over page >





Notes: LGCM were modelled in MPlus software, shown by the child's sex to indicate some differences over time. The slope and intercept from the trajectories refer to the degree and direction of change over time and the starting point of that outcome in early childhood, respectively. SDQ: Strengths and Difficulties Questionnaire. CI: confidence interval.

Source: LSAC K cohort, Waves 1–7, *n* = 3,368

Table S1: Logistic regression models of socio-demographic, psychosocial, school and childhood trajectory factors to predict self-injury among young people aged 14–17

	Model 1: Socio-demographic	Model 2: Psychosocial	Model 3: School factors	Model 4: Early adolescence	Model 5: Early years	Model 6: All factors
	aOR	aOR	aOR	aOR	aOR	aOR
Socio-demographic (age 14–15)						
Female sex (ref.: male)	3.01***	2.06***	3.40***	3.73***	2.68***	2.23***
Same-sex attracted	6.16***					3.47***
Language other than English at home	0.41***					0.48**
SEP (ref.: Highest 25%)						
Middle 50%	1.26*					1.06
Lowest 25%	1.44**					0.78
Remoteness (ref.: major city)						
Inner regional	0.93					1.03
Outer regional, remote or very remote	0.70**					0.79
Psychosocial (age 14–15)						
Elevated depressive symptoms		3.51***				3.06***
Peer relationships						
Low trust		0.88				0.83
Poor communication		1.18				1.16
Bullying victimisation		1.71***				1.46**
Anxiety symptoms		1.08***				1.08***
Temperament						
Persistence		0.84				1.00
Introversion		0.93				0.97
Reactivity		1.45**				1.21
Poor sleep quantity		1.03				1.01
Poor quality sleep		1.60**				1.53**

Table continued over page >

	Model 1: Socio-demographic	Model 2: Psychosocial	Model 3: School factors	Model 4: Early adolescence	Model 5: Early years	Model 6: All factors
Parent–child relationship						
Close to at least one parent		0.56**				0.52**
Low maternal responsiveness		1.34*				1.38*
Low maternal autonomy-granting		1.00				0.99
High maternal demandingness		1.06				1.09
Low paternal responsiveness		1.05				0.93
Low paternal autonomy-granting		1.47**				1.38**
High paternal demandingness		1.06				1.02
School (age 14–15)						
School co-educational status^ (ref.: co-ed)						
All Girls			0.67**			0.68
All Boys			1.10			1.06
School size^ (ref.: smallest 25%)						
Middle 50%			1.07			1.24
Largest 25%			0.84			0.93
School sector (ref.: government/public)						
Catholic			0.76*			0.73*
Independent/private			0.77*			0.68**
Ever repeated a grade			1.28			1.73*
Low school belonging			3.74***			0.95
Early adolescence (age 12–13)						
Conduct problems				1.24***		1.11*
Social functioning				0.98***		0.99
Early alcohol consumption				1.39***		1.11

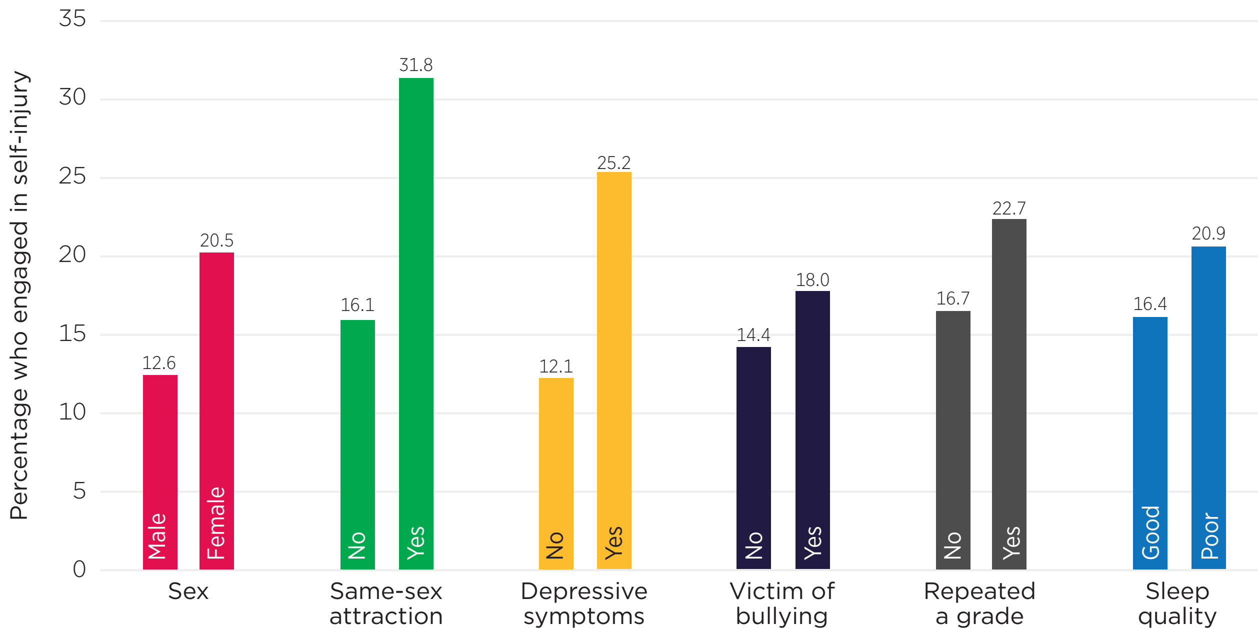
Table continued over page >

	Model 1: Socio-demographic	Model 2: Psychosocial	Model 3: School factors	Model 4: Early adolescence	Model 5: Early years	Model 6: All factors
Early years						
Slopes						
Emotional difficulties					8.62***	1.54
Peer problems					4.72***	0.95
Angry parenting					36.08***	1.94
Parent mental health					1.33	0.98
Intercepts						
Emotional difficulties					1.08	0.87
Peer problems					1.28***	0.92
Angry parenting					1.03	0.74
Parent mental health					1.09***	1.07**
Constant	0.09***	0.02***	0.08***	0.27***	0.01***	0.05***
N	**2,704**	**2,616**	**2,737**	**2,637**	**2,744**	**2,504**

Notes: *N* varies across models based on data available on outcome, predictors and linked MySchool (denoted by ^) data. Adjusted for 1,146 clusters in schools. ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.
SEP = Socio-economic position; aOR = adjusted Odds Ratio; 'ref.' = reference category

Source: LSAC, K cohort, Waves 1–7

Figure S3: Adjusted percentages of those who had engaged in self-injury between 14 and 17 years



Notes: The percentages are posterior predicted probabilities of having engaged in self-injury, after controlling for all other factors. It represents the percentages based on the last logistic regression (Model 6).

Source: LSAC K cohort, Waves 6–7, weighted. *n* = 2,504

KEY REFERENCES

Bentley, K. H., Cassiello-Robbins, C. F., Vittorio, L., Sauer-Zavala, S., & Barlow, D. H. (2015). The association between nonsuicidal self-injury and the emotional disorders: A meta-analytic review. *Clinical Psychology Review, 37*, 72-88. doi:https://doi.org/10.1016/j.cpr.2015.02.006

De Leo, D., & Heller, T. S. (2004). Who are the kids who self-harm? An Australian self-report school survey. *Medical Journal of Australia, 181*(3), 140–144.

Fox, K. R., Franklin, J. C., Ribeiro, J. D., Kleiman, E. M., Bentley, K. H., & Nock, M. K. (2015). Meta-analysis of risk factors for nonsuicidal self-injury. *Clinical Psychology Review, 42*, 156-167. doi:https://doi.org/10.1016/j.cpr.2015.09.002

King, M., Semlyen, J., Tai, S. S., Killaspy, H., Osborn, D., Popelyuk, D., & Nazareth, I. (2008). A systematic review of mental disorder, suicide, and deliberate self harm in lesbian, gay and bisexual people. *BMC Psychiatry, 8*(1), 70. doi:10.1186/1471-244X-8-70

Mars, B., Cornish, R., Heron, J., Boyd, A., Crane, C., Hawton, K. et al. (2016). Using data linkage to investigate inconsistent reporting of self-harm and questionnaire non-response. *Archives of Suicide Research, 20*(2), 113–141. doi:10.1080/13811118.2015.1033121

Muehlenkamp, J. J., Xhunga, N., & Brausch, A. M. (2019). Self-injury age of onset: A risk factor for NSSI severity and suicidal behavior. *Archives of Suicide Research, 23*(4), 551-563. doi:10.1080/13811118.2018.1486252

Victor, S. E., Hipwell, A. E., Stepp, S. D., & Scott, L. N. (2019). Parent and peer relationships as longitudinal predictors of adolescent non-suicidal self-injury onset. *Child and Adolescent Psychiatry and Mental Health, 13*(1), 1. doi:10.1186/s13034-018-0261-0

Young, R., Sweeting, H., & Ellaway, A. (2011). Do schools differ in suicide risk? The influence of school and neighbourhood on attempted suicide, suicidal ideation and self-harm among secondary school pupils. *BMC Public Health, 11*(1), 874. doi:10.1186/1471-2458-11-874

Zubrick, S. R., Hafekost, J., Johnson, S. E., Lawrence, D., Saw, S., Sawyer, M., & Buckingham, W. J. (2016). Self-harm: Prevalence estimates from the second Australian Child and Adolescent Survey of Mental Health and Wellbeing. *Australian and New Zealand Journal of Psychiatry, 50*(9), 911-921. doi:10.1177/0004867415617837