

# **School and class level variation in self-harm, suicide ideation and suicide attempts in Danish high schools**

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## **Acknowledgement**

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## **Abstract**

**Background:** Strong associations have been found between being exposed to self-harm in family and friends and own self-harm in adolescence. Therefore, self-harm and suicide behavior might tend to cluster within school and school classes. The aim of this study was to describe the prevalence, frequency and type of self-harm, suicide ideation and suicide attempts within Danish high schools and to test whether self-harm and suicide behavior cluster in schools and school classes.

**Methods:** Data came from the Danish National Youth Study 2014, a national survey. The respective study included 66,284 high school students nested in 117 schools and 3,146 school classes. The prevalence and clustering of self-harm behavior, ever and within the last year, as well as type of self-harm e.g. cutting, burning, scratching and hitting and suicide behavior suicide ideation and suicide attempts were investigated. Multi-level logistic regression was applied to quantify clustering among participants within the same class and school.

**Findings:** The prevalence of self-harm was relatively high with 12,960 (20%) reporting self-harm ever and 5,706 (8.6%) within the last year. Prevalence was higher among girls than boys. Among girls, cutting (15%) and scratching (13%) was the most common type of self-harm, whereas among boys, hitting (6.7%) was most prevalent. The degree of clustering of self-harm and suicide behavior was low, with school level intra-class correlation coefficients (ICC) ranging from 0.8-1.8 percent and school class level ICC's from 4.3-6.8 percent.

**Interpretation:** This study shows that self-harm was common, especially in girls. The degree of clustering of self-harm and suicide behavior in school and school classes was low, suggesting that

individual factors are more important risk factors for self-harm and suicide behavior than school and class level factors.

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## Introduction

Self-harm and suicide are major public health problems in adolescence and young adulthood, with high rates of self-harm and suicide being the second most common cause of death in young people worldwide (1, 2). International community-based studies show that around 5-20% of adolescents, with considerable more girls than boys, report having self-harmed (3-8), and hospital records show that the prevalence is rising (9). Young people who self-harm ~~independent of suicidal intent~~, have also been found to have higher rates of suicide attempts and are more likely to die from suicide (8, 10-13).

Several individual risk factors for self-harm, suicide ideation and suicide attempt in the transitional life-stage of adolescence have been identified, including sociodemographic factors, such as low socioeconomic status, mental health problems, impulsivity and risk taking (14-16), homo- and bisexuality (17), but also negative life events such as parental divorce, parental death (14, 16), physical or sexual abuse(16), are all important predictors (2, 15).

Given the amount of time young people spend at school, the school and the school class constitute important environmental and contextual influences on the risk of self-harm and suicide behavior. Even small effects at the contextual level may be of public health importance, given the high prevalence of self-harm.

Suicide tends to cluster (18-20) and anecdotal studies have reported ‘epidemics’ of self-harm in residential treatment settings (21). Strong associations have been found between being exposed to self-harm in family and friends and self-harm in adolescence (2, 7, 22, 23). Therefore self-harm and suicide behavior might cluster within school and school classes. One theory is that of *clustering of risk factors* where risk factors for self-harm might cluster and thereby also the risk of self-harm and suicidal behavior (2, 18). Another theory is that of *social contagion* where self-harm and suicide behavior of others provides a behavioral model for vulnerable individuals and thereby

increases their likelihood of imitating the behavior (18). However, few studies have investigated the clustering of self-harm, suicide ideation and suicide attempts in high schools, and these studies have found the clustering effect to be minimal (4, 7, 24). To our knowledge, no previous studies have assessed the impact of the school class in self-harm, suicide ideation and suicide attempts. While school level clustering may reflect clustering of local conditions, such as neighbourhood socio-economy, variation in school classes may represent factors associated with social dynamics and norms between students at the micro-level.

The aim of this study was to describe the prevalence, frequency and type of self-harm, suicide ideation and suicide attempts within Danish high schools and to investigate whether self-harm and suicide behavior cluster in schools and school classes.

## **Method**

### **The Danish National Youth Study 2014**

The data for this study came from the Danish National Youth Study 2014, a national survey of 75,853 high school and vocational school students. The Danish National Youth Study was conducted with the aim of investigating health, health behavior and mental health among young people in secondary education in Denmark. A thorough description of the study design and population characteristics of the Danish National Youth Study 2014 have been provided elsewhere (25). The respective study includes high school students. All general high schools in Denmark were invited to participate. Eighty-seven percent of all high schools in Denmark participated in the survey and 85% of high school students in participating schools participated (figure 1). After excluding two pilot schools (n= 1,661) without the question on frequency of self-harm and those with missing information on self-harm (n=2,729), the study included 66,284 participants nested in 117 schools and 3,146 school classes.

## **Measures**

### *Self-harm and suicidal behaviors*

#### **Self-harm**

Participants were asked if they “had ever deliberately hurt themselves e.g. cutting, scratching, burning, or hitting?” The possible answers were “Yes” and “No”. Participants who answered “yes” were also asked what they did e.g. cutting, scratching, burning, or hitting, with the option of more than one answer, and how frequently they had self-harmed, with the possible answers “Not within the last year”, “monthly or rarer”, “weekly” or “daily or almost daily”. Based on the frequency and type of self-harm questions, variables were coded for self-harm (all types) within the last year,

cutting within the last year, burning within the last year, scratching within the last year, and hitting within the last year.

### Suicidal ideation

Participants were asked if they “ever have considered suicide”. The possible answers were “Yes”, “No”, and “Do not want to answer”. Those who answered they did not want to answer (N= 4,564) were coded conservatively and were added to those answering “No” to this question.

### Suicide attempts

Participants, who had considered suicide, were also asked if they “ever have attempted suicide”. The possible answers were “Yes”, “No”, and “Do not want to answer”. Those who had previously answered they had not considered suicide were added to those answering “No” to this question and those who answered they did not want to answer (N=1,393) were coded as missing.

### *Other covariates*

Participants were also asked to report their sex (boy/girl), birthday and birth year (from which age in years were calculated), study program (Upper secondary leaving examination/Higher preparatory examination) school year (1<sup>st</sup> /2<sup>nd</sup> /3<sup>rd</sup>), perceived ethnicity (Danish/ Danish and other/ other ethnicity than Danish), cohabitation: “who do you live with?” (living alone/ living with both parents/ living with one parent: mother or father), parental separation within the last year: “within the last year has your parents moved apart?” (yes/no), and financial strains in the family within the last year: “within the last year have your parents had difficulties paying the bills?” (yes/no), quality of life measured by Cantril’s ladder (scores  $\geq 7$  indicating high quality of life), and homo- and bisexuality: “Are you mostly attracted to?” (same sex or both/other sex).

Almost all participants in the Danish National Youth Study 2014 have been linked to their unique Personal Identification Number (CPR) (95% of high school students). Participants were linked to the Danish Civil Registration System and the educational register (26) to identify parents and parents' highest achieved educational level. Parents' highest achieved educational level was coded into basic schooling, high school or vocational school and higher education.

### **Statistical analysis**

Statistical analyses and data processing were performed using STATA 14. Multi-level logistic regression nesting participants within schools (n=117) and school classes (n=3,146) were applied to test for dependency among participants within the same class and within the same school. Initially log-likelihood ratio test was used to test if multi-level models were better at describing data than logistic regression assuming no grouping. Interclass correlation coefficients (ICC) were estimated as:

$$\text{School level: } \frac{\sigma_1^2}{\sigma_1^2 + \sigma_2^2 + \sigma_3^2} \quad \& \quad \text{School and class level: } \frac{\sigma_1^2 + \sigma_2^2}{\sigma_1^2 + \sigma_2^2 + \sigma_3^2}$$

where  $\sigma_1^2$  is the variance at the school level,  $\sigma_2^2$  is the variance at the class level and  $\sigma_3^2$  is the variance at the student level which is approximated to 3.29 (27). To investigate age patterns of self-harm, suicide ideation, and suicide attempts between boys and girls, log-likelihood ratio test was used to test a model including the interaction between sex and age categories ( $\leq 16$ , 17, 18,  $\geq 19$ ) against a model without the interaction. To test the hypotheses of contagion or that of vulnerable people clustering together, multilevel models controlling for individual and social risk factors for self-harm and suicide behavior were performed. Individual and social risk factors included were sex, age, parental education, parental divorce, financial strains in the family, and homo- and bisexuality, which has all been associated with self-harm and suicide behavior (2, 14, 15).

Multilevel logistic regression was also estimated as odds ratios (OR) with 95% confidence intervals



(CI) between individual and social risk factors and self-harm, cutting, burning, scratching, and hitting within the last year, and suicide ideation, and suicide attempt.

## **Results**

### **Study participants' characteristics**

Table 1 shows the overall characteristics of the participants' of the National Danish Youth Study and among boys and girls. The study included 66,284 individuals, with more girls (62%) than boys and a mean age of 17.9 years. The vast majority of students attended Upper secondary school leaving examination (92%), perceived themselves as Danish (91%), had parents with higher education (61%), and lived with both parents (65%). A smaller proportion had experienced financial strains in the family (16%) or parental separation (5.3%) within the last year. Participants generally had high quality of life with a mean score of 7.1 measured by Cantril's ladder. A relatively small proportion identified themselves as homo- or bisexual (4.2%).

### **Self-harm – type and frequency, and suicide ideation and suicide attempts**

A total for 12,690 individuals (20%) reported self-harm, with twice as many girls (24%) as boys (12%) reporting self-harm ever (table 2). Approximately half of those reporting self-harm ever, had done this within the last year (8.6 %). Among girls, cutting (15%) and scratching (13%) were the most common types of self-harm, whereas among boys hitting (6.7%) was the most widely used method of self-harm. Eighteen percent girls and 12% boys said they had ever considered suicide and 3.4% girls and 1.8% boys that they had ever attempted suicide.

### **Age and sex patterns**

Figure 2 shows age patterns of self-harm ever, self-harm within the last year, type of self-harm within the last year, and suicide ideation and suicide attempts ever by sex. The odds of self-harm ever rose with increasing age among both boys and girls, with the odds being significantly higher among girls. Girls also had significantly higher odds of self-harm within the last year compared to boys in all age groups. Among boys there was no significant difference across age groups in the odds of cutting, burning, scratching or hitting within the last year, while among girls there was a

tendency to decreasing odds with increasing age. For example for cutting within the last year, girls aged  $\leq 16$  years had an OR= 6.77 (95% CI 5.46-8.73) and girls aged  $\geq 19$  years had an OR=3.42 (95% CI 2.60-4.50) compared to boys aged  $\leq 16$  years. Both among boys and girls the odds of suicide ideation and suicide attempts increased with increasing age. For example boys aged  $\geq 19$  years had 2.35 (95% CI 1.70-3.36) times higher odds of suicide attempts compared to boys aged  $\leq 16$  years.

### **Individual and social risk factors for self-harm, suicide ideation and suicide attempt**

Increasing age was associated with higher odds of self-harm ever, suicide ideation and suicide attempts, but with lower odds of self-harm within the last year. Girls had higher odds of self-harm, suicide ideation and suicide attempts compared to boys. This applied particularly to cutting and scratching within the last year; girls had an OR of 4.84 (95% CI 4.33-5.40) and 3.50 (95% CI 3.18-4.84) respectively. Having parents with lower education was also associated with higher odds of self-harm, suicide ideation and suicide attempt. For example, young people with parents with basic schooling as the highest achieved educational level had 2.04 (95% CI 1.69-2.40) times higher odds of suicide attempt compared to young people with parents with higher education. Parental separation and financial strains in the family within the last year were also associated with higher odds of self-harm. Young people who identified themselves as homo- or bisexual had higher odds for suicide ideation and suicide attempt. For example, homo- and bisexuality were associated with 5.71 (95% CI 4.80-6.79) higher odds of burning within the last year.

### **Clustering of self-harm, suicide ideation and suicide attempts in schools and school classes**

In total 5,706 individuals reported having self-harmed within the last year, which was approximately half of those reporting self-harm ever (table 4). All log likelihood ratio tests showed

multilevel models were better at describing the data than logistic regression model assuming no grouping effects. The interclass correlation coefficients (ICCs) at school level were generally low, ranging from 0.8 to 1.8 percent for all self-harm and suicide behavior outcomes. For example, at school level the ICC for self-harm within the last year was 1.1 95% CI [0.7-1.7] and for attempted suicide it was 1.8 95% CI [1.0-3.4]. The ICC scores at school and class level ranged from 4.3 percent 95% CI [3.3-5.5] for self-harm within the last year to 6.8 percent 95% CI [5.1-8.7] for cutting within the last year. Sex stratified analysis showed no large differences in ICC-scores between boys and girls. For girls, the highest school and class level variation were found in burning (8.5 percent 95% CI [4.1-17]) and cutting (6.6 percent 95% CI [4.9-8.8]) within the last year and for boys in ever attempted suicide (13 percent 95% CI [6.6-23]) and scratching (11 percent 95% CI [5.2-21]) within the last year.

To test the hypothesis of contagion or vulnerable people clustering together, multilevel analyses controlling for individual and social risk factors were performed. It was assumed that the clustering of self-harm and suicide behavior would be reduced if individual and social risk factors could explain most of the clustering. After adjustment all school level and class level ICC scores were reduced (table 5, model 2). The highest school and class level ICC was found for cutting within the last year (ICC 5.6 95% CI [3.9-7.7]).

## Discussion

The study found a high prevalence of self-harm (20% ever and 10% within the last year), suicide ideation (16%) and suicide attempts (2.8%) among Danish high school students. However, no strong evidence of clustering of self-harm, suicide ideation or suicide attempts in school and school classes was found.

Individual and social factors associated with higher odds of self-harm, suicide ideation and suicide attempts was being a girl, having parents with lower education, having experienced parental separation or financial strains in the family within the last year, and identifying as homo- or bisexual. The increasing odds of self-harm ever, suicide ideation and suicide attempts among both boys and girls in older age groups, is most likely a cumulative effect, rather than a result of increasing incidence with increasing age, as girls showed lower odds of all types of self-harm in the last year with increasing age. The results suggest that self-harm, at least, is not an increasingly common phenomenon as young people grow older in high school.

The relatively low school level ICC's for self-harm, suicide ideation and suicide attempt are in line with previous findings, which also have suggested school level variation in these phenomena of between one and two percent (24). To our knowledge we are the first to report school class level variation in self-harm, suicide ideation and suicide attempts. We consistently found school class level variation to be higher than school level variation, although also rather low this was between four and seven percent in sex, age and school program-adjusted analyses. The higher school class level variation could indicate that factors associated with social dynamics and norms between students may be more important for self-harm, suicide ideation and suicide attempts, than local conditions such as geography and neighbourhood socio-economic characteristics as represented by school location. After further adjustment for individual and social risk factors, school and class level, variation in self-harm, suicide ideation and suicide attempts decreased,

suggesting that individual level factors may be more important than contagion through shared school or school class environment.

### Strengths and limitations

The large survey sample is one of the main strengths of our study. The study included an almost complete sample of Danish high school students. Since all general high schools were invited and participation rates at all levels were high (school level: 87%, class level: 96% and individual level: 85%), the study population is assumed to be largely representative of students in Danish high schools and the risk of selection bias is considered to be low. The low non-response rate led to almost intact units (schools and classes), which is particularly advantageous for investigating clustering effects in schools and school classes.

The study also included a wide range of measures of self-harm and suicide behavior, which made it possible to give a detailed description of self-harm and suicidal behavior in Danish high-school students. The Danish National Youth Study also included several known individual and social risk factors for self-harm, suicide ideation and suicide attempts, which made it possible to show how well-known risk factors at the individual level were associated with self-harm and suicidal behavior. However, our list of risk factors was not comprehensive and many more factors are known to exist (13-15).

All self-harm and suicide behavior outcomes were self-reported and students were asked if they had ever self-harmed, thought of suicide or attempted suicide. We had no means of verifying of these reports only for the self-harm outcomes we were able to distinguish type of self-harm and if the behavior was current (within the last year) or referred to past behavior potentially before enrolling into high school. Furthermore, self-poisoning, drug or alcohol abuse, starvation or stopping medication as means of harming oneself were not included in the self-harm questions.

## Conclusion

This study showed that the school and the class accounted for a relatively small part of the variation in self-harm and suicide behavior. Our results indicate that individual factors are more important than school and class factors in contributing to these phenomena and to prevention of self-harm and suicide behavior.

## Contribution

VP and JST had the idea for the study and designed the paper. VP performed the analyses and drafted the manuscript. All authors contributed to discussing and commenting on the paper. JST is the study guarantor.

## **Research in context**

### **Evidence before this study**

Suicide tends to cluster and also self-harm might be contagious as strong associations between self-harm in adolescence and being exposed to self-harm in family and friends have been found. This study investigated whether self-harm and suicide behavior tend to cluster in schools and school classes. Only few studies have investigated the clustering of self-harm, suicide ideation and suicide attempts in schools, and these studies have found the clustering effect to be minimal. To our knowledge, no previous studies have looked at school class level variation in self-harm, suicide ideation and suicide attempts

### **Added value of this study**

This study showed that the school and the class accounted for a relatively small part of the variation in self-harm and suicide behavior. We consistently found school and class level variation to be higher than school level variation, although also rather low.

### **Implications of all the available evidence**

Our results and previous evidence indicate that individual factors are more important than school and class factors in contributing to these phenomena and to prevention of self-harm and suicide behavior.

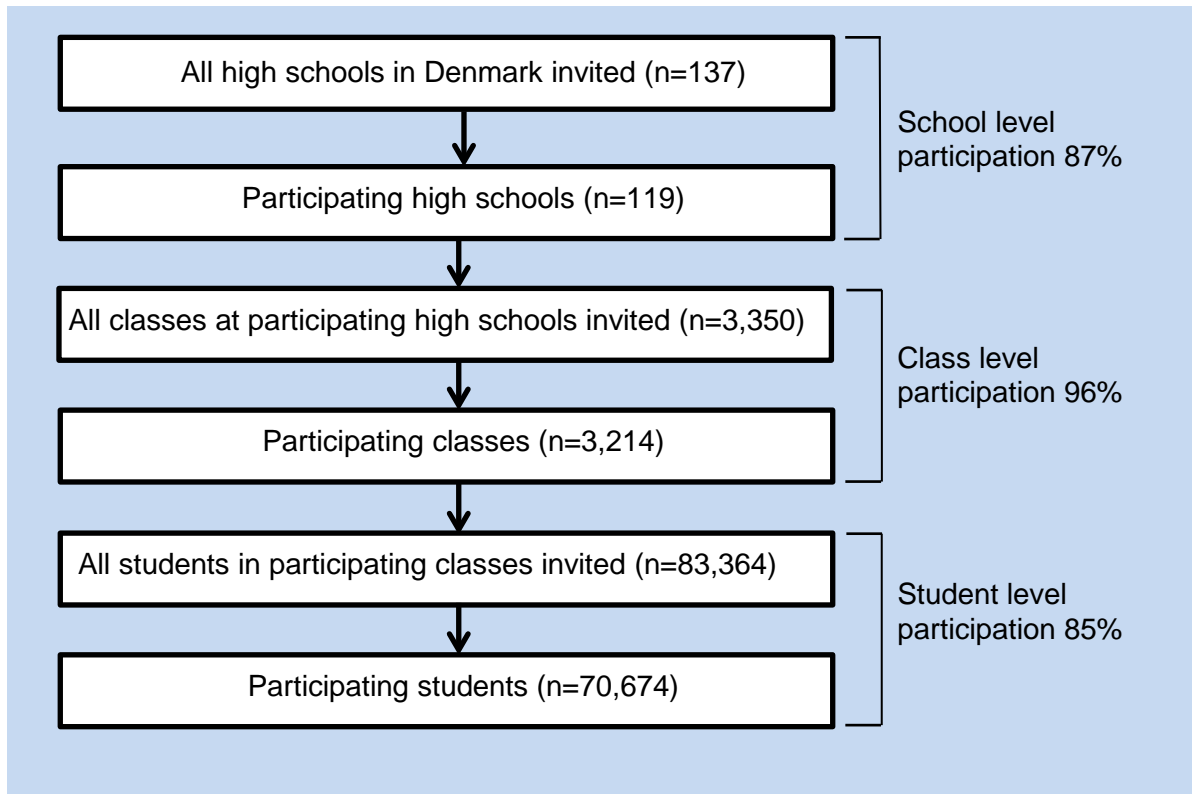


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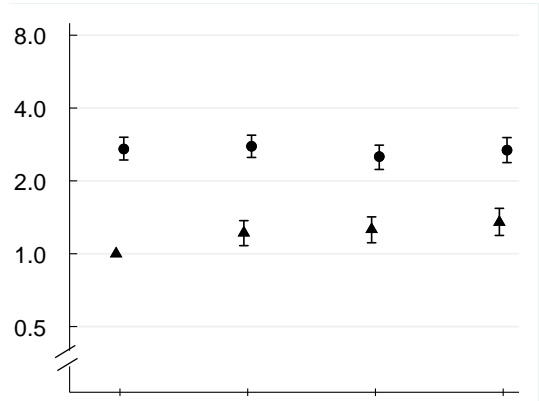
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**Figure 1: Flowchart of participation in the Danish National Youth Study 2014**

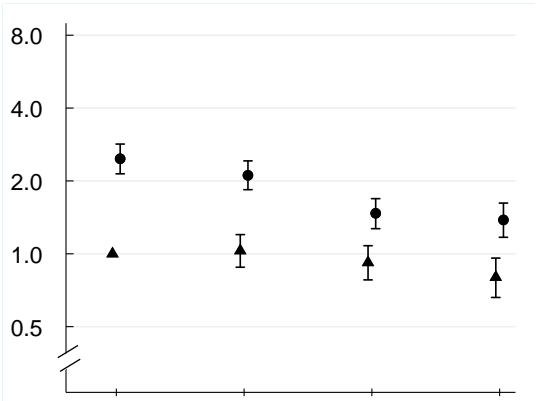


**Figure 2: Age and sex patterns of self-harm ever, type of self-harm within the last year and suicide ideation and suicide attempts.**

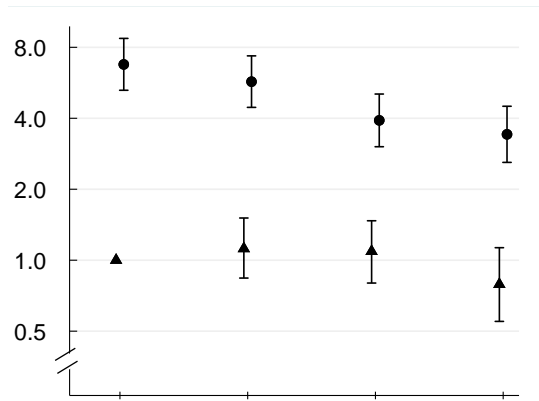
Ever self-harmed



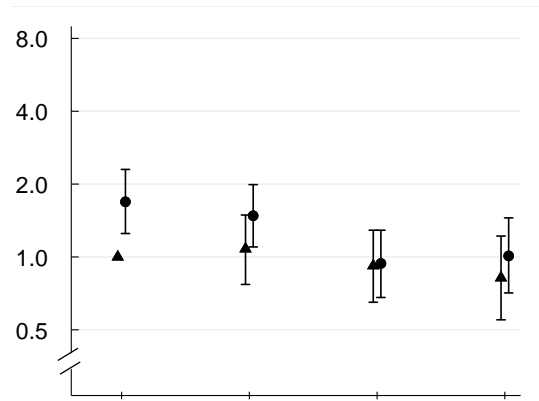
Self-harmed within the last year



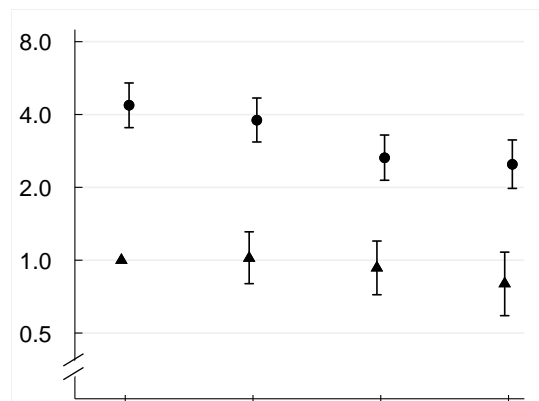
Cutting within the last year



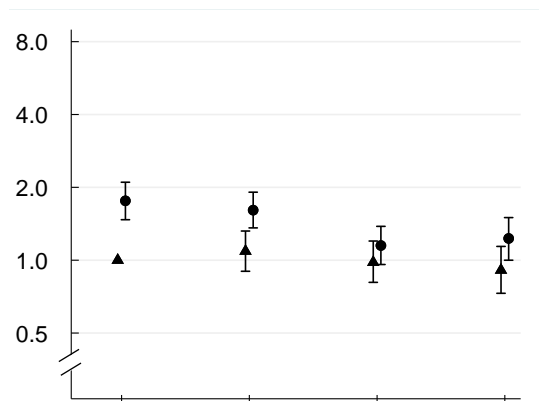
Burning within the last year



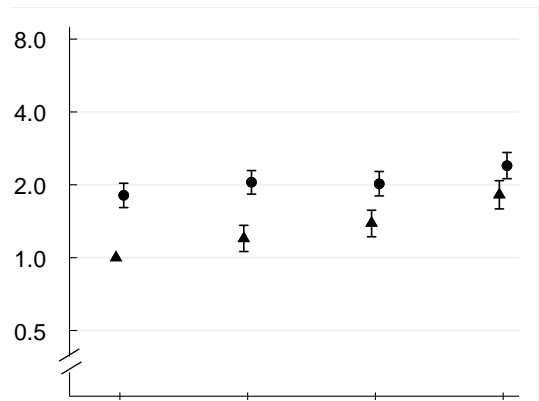
Scratching within the last year



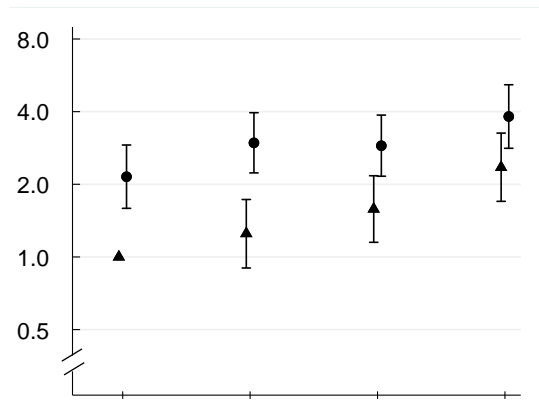
Hitting within the last year



Suicide ideation



Suicide attempt



≤16 17 18 19+  
Age group

▲ Boys ● Girls

**Table 1: Descriptive characteristics of the Danish National Youth Study 2014**

	<b>Total (%)</b> 66,284 (100)	<b>Boys (%)</b> 25,437 (38)	<b>Girls (%)</b> 40,847 (62)
<b>Age</b>			
Mean years (SD)	17.9 (1.5)	18.0 (1.8)	17.8 (1.2)
<b>Study program, N (%)</b>			
Upper secondary school leaving examination	61,183 (92)	23,409 (92)	37,774 (92)
Higher preparatory examination	5,101 (7.7)	2,028 (8.0)	3,073 (7.5)
<b>School year, N (%)</b>			
1 <sup>st</sup>	24,735 (37)	9,458 (37)	15,277 (37)
2 <sup>nd</sup>	22,016 (35)	8,916 (35)	14,100 (35)
3 <sup>rd</sup>	18,533 (28)	7,063 (28)	11,470 (28)
<b>Perceived ethnicity<sup>*</sup>, N (%)</b>			
Danish	59,197 (91)	22,311 (89)	36,886 (91)
Danish and other	4,424 (6.8)	1,829 (7.3)	2,595 (6.4)
Other than Danish	1,761 (2.3)	819 (3.3)	942 (2.3)
<b>Parental education<sup>*</sup>, N (%)</b>			
Basic schooling	2,597 (4.0)	821 (3.4)	1,776 (4.6)
High school or vocational training	21,626 (35)	7,347 (31)	14,279 (37)
Higher education	38,215 (61)	15,697 (66)	22,518 (58)
<b>Cohabitation<sup>*</sup>, N (%)</b>			
Lives with both parents	42,622 (65)	16,685 (66)	25,937 (64)
Lives with one parent	19,192 (29)	7,101 (28)	12,091 (30)
Lives alone	3,844 (5.9)	1,394 (5.5)	2,450 (6.1)
<b>Parents' separation<sup>*</sup>, N (%)</b>			
Yes	3,492 (5.3)	1,319 (5.3)	2,173 (5.3)
No	62,496 (95)	23,983 (95)	38,513 (95)
<b>Financial strains in the family<sup>a*</sup>, N (%)</b>			
Yes	10,452 (16)	3,128 (12)	7,324 (18)
No	55,590 (84)	22,183 (88)	33,407 (82)
<b>Quality of life<sup>b*</sup></b>			
Mean score (SD)	7.1 (1.7)	7.5 (1.6)	6.9 (1.7)
<b>Homo- or bisexual</b>			
Yes	2,750 (4.2)	769 (3.0)	1,981 (4.9)
No	63,423 (96)	24,628 (97)	38,795 (95)

<sup>a</sup>N does not sum up to the total study population for all variables due to missing answers on some items. <sup>a</sup>Within the previous year. <sup>b</sup>Measured by Cantril's ladder.

**Table 2: Prevalence, frequency and type of self-harm and prevalence of suicide ideation and suicide attempts among boys and girls**

	<b>Total</b> N (%)	<b>Boys</b> N (%)	<b>Girls</b> N (%)
<b>Total</b>	66,284 (100)	25,437 (100)	40,847 (100)
<b>Self-harm behavior</b>			
<b>Ever self-harmed</b>			
Yes	12,960 (20)	3,172 (12)	9,788 (24)
No	53,324 (80)	22,265 (88)	31,095 (76)
<b>Frequency of self-harm</b>			
Not within the last year	7,179 (10)	1,737 (6.4)	5,442 (13)
Monthly or rarer	4,780 (6.9)	1,221 (4.5)	3,559 (8.5)
Weekly	681 (1.0)	122 (0.5)	559 (1.3)
Daily or almost daily	245 (0.4)	68 (0.3)	177 (0.4)
<b>Type of self-harm</b>			
Cutting	7,350 (11)	926 (3.4)	6,424 (15)
Burning	1,585 (2.4)	588 (2.2)	997 (2.5)
Scratching	6,148 (9.1)	989 (3.8)	5,159 (13)
Hitting	5,447 (8.1)	1,769 (6.7)	3,678 (9.0)
<b>Suicidal behavior</b>			
<b>Ever considered suicide</b>			
Yes	10,551 (16)	3,161 (12)	7,350 (18)
No	55,750 (84)	22,276 (88)	33,474 (82)
<b>Ever attempted suicide</b>			
Yes	1,804 (2.8)	451 (1.8)	1,353 (3.4)
No	63,126 (97)	24,743 (98)	38,383 (97)

N does not sum up to the total study population for all variables due to missing answers on some items.

**Table 3: Individual and social factors associated with self-harm and suicidal behavior**

	Self-harm behavior						Suicidal behavior	
	Self-harm ever OR 95% CI	Self-harm within the last year OR 95% CI	Cutting within the last year OR 95% CI	Burning within the last year OR 95% CI	Scratching within the last year OR 95% CI	Hitting within the last year OR 95% CI	Suicide ideation OR 95% CI	Suicide attempts OR 95% CI
<b>Age</b>	1.01 (1.00-1.02)	0.88 (0.86-0.91)	0.86 (0.83-0.89)	0.99 (0.94-1.04)	0.87 (0.84-0.91)	0.95 (0.92-0.98)	1.04 (1.03-1.05)	1.06 (1.05-1.09)
<b>Sex</b>								
Boys	1 reference	1 reference	1 reference	1 reference	1 reference	1 reference	1 reference	1 reference
Girls	2.22 (2.12-2.32)	1.95 (1.83-2.08)	4.84 (4.33-5.40)	1.34 (1.17-1.55)	3.50 (3.18-3.85)	1.43 (1.32-1.55)	1.55 (1.48-1.63)	2.00 (1.79-2.23)
<b>Parental education,</b>								
Basic schooling	1.26 (1.14-1.39)	1.17 (1.02-1.34)	1.44 (1.23-1.70)	1.66 (1.25-2.21)	1.21 (1.02-1.43)	1.18 (0.99-1.41)	1.18 (1.06-1.31)	2.04 (1.69-2.47)
High school or vocational training	1.12 (1.07-1.17)	1.07 (1.00-1.14)	1.11 (1.03-1.21)	1.11 (0.96-1.28)	1.07 (0.99-1.15)	1.06 (0.98-1.15)	1.06 (1.01-1.11)	1.26 (1.14-1.40)
Higher education	1 reference	1 reference	1 reference	1 reference	1 reference	1 reference	1 reference	1 reference
<b>Parents' separation<sup>a</sup></b>								
Yes	1.35 (1.25-1.47)	1.35 (1.21-1.51)	1.32 (1.14-1.52)	1.61 (1.26-2.05)	1.43 (1.24-1.64)	1.39 (1.20-1.60)	1.36 (1.25-1.49)	1.73 (1.46-2.05)
No	1 reference	1 reference	1 reference	1 reference	1 reference	1 reference	1 reference	1 reference
<b>Financial strains in the family<sup>a</sup></b>								
Yes	2.01 (1.91-2.11)	1.95 (1.83-2.08)	2.08 (1.91-2.25)	2.32 (2.00-2.68)	2.03 (1.87-2.20)	1.92 (1.76-2.09)	2.18 (2.07-2.29)	2.60 (2.35-2.88)
No	1 reference	1 reference	1 reference	1 reference	1 reference	1 reference	1 reference	1 reference
<b>Homo- or bisexual</b>								
Yes	3.66 (3.37-3.97)	3.73 (3.40-4.10)	4.40 (3.93-4.92)	5.71 (4.80-6.79)	4.51 (4.04-5.02)	3.76 (3.35-4.22)	3.98 (3.67-4.32)	4.60 (4.01-5.27)
No	1 reference	1 reference	1 reference	1 reference	1 reference	1 reference	1 reference	1 reference

Sex, age, and study program adjusted. <sup>a</sup>Within the previous year.

**Table 4: Clustering (ICC) of self-harm and type of self-harm within the last year, suicide ideation and suicide attempts within school and school classes, in total and among boys and girls.**

	<b>Total* (N=66,284)</b>			<b>Boys (N=25,437)</b>			<b>Girls (N=40,847)</b>		
	Prevalence	School level	School and Class level	Prevalence	School level	School and Class level	Prevalence	School level	School and Class level
	N (%)	ICC (95% CI)	ICC (95% CI)	N (%)	ICC (95% CI)	ICC (95% CI)	N (%)	ICC (95% CI)	ICC (95% CI)
<b>Self-harm behavior</b>									
<b>Ever self-harmed</b>	12,960 (20)	0.8 (0.5-1.3)	4.5 (3.9-5.3)	3,172 (12)	1.1 (0.6-2.0)	5.3 (3.7-7.6)	9,788 (24)	1.0 (0.7-1.6)	5.1 (4.3-6.1)
<b>Self-harmed within the last year</b>	5,706 (8.6)	1.1 (0.7-1.7)	4.3 (3.3-5.5)	1,411 (5.6)	1.1 (0.4-2.7)	5.0 (2.5-9.9)	4,295 (11)	1.4 (0.9-2.2)	4.9 (3.7-6.5)
<b>Cutting within the last year</b>	3,217 (5.0)	1.5 (0.9-2.5)	6.8 (5.1-8.7)	378 (1.5)	2.5 (0.7-7.8)	4.4 (3.1-40)	2,839 (7.1)	1.5 (0.9-2.6)	6.6 (4.9-8.8)
<b>Burning within the last year</b>	919 (1.4)	1.6 (0.6-3.9)	6.5 (3.2-13)	294 (1.2)	2.2 (0.4-10)	10 (2.7-31)	625 (1.6)	1.4 (0.4-5.3)	8.5 (4.1-17)
<b>Scratching within the last year</b>	3,386 (5.2)	1.5 (0.9-2.4)	5.7 (4.3-7.6)	526 (2.1)	1.7 (0.4-6.3)	11 (5.2-21)	2,860 (7.2)	1.6 (0.9-2.6)	5.4 (3.8-7.5)
<b>Hitting within the last year</b>	3,063 (4.7)	1.3 (0.7-2.2)	4.8 (3.3-6.8)	939 (3.8)	1.0 (0.3-3.4)	6.3 (2.9-13)	2,124 (5.4)	1.8 (1.1-3.1)	5.1 (3.2-8.0)
<b>Self-harm behavior</b>									
<b>Ever had suicide thoughts</b>	10,489 (16)	0.9 (0.6-1.4)	5.1 (4.3-6.0)	3,149 (12)	1.2 (0.6-2.1)	8.0 (6.2-10)	7,340 (18)	0.7 (0.4-1.3)	4.9 (4.0-6.1)
<b>Ever attempted suicide</b>	1,796 (2.8)	1.8 (1.0-3.4)	5.8 (3.7-9.0)	448 (1.8)	1.7 (0.4-7.2)	13 (6.6-23)	1,348 (3.4)	1.6 (0.7-3.4)	6.1 (3.5-10)

\*Sex, age and study program adjusted



**Table 5: Clustering (ICC) of self-harm and type of self-harm within the last year, suicidal ideation and suicide attempts within schools and school classes, in sex, age and school program adjusted analysis (Model 1) and multi-adjusted analysis (Model 2)**

	<b>Model 1 (N=66,284)</b>			<b>Model 2 (N=62,050)</b>	
	Prevalence	School level	School and Class level	School level	School and Class level
	N (%)	ICC (95% CI)	ICC (95% CI)	ICC (95% CI)	ICC (95% CI)
<b>Self-harm behavior</b>					
<b>Ever self-harmed</b>	12,960 (20)	0.8 (0.5-1.3)	4.5 (3.9-5.3)	0.6 (0.3-0.9)	3.7 (3.0-4.5)
<b>Self-harmed within the last year</b>	5,706 (8.6)	1.1 (0.7-1.7)	4.3 (3.3-5.5)	0.9 (0.5-1.4)	3.2 (2.2-4.5)
<b>Cutting within the last year</b>	3,217 (5.0)	1.5 (0.9-2.5)	6.8 (5.1-8.7)	1.2 (0.7-2.2)	5.6 (3.9-7.7)
<b>Burning within the last year</b>	919 (1.4)	1.6 (0.6-3.9)	6.5 (3.2-13)	1.1 (0.3-3.9)	2.5 (0.3-17)
<b>Scratching within the last year</b>	3,386 (5.2)	1.5 (0.9-2.4)	5.7 (4.3-7.6)	1.2 (0.6-2.0)	4.1 (2.7-6.2)
<b>Hitting within the last year</b>	3,063 (4.7)	1.3 (0.7-2.2)	4.8 (3.3-6.8)	0.8 (0.4-1.7)	3.2 (1.8-5.6)
<b>Self-harm behavior</b>					
<b>Ever had suicide thoughts</b>	10,551 (16)	0.9 (0.6-1.4)	5.1 (4.3-6.0)	0.7 (0.4-1.1)	4.2 (3.5-5.1)
<b>Ever attempted suicide</b>	1,804 (2.8)	1.8 (1.0-3.4)	5.8 (3.7-9.0)	1.3 (0.6-2.9)	3.9 (1.9-7.8)

Model 1: Sex, age, and study program adjusted

Model 2: Sex, age, study program, parental education, parental separation, financial strains in the family, and homo- and bisexuality adjusted