Prevalence of suicidal thoughts and behaviors among young adults between 2000 and 2021: Results from six national representative surveys in France

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ABSTRACT

The study examines the prevalence of 12-month suicidal thoughts and lifetime suicide behaviors among young adults between 2000 and 2021. Data were drawn from the Health Barometer survey, a cross-sectional survey on a French national representative sample. The 2000, 2005, 2010, 2014, 2017, and 2021 survey waves were pooled to examine time trends in 12-month suicidal thoughts and lifetime suicidal behaviors among respondents aged 18 to 25 ($n = 13,326$), categorized based on sex and on their occupational status: students, those employed, and those who are neither in employment, education or training (NEETs). The 12-month prevalence of suicidal ideation among young adults in 2021 (6.8 %) is no different from that of 2000 (7.0 %), despite a U-shape curve in between. In contrast, the overall prevalence of lifetime suicide attempts was significantly higher in 2021 as compared to what was observed on average in the previous 21 years. In multivariate models, females and NEETs were overall at greatest risk for suicidal ideation and suicidal behaviors. Additional attention and prevention efforts are needed to reach young adults who are neither in employment, education or training.

1. Introduction

Over the past two decades, significant changes in suicide rates have been documented. For instance, in the U.S., the overall age-adjusted suicide rate increased by 30 % between 2000 (10.4 per 100,000) and 2020 (13.5 per 100,000), with a peak in 2018 (14.2 per 100,000) followed by a 5 % decline from 2018 to 2020 (Garnett et al., 2022). Among 15 to 24 year olds, a stable trend was observed from 2000 through 2007, followed by a significant increasing trend from 2007 through 2020, especially among females (Garnett et al., 2022). In contrast, suicide rates have decreased by 32.6 % in France from 2001 (19.8 per 100,000) to 2017 (13.4 per 100,000), despite the country's rates of suicide deaths remaining among the highest amid other Western European countries (Observatoire National du Suicide, 2022). Among 15 to 24 year olds, the decrease in suicide deaths has been even larger with a 43.5 % reduction from 2001 to 2017 (Observatoire National du Suicide, 2022).

The past quarter of century has seen significant societal change with the development of the Internet and mobile technologies which have deeply transformed how people spend their time and how they communicate. In addition to these profound contextual changes, the COVID-19 pandemic led to significant concerns regarding global mental health, particularly regarding the mental health of young people (Santomauro et al., 2021). Mapping national trends of significant mental health outcomes such as suicidal thoughts and behaviors (STB) in that context is therefore key to inform policy makers, clinicians and researchers. Furthermore, STB and suicide deaths are correlated yet distinct outcomes (McHugh et al., 2019) in terms of associated risk factors, and time trends in suicide deaths do not necessarily follow time trends in STB.

Data from the Youth Risk Behavior Survey in the U.S. have shown that the prevalence of suicidal ideation among adolescents decreased from 19.4 % in 1991 to 15.8 % in 2019, whereas the prevalence of suicide attempts increased from 7.3 % in 1991 to 8.9 % in 2019 (Xiao et al., 2021). Similarly, in France, data from the ESCAPAD survey, an annual national survey of 17-year olds described a significant increase in suicidal thoughts and behaviors among 17 year olds between 2011 and 2017 (Janssen et al., 2019). Moreover, when examining the mental health of young adults, it is crucial to differentiate college students from

non-college attending peers either employed or not employed as there is consistent evidence showing that the distribution of mental health problems including STB is associated with occupational status (Auerbach et al., 2016; Blanco et al., 2008; Kovess-Masfety et al., 2016; Mortier et al., 2018). Examining time trends in this population therefore requires nationally representative samples of young adults to identify differential patterns of risk. To address this issue, the present study examines data from six waves of a recurring national survey of a representative sample of adults residing in metropolitan France. The objective of the study is to examine time trends in the prevalence of STB among young adults between 2000 and 2021. A second objective of the study is to examine these trends by occupational status comparing students, those employed, and those who are neither employed nor in training and by sex.

2. Methods and participants

2.1. Survey procedure

The Health Barometer is a recurrent population-based survey conducted in a nationally representative sample of French residents and lead by Santé Publique France. For each survey wave, a computer-assisted telephone interview (CATI) was used to identify health behaviors and determinants as well as health inequities in the French general population (Richard et al., 2018). The present study combined data from six surveys waves conducted in 2000, 2005, 2010, 2014, 2017, and 2021 respectively, which asked questions about suicidal thoughts and behaviors. The surveys used on a two-stage random sampling strategy. First, household selection was performed using randomly generated phone numbers. Second, one individual was randomly selected within each household (Kish, 1949). If a household or respondent refused or could not be contacted, there was no replenishment. In addition, mobile phone numbers were randomly generated to reach individuals who may or may not have a landline. Data were collected by trained interviewers from a professional survey company. The survey response rate was 62.8 % in 2000, 58.2 % in 2005, 52.7 % in 2010, 56.6 % in 2014, 48.5 % in 2017 and 44.3 % in 2021. Consent was obtained over the phone. National surveys conducted by Santé Publique France were exempt from approval by a formal ethical review board. However, they were required to be registered with the French commission on data privacy and public liberties (Commission Nationale Informatique et Liberté). In the present study, we pooled data from all six surveys then restricted the sample to respondents who were aged 18 to 25 ($n = 13,936$). For analysis, the sample was further restricted to respondents in that age group who had no missing data on the occupational status or STB variables, yielding a final sample of $n = 13,926$ respondents for analysis.

2.2. Survey variables

2.2.1. Current occupational status

Respondents were categorized into three mutually exclusive categories based on their current occupational status: employed, students, neither employed nor in training (NEET).

2.2.2. Sociodemographic variables

Sociodemographic variables extracted from the survey included sex (male, female), region of residence (rural, urban other than Paris, Paris region), living situation (living alone, not living alone), and income. Adjusted household income based on net monthly total income and number of individuals living in household (https://data.oecd.org/hha/household-disposable-income.htm) was categorized in terciles reflecting income level from lowest (first tercile) to highest (third tercile), and undisclosed income level.

2.2.3. Suicidal thoughts and behaviors

In the 2000 and 2005 surveys, the wording was "Over the past 12 months, have you thought about suicide?" In 2010 and in all subsequent surveys, a minor change in language (the addition of a self-referring pronoun, "vous" which means "you") in the suicidal ideation question occurred, one that is barely noticeable in French and would not even be noticeable when translated into English as the word suicide is already self-referring. Specifically, respondents were asked "Over the past 12 months, have you thought about [your] suicide?".

Lifetime and 12-month attempts were assessed based on the following questions: « In your life, have you ever attempted suicide?". Those who responded that they had were then asked: "Did this attempt occur over the past twelve months? ».

2.3. Data analysis

Data from the 2000, 2005, 2010, 2014, 2017, and 2021 Health Barometers were pooled, then restricted to respondents aged 18 to 25 at the time of the survey. Descriptive analyses were performed to characterize the sample and to present the prevalence of a 12-month suicidal thoughts and lifetime attempts overall, by sex, and by occupational status using cross-tabulations and Chi square tests. Estimates with their 95 % confidence intervals (CI) are presented. Differences in prevalence was based on non-overlapping confidence intervals. Multivariable logistic regressions were then performed to identify factors including survey wave (using grand means as the reference), occupational status, and sociodemographic covariates associated with the presence of 12-month suicidal thoughts and lifetime suicide attempts. Interactions between survey wave and covariates were tested in multivariable analyses for both outcomes. Stratified analyses were carried out by sex and occupational status. The Health Barometer relied on sampling weights, followed by post-stratification to correct the sample on non-response and multiple adjustment criteria from auxiliary which was obtained from the most recent external national census data information. Sampling weights were determined using the calculation of an individual's probability of inclusion from three sources of information: (1) the probability of selecting the called telephone number, (2) the number of landlines and mobile phone numbers, and (3) the number of individuals from whom the selection was made. The probability of selecting an individual, while ignoring the probability of being surveyed multiple times, was obtained by summing for each respondent the telephone numbers, the probability of selecting the telephone number divided by the number of eligible individuals reachable on that telephone number. In addition, the Health Barometer of each survey year accounted for non-response through post-stratification. Post-stratification involved modifying the weight of each respondent in the sample to correct potential sampling errors and this using auxiliary information available in the Employment Survey conducted by the National Institute of Statistics and Economic Studies (INSEE), such as: sex crossed with age in decade intervals, size of urban unit, region of residence, level of education, and number of persons in the household. This allowed adjusting the sample to match the structure of the overall population and thereby ensures the representativeness of the sample. All analyses were performed using Stata® (version 15.0 SE).

3. Results

3.1. Sample characteristics

Sample characteristics are summarized in Table 1. Overall, 35.1 % of the 18 to 25 year olds were employed, 47.2 % were students, and the remaining 17.7 % were neither employed nor students. Age was associated with occupation whereby those employed tended to be older than students, while NEETs were equally distributed across age ranges with the exception of the youngest age stratum. Overall, 14.2 % of young adults reported living alone, and the majority resided in an urban region (62.9 %), followed by the Paris region (19.9 %). The overall sample had an equal proportion of females and males, so did the students. Those

Table 1
Sample characteristics.

	18–25 year olds			Employed			Students			Neither employed nor students			Chi2	
	n = 13,926			n = 5173			n = 6715			n = 2038				
	%	95 %CI		%	95 %CI		%	95 %CI		%	95 %CI		Chi^2	p
Overall	100	–	–	35.1	34.1	36.1	47.2	46.2	48.2	17.7	16.8	18.5	–	–
Survey wave													80.1795	<0.0001
2000	10.3	9.7	10.9	10.4	9.6	11.4	10.7	9.9	11.5	9.0	7.7	10.5		
2005	20.7	19.8	21.6	21.3	19.8	22.9	20.2	19.1	21.5	20.5	18.2	22.9		
2010	19.8	19.1	20.6	19.6	18.4	20.9	18.9	17.9	20.0	22.8	20.7	25.1		
2014	12.1	11.5	12.8	12.4	11.4	13.5	10.8	10.1	11.6	15.0	13.2	16.9		
2017	19.3	18.5	20.1	17.8	16.6	19.1	20.7	19.6	21.9	18.4	16.4	20.6		
2021	17.8	17.1	18.6	18.4	17.1	19.8	18.7	17.6	19.8	14.4	12.5	16.5		
Sex													114.2482	<0.0001
Male	50.2	49.2	51.2	55.8	54.1	57.4	48.6	47.2	50.0	43.3	40.6	46.0		
Female	49.8	48.8	50.8	44.2	42.6	45.9	51.4	50.0	52.8	56.7	54.0	59.4		
Age													3477.2764	<0.0001
18–19	24.4	23.5	25.3	6.6	5.8	7.5	41.6	40.2	43.0	13.7	12.0	15.7		
20–21	27.0	26.1	28.0	19.6	18.2	21.0	33.5	32.1	34.8	24.7	22.4	27.3		
22–23	23.8	22.9	24.6	31.0	29.4	32.6	16.9	15.9	17.9	27.9	25.6	30.3		
24–25	24.8	24.0	25.7	42.9	41.3	44.6	8.1	7.4	8.8	33.7	31.2	36.3		
Lives alone													84.6842	<0.0001
No	85.8	85.2	86.4	83.1	82.0	84.1	85.9	85.0	86.7	91.0	89.6	92.3		
Yes	14.2	13.6	14.8	16.9	15.9	18.1	14.2	13.3	15.0	9.0	7.7	10.5		
Income level													824.4115	<0.0001
1st tercile	40.9	39.9	41.8	32.8	31.3	34.5	42.7	41.4	44.1	51.7	49.0	54.5		
2nd tercile	23.1	22.3	23.9	34.3	32.8	35.9	17.5	16.5	18.6	15.7	14.0	17.5		
3rd tercile	18.6	17.8	19.3	21.9	20.6	23.3	17.8	16.8	18.9	14.0	12.3	15.9		
Undisclosed	17.5	16.7	18.4	11.0	9.7	12.3	22.0	20.8	23.2	18.6	16.2	21.2		
Region of residence													124.2246	<0.0001
Rural	17.3	16.6	18.0	20.0	18.7	21.3	15.1	14.2	16.1	17.8	15.9	19.8		
Urban	62.9	61.9	63.8	61.3	59.6	62.9	62.1	60.7	63.5	68.1	65.5	70.6		
Paris region	19.9	19.0	20.8	18.8	17.4	20.3	22.8	21.6	24.1	14.2	12.2	16.4		

Note: Percentages are weighted.

employed comprised, however more males, and NEETs comprised more females. Reported income was lowest among NEETs (51.7 %), followed by students (42.7 %) and those employed (32.8 %).

3.2. Overall prevalence of suicidal thoughts and behaviors among 18 to 25 year olds in the past two decades

The pooled prevalence of 12-month suicidal thoughts among 18- to 25-year-olds across all surveys in the past two decades was 5.0 % (Table 2) and varied significantly by occupational status, with 4.0 % among those employed, 5.4 % among students and 5.8 % among NEETs. Females reported suicidal thoughts more frequently than males (5.7 % vs 4.3 %, p < .01). Overall, 6.1 % of young adults reported a lifetime attempt (Table 3): NEETs had the highest rate (9.8 %) followed by those employed (5.7 %) and students (5.0 %). Lifetime attempts were more frequently reported by females (8.8 %) than by males (3.3 %, p < .001). Among both males and females, NEETs reported the highest rates of STB.

3.3. Prevalence of 12-month suicidal thoughts by sex and occupation status between 2000 and 2021

The prevalence of 12-month suicidal thoughts in 2021 (6.8 %) was fundamentally at the same level it was in 2000 (7.0 %) (Fig. 1). However, the prevalence of suicidal thoughts had been steadily decreasing between 2000 and 2010 when it reached 3.2 %, and remained stable in 2014 reaching 3.4 % and 2017 reaching 4.5 %. It is in 2017 (4.5 %) that the recent increase was initiated and continued in 2021 (6.8 %). Females and males showed a similar U-shaped pattern in the prevalence of suicidal thoughts. In contrast, stratifying by occupational status demonstrated a less consistent evolution of suicidal thoughts (Fig. 2). Among students, rates of suicidal thoughts went from 9.7 % in 2000 to 6.9 % in 2021 (a non-significant decrease), with a U-shape trend in between. NEETs displayed a sharp increase over the past two decades going from 2.5 % in 2000 to 9.6 % in 2021, with a peak in 2005 (8.8 %). Those

employed showed the most stable findings with non-significant differences across time ranging from 2000 (5.1 %) to 2014 (3.0 %) and its highest rate in 2021 (5.6 %).

3.4. Prevalence of lifetime suicide attempts by sex and occupation status between 2000 and 2021

The overall prevalence of lifetime suicide attempts (SA) has risen from 4.7 % (95 %CI=3.8–5.8) in 2005 to 8.7 % (95 %CI=7.4–10.2) in 2021 (Fig. 3). Males and females displayed stable differences from each other across time and diverged in 2021 when females reached 12.2 % and males stabilized at 5.3 %. Occupational status was associated with differential patterns of lifetime SA. NEETs reported on average the highest prevalence at each time point than other occupation groups and showed stable prevalences throughout survey years and reached their peak in 2021 (14.1 %). Students and those employed had similar prevalences over time except for an increase between 2017 and 2021 in students. Overall, between 2000 and 2021, rates among those employed ranged from 6.2 % to 7.9 % (non-significant), while for students, rates rose from 5.5 % to 7.8 % (non-significant) in that time frame (Fig. 4).

3.5. Multivariable analysis of factors associated with the presence of STB

Adjusting for key sociodemographic characteristics, including occupational status, multivariable models suggested a U-shaped curve in suicidal thoughts in the past 20 years, with a low point in 2010 and 2014 (Table 4). Models also showed that respondents with suicidal thoughts were more likely NEETs (AOR=1.5, 95 %CI=1.2–2.0).

Multivariable models also highlighted a recent increase in lifetime SA (AOR=1.5, 95 %CI=1.3–1.8) in 2021, and lowest risk in 2010 (AOR=0.8, 95 %CI=0.7–1.0). As compared to those employed, participants with lifetime SA were more likely NEETs (AOR=1.6, 95 %CI=1.3–2.0) and less likely students (AOR=0.7, 95 %CI=0.5–0.9). In contrast, female sex was significantly associated with both suicidal

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Table 2

Prevalence of 12-month suicidal thoughts among 18 to 25 year olds overall, by sex, and by survey wave.

		12-month suicidal thoughts																						
		Overall			Survey wave																			
		2000–2021			2000			2005			2010			2014			2017			2021				
	n	%	95% CI		%	95% CI		%	95% CI		%	95% CI		%	95% CI		%	95% CI		%	95% CI		Chi²	p
All 18–25 year olds	13,926	5.0	4.6	5.5	7.0	5.7	8.5	5.6	4.7	6.8	3.2	2.5	4.0	3.4	2.5	4.5	4.5	3.7	5.5	6.8	5.7	8.2	61.15	<0.0001
Employed	5173	4.0	3.4	4.7	5.1	3.5	7.4	3.6	2.4	5.4	3.4	2.3	4.9	3.0	1.8	4.9	3.7	2.5	5.4	5.6	4.1	7.6	11.17	.1428
Students	6715	5.4	4.8	6.1	9.7	7.6	12.4	6.0	4.7	7.7	3.1	2.2	4.3	2.8	1.7	4.6	4.8	3.7	6.3	6.9	5.4	8.9	56.94	<0.0001
NEET	2038	5.8	4.7	7.2	2.5	1.1	5.7	8.8	5.9	12.9	3.2	1.8	5.5	5.1	3.0	8.7	5.1	3.0	8.4	9.6	6.1	14.9	24.63	.0021
Chi²		15.9427			20.5963			16.127			0.1856			4.7886			1.9209			6.2871				
		p = .0048			p = .0002			p = .0051			p = .9333			p = .1919			p = .4999			p = .1329				
Females	7207	5.7	5.1	6.4	8.7	6.8	11.0	4.9	3.8	6.4	4.0	3.0	5.3	3.3	2.2	5.1	5.4	4.1	7.1	9.0	7.1	11.4	57.1	<0.0001
Employed	2453	4.9	3.9	6.0	5.5	3.5	8.6	2.8	1.6	5.0	5.0	3.1	8.0	3.1	1.4	6.7	5.9	3.6	9.3	7.0	4.5	10.8	12.5	.1092
Students	3567	6.1	5.2	7.1	12.5	9.3	16.6	5.3	3.8	7.4	3.7	2.5	5.7	1.9	0.9	3.9	5.5	3.8	7.9	9.0	6.5	12.4	55.96	<0.0001
NEET	1187	6.2	4.7	8.0	4.1	1.8	9.2	7.4	4.4	12.4	3.1	1.5	6.4	6.3	3.1	12.4	4.4	2.1	8.8	13.1	7.5	21.9	21	.0080
Chi²		4.4488 p = .2288			16.7351 p = .0009			8.5079 p = .0403			2.0958 p = .4821			8.7715 p = .0526			0.6202 p = .7987			5.2822 p = .1900				
Males	6719	4.3	3.7	4.9	5.3	3.7	7.6	6.3	4.8	8.3	2.4	1.7	3.5	3.4	2.3	5.1	3.6	2.6	4.9	4.7	3.5	6.3	30.49	.0003
Employed	2720	3.3	2.6	4.2	4.8	2.7	8.4	4.2	2.5	7.1	2.1	1.1	3.8	2.9	1.6	5.5	1.9	1.0	3.5	4.5	2.8	7.0	11.17	.1038
Students	3148	4.7	3.9	5.7	7.0	4.4	10.9	6.8	4.7	9.8	2.4	1.3	4.1	3.8	1.9	7.4	4.1	2.8	6.0	4.7	3.1	7.0	18.95	.0158
NEET	851	5.4	3.9	7.5	–	–	–	10.5	5.8	18.3	3.3	1.4	7.5	3.7	1.6	8.1	5.9	2.8	12.0	5.6	2.5	12.0	15.18	.0374
Chi²		10.15 p = .0324			7.09 p = .0722			8.83 p = .0588			1.06 p = .6541			0.40 p = .8451			7.63 p = .0522			0.33 p = .8855				

Note: Percentages are weighted.

Table 3

Prevalence of lifetime suicidal behaviors among 18 to 25 year olds overall, by sex, and by survey wave.

|		Life suicide attempt																						
		Overall			Survey wave																			
		2000–2021			2000			2005			2010			2014			2017			2021				
	n	%	95 %CI		%	95 % CI		%	95 % CI		%	95 % CI		%	95 % CI		%	95 % CI		%	95 %CI		Chi²	p
All 18–25 year olds	13,926	6.1	5.6	6.5	6.1	4.9	7.6	4.7	3.8	5.8	5.1	4.3	6.1	5.8	4.6	7.3	6.2	5.1	7.4	8.7	7.4	10.2	45.26	<0.0001
Employed	5173	5.7	5.0	6.5	6.2	4.2	8.9	3.6	2.5	5.2	4.5	3.3	6.0	6.4	4.7	8.8	6.3	4.6	8.7	7.9	6.0	10.3	21.77	.0070
Students	6715	5.0	4.4	5.6	5.5	3.9	7.6	3.9	2.8	5.4	4.3	3.3	5.7	3.7	2.3	5.9	4.4	3.3	5.9	7.8	6.2	9.8	29.38	.0009
NEET	2038	9.8	8.3	11.4	7.8	4.6	13.0	9.0	6.0	13.2	7.8	5.5	10.9	8.9	5.8	13.4	11.4	7.9	16.0	14.1	9.6	20.2	10.63	.1852
Chi²		74.68 p < .0001			1.8539 p = .5198			22.95 p = .0005			11.27 p = .0109			13.61 p = .0141			27.29 p = .0002			14.16 p = .0124				
Females	7207	8.8	8.0	9.7	8.0	6.2	10.2	7.4	5.8	9.4	7.4	6.0	9.1	8.2	6.2	10.7	9.5	7.7	11.6	12.2	10.1	14.8	27.44	.0027
Employed	2453	8.7	7.4	10.2	9.1	6.0	13.7	6.2	4.0	9.5	6.1	4.1	8.8	9.3	6.3	13.5	10.4	7.2	14.8	12.0	8.5	16.8	16.08	.0511
Students	3567	7.2	6.3	8.3	6.9	4.7	10.1	6.5	4.5	9.2	6.3	4.6	8.5	5.3	3.0	9.3	7.1	5.2	9.8	10.3	7.8	13.6	13.24	.1059
NEET	1187	12.8	10.6	15.4	8.7	4.9	14.9	11.5	7.1	18.2	11.3	7.7	16.2	12.1	7.3	19.5	14.5	9.4	21.5	19.1	12.0	28.9	9	.2938
Chi²		40.328 p < .0001			1.3311 p = .6022			8.961 p = .0788			10.21 p = .0184			9.654 p = .0616			11.37 p = .0253			9.563 p = .0550				
Males	6719	3.3	2.9	3.8	4.3	2.8	6.6	2.0	1.3	3.0	2.8	2.0	3.9	3.2	2.2	4.8	2.9	2.0	4.3	5.3	4.0	7.0	27.48	.0008
Employed	2720	3.3	2.6	4.1	4.0	2.0	7.9	1.6	0.8	3.0	3.2	2.0	5.2	3.9	2.2	6.7	2.9	1.5	5.5	4.7	3.0	7.2	9.79	.1620
Students	3148	2.6	2.0	3.3	4.1	2.2	7.5	1.1	0.4	2.6	2.4	1.3	4.1	1.8	0.8	4.1	1.6	0.8	2.9	5.1	3.4	7.6	27.27	.0006
NEET	851	5.7	4.2	7.8	6.5	2.0	18.8	5.6	2.8	11.2	2.8	1.2	6.3	4.9	2.2	10.6	7.5	3.8	14.2	8.2	4.2	15.5	5.55	.4872
Chi²		24.06 p = .0001			1.07 p = .7240			14.72 p = .0011			0.85 p = .6918			4.29 p = .1737			19.25 p = .0014			3.18 p = .3200				

Note: Percentages are weighted.
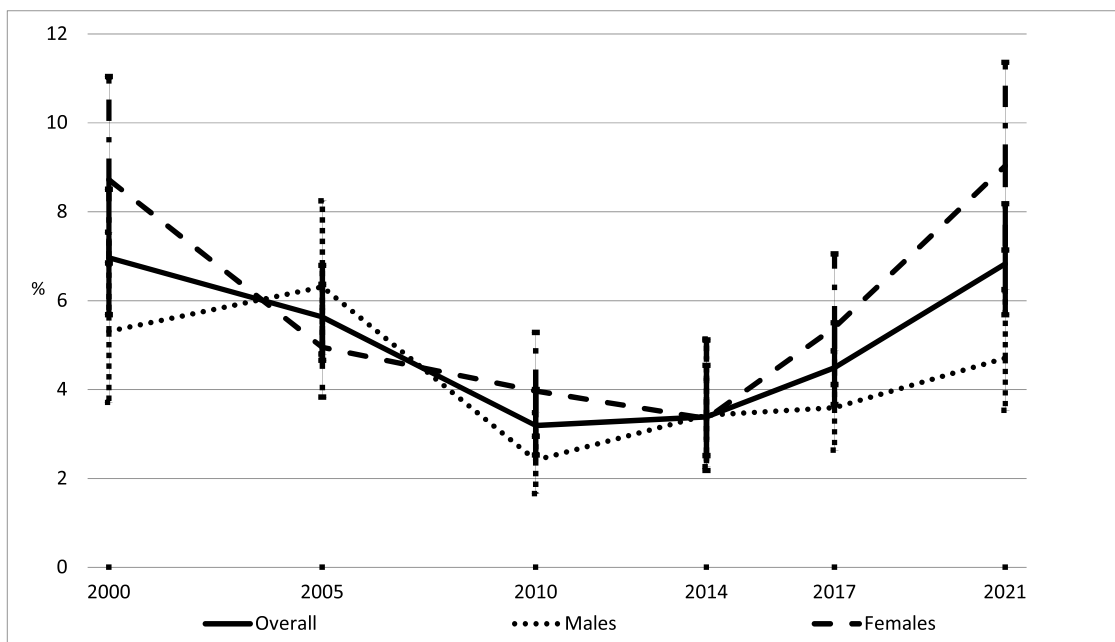
Fig. 1. Trends in the prevalence of 12-month suicidal thoughts among 18 to 25 year olds by sex.
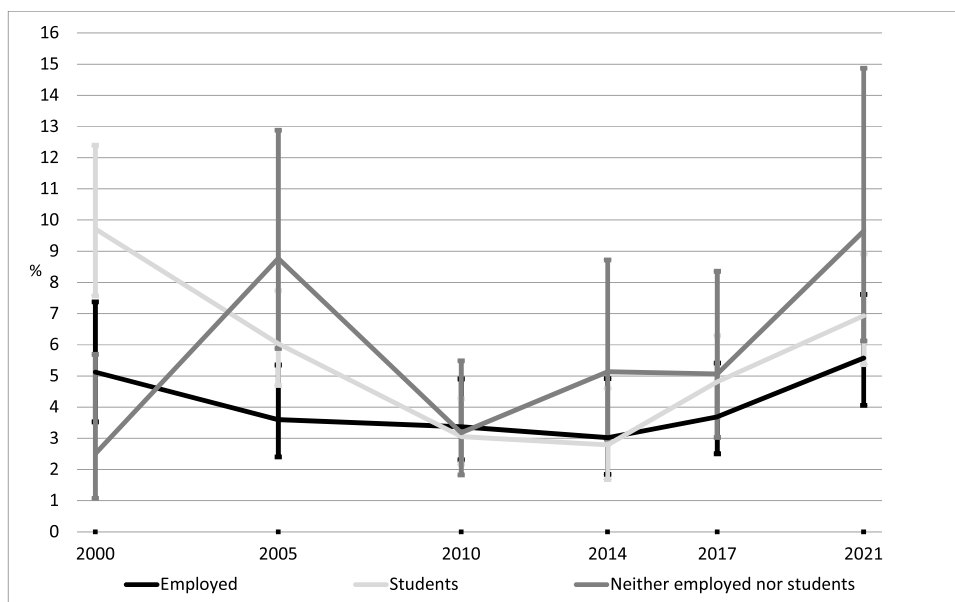

Fig. 2. Trends in the prevalence of 12-month suicidal thoughts among 18 to 25 year olds by occupational status.

thoughts (AOR=1.4, 95 %CI=1.1–1.6) and lifetime SA (AOR=2.8, 95 % CI=2.3–3.4).

When examining interactions between survey wave and each co-variate examined, two significant interactions were found, one for wave x sex ($p = .0144$), and for wave x occupational status ($p = .0153$) pre-dicting suicidal thoughts. The other interactions tested were between survey wave and age ($p = .3651$), living alone ($p = .1640$), income level ($p = .5034$), region of residence ($p = 0.8416$), were not significant. None of the interactions between survey wave and covariates in predicting suicidal behavior were significant (wave x sex= 0.2547; wave x age = 0.6461; wave x occupational status = 0.4851; wave x living alone = 0.0754; wave x income level = 0.8568; and wave x region of residence = 0.4206).

Stratified analyses by sex (Table 5) and by occupational status

(Table 6) are also presented. The findings show that differences in study waves were more prominent among females than males regarding sui-cidal thoughts, while both sexes displayed higher rates in 2021 as compared to the period mean for lifetime suicide attempts (Table 5). Similarly, survey wave was differentially associated with suicidal thoughts and behaviors when stratifying by occupational status (Table 6).

4. Discussion

Pooling data from six national surveys conducted in representative samples of the general population of French residents in the past two decades, the present study led to the following noteworthy findings. The prevalence of suicidal thoughts in 2021 is no different from that of 2000.
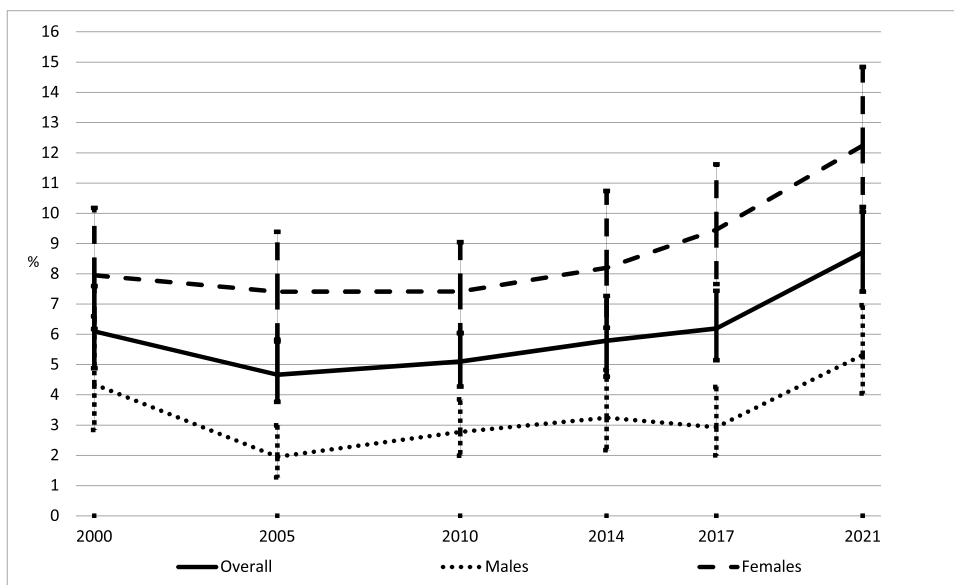
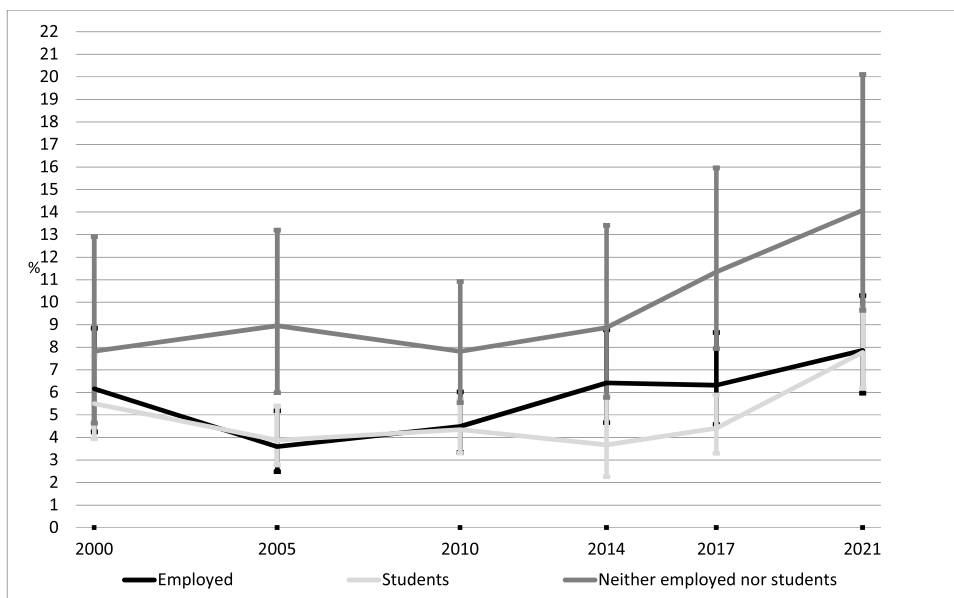**Fig. 3.** Trends in the prevalence of lifetime suicidal behaviors among 18 to 25 year olds by sex.

Fig. 4. Trends in the prevalence of lifetime suicidal behaviors among 18 to 25 year olds by occupational status.

In contrast, the prevalence of lifetime suicide attempts was highest in 2021 as compared to what was observed on average in the past 21 years. Further, the patterns of STB observed in the past two decades were significantly different by occupational status, pointing to NEETs as the young adults most at risk for STB.

In contrast with declining rates of suicide deaths in France over the past twenty years in the 15–24 age group (Observatoire National du Suicide, 2022), the national prevalence of suicidal thoughts among 18–25 year olds has followed a U-shaped curve, with the prevalence in 2000 and 2021 being the highest in the period. The present findings also show a slight but significant increase in lifetime suicide attempts among young adults between 2005 and 2021. Data from the Health Barometer has also shown that the prevalence of major depressive episodes among young adults was relatively stable between 2005 and 2017, then nearly doubled in 2021 (Husky et al., 2023).

Pre-COVID-19 pandemic increases in suicidal thoughts and behaviors argue in favor of considering the possible deleterious effects of broader societal factors such as increased screen time (Twenge et al., 2017), social media use (Cai et al., 2023; Primack et al., 2017), decrease in sleep duration (Twenge et al., 2019), or reduction in physical activity (Guthold et al., 2018). Although none of these probable contributing factors were directly assessed in the surveys that were analyzed here, we speculate that poor sleep (Pigeon et al., 2012), cyberbullying (Nesi et al., 2021), lack of physical activity (Grasdalsmoen et al., 2020; Vancampfort et al., 2018) may play a role in STB and should be included in subsequent national surveys. To date, the extent to which the COVID-19 pandemic has negatively influenced rates of STB among young adults by occupational status remains unclear. However, one meta-analysis suggests an increase in suicidal thoughts and behaviors, especially among females, young adults (Dubé et al., 2021), another suggests an increase in visits for suicide attempts within pediatric emergency departments (Madigan et al., 2023). Additional longitudinal population-based studies are needed to quantify the changes in STB associated with the COVID-19 pandemic among young adults.

Table 4

Multivariate analysis of factors associated with the presence of a 12-months suicidal thoughts and lifetime attempts.

	12-month suicidal thoughts (n = 13,868)				Life suicide attempt (n = 13,868)			
	n	%	AOR	95 %CI	n	%	AOR	95 %CI
Survey wave (ref. : grand mean)								
2000	1668	7.0	1.5***	[1.2–1.8]	1668	6.1	1,0	[0.8–1.3]
2005	2599	5.6	1.3**	[1.1–1.6]	2599	4.7	0.9	[0.7–1.1]
2010	2892	3.2	0.6***	[0.5–0.8]	2892	5.1	0.8*	[0.7–1.0]
2014	1809	3.4	0.7**	[0.5–0.9]	1807	5.8	0.9	[0.7–1.1]
2017	2611	4.5	0.9	[0.7–1.1]	2610	6.2	1,0	[0.8–1.2]
2021	2339	6.8	1.4**	[1.2–1.7]	2338	8.7	1.5***	[1.3–1.8]
Age								
18–19	3245	5.6	1.3	[1.0–1.8]	3246	6.6	1.7***	[1.2–2.2]
20–21	3361	5.0	1.1	[0.8–1.5]	3357	5.6	1.2	[0.9–1.6]
22–23	3409	4.9	1.1	[0.8–1.4]	3411	6.1	1.2	[0.9–1.5]
24–25 (ref.)	3903	4.5	- 1 -		3904	6.0	- 1 -	
Sex								
Male (ref.)	6715	4.3	- 1 -		6716	3.3	- 1 -	
Female	7203	5.7	1.4**	[1.1–1.6]	7202	8.8	2.8***	[2.3–3.4]
Status								
Employed (ref.)	5170	4.0	- 1 -		5173	5.7	- 1 -	
Students	6710	5.4	1.2	[1.0–1.6]	6710	5.0	0.7**	[0.5–0.9]
Neither employed nor students	2038	5.8	1.5**	[1.2–2.0]	2035	9.8	1.6***	[1.3–2.0]
Lives alone								
No (ref.)	10,956	4.7	- 1 -		10,957	5.9	- 1 -	
Yes	2962	7.1	1.6***	[1.3–2.1]	2961	7.2	1.3*	[1.0–1.6]
Income level								
1st tercile	5382	5.6	1.2	[0.9–1.6]	5379	7.4	1.3*	[1.0–1.7]
2nd tercile	3617	4.8	1.1	[0.9–1.5]	3617	5.8	1.2	[0.9–1.5]
3rd tercile (ref.)	2889	4.6	- 1 -		2889	4.6	- 1 -	
Undisclosed	2030	4.4	0.9	[0.6–1.2]	2033	4.7	0.9	[0.6–1.2]
Region of residence								
Rural (ref.)	2658	4.6	- 1 -		2659	5.4	- 1 -	
Urban	8848	5.1	1.0	[0.8–1.3]	8847	6.6	1.1	[0.9–1.4]
Paris region	2362	5.1	1.1	[0.8–1.4]	2362	4.8	0.9	[0.7–1.2]

Note: ***: $p < .001$; **: $p < .01$; * $p < .05$. Adjusted odds ratios (AOR) are adjusted for all variables presented in the table.

Table 5

Multivariate analysis of factors associated with the presence of a 12-months suicidal thoughts and lifetime attempts stratified by sex.

	12-month suicidal thoughts				Life suicide attempt			
	Men (n = 6698)		Women (n = 7170)		Men (n = 6699)		Women (n = 7169)	
	AOR	95 %CI	AOR	95 %CI	AOR	95 %CI	AOR	95 %CI
Survey wave (ref. : grand mean)								
2000	1.4	[1.0–1.9]	1.7***	[1.3–2.1]	1.4	[1.0–2.1]	0.9	[0.7–1.1]
2005	1.8***	[1.4–2.4]	1,0	[0.8–1.3]	0.6*	[0.4–0.9]	1,0	[0.8–1.3]
2010	0.6	[0.4–0.8]	0.7**	[0.5–0.9]	0.8	[0.6–1.2]	0.8*	[0.7–1.0]
2014	0.8	[0.5–1.2]	0.6**	[0.4–0.8]	0.9	[0.6–1.3]	0.9	[0.7–1.2]
2017	0.8	[0.6–1.1]	0.9	[0.7–1.2]	0.9	[0.6–1.2]	1.1	[0.9–1.3]
2021	1.1	[0.8–1.5]	1.7***	[1.3–2.1]	1.7**	[1.2–2.2]	1.5***	[1.2–1.8]
Age								
18–19	1.6*	[1.0–2.5]	1.1	[0.7–1.7]	1.4	[0.8–2.3]	1.8***	[1.3–2.6]
20–21	1.5	[1.0–2.2]	0.9	[0.6–1.3]	1	[0.6–1.6]	1.3	[0.9–1.8]
22–23	1.4	[0.9–2.1]	0.9	[0.7–1.4]	1	[0.6–1.5]	1.3	[1.0–1.7]
24–25 (ref.)	- 1 -		- 1 -		- 1 -		- 1 -	
Status								
Employed (ref.)	- 1 -		- 1 -		- 1 -		- 1 -	
Students	1.2	[0.9–1.7]	1.3	[0.9–1.8]	0.7	[0.4–1.1]	0.7**	[0.5–0.9]
Neither employed nor students	1.6*	[1.1–2.5]	1.4	[1.0–2.1]	1.8**	[1.2–2.7]	1.5**	[1.2–2.1]
Lives alone								
No (ref.)	- 1 -		- 1 -		- 1 -		- 1 -	
Yes	1.8***	[1.3–2.5]	1.6**	[1.2–2.1]	1.2	[0.8–1.7]	1.3*	[1.0–1.7]
Income level								
1st tercile	1.1	[0.8–1.6]	1.4	[0.9–2.0]	1.2	[0.7–1.8]	1.4*	[1.0–2.0]
2nd tercile	0.8	[0.5–1.2]	1.6*	[1.0–2.3]	0.9	[0.6–1.5]	1.3	[1.0–1.9]
3rd tercile (ref.)	- 1 -		- 1 -		- 1 -		- 1 -	
Undisclosed	0.7	[0.4–1.1]	1.1	[0.7–1.8]	0.9	[0.5–1.5]	0.9	[0.6–1.3]
Region of residence								
Rural (ref.)	- 1 -		- 1 -		- 1 -		- 1 -	
Urban	1,0	[0.7–1.4]	1,0	[0.7–1.4]	1.1	[0.7–1.6]	1.1	[0.9–1.5]
Paris region	1.2	[0.8–1.9]	1,0	[0.6–1.4]	0.9	[0.5–1.6]	0.9	[0.6–1.3]

Note: ***: $p < .001$; **: $p < .01$; * $p < .05$. Adjusted odds ratios (AOR) are adjusted for all variables presented in the table.

Table 6

Multivariate analysis of factors associated with the presence of a 12-months suicidal thoughts and lifetime attempts stratified by occupational status.

| | 12-month suicidal thoughts | | | | | | Life suicide attempt | | | | | |
| | Employed (n = 5145) | | Students (n = 6692) | | Neither employed nor students (n = 2031) | | Employed (n = 5148) | | Students (n = 6692) | | Neither employed nor students (n = 2028) | |
	AOR	95 %CI	AOR	95 %CI	AOR	95 %CI	AOR	95 %CI	AOR	95 %CI	AOR	95 %CI
Survey wave (ref.: grand mean)												
2000	1.4	[1.0–2.0]	2.0***	[1.5–2.6]	0.5	[0.2–1.0]	1.2	[0.8–1.7]	1.1	[0.8–1.6]	0.8	[0.5–1.3]
2005	1,0	[0.7–1.5]	1.4*	[1.1–1.8]	1.9**	[1.2–3.1]	0.7	[0.5–1.0]	0.9	[0.6–1.2]	1,0	[0.6–1.6]
2010	0.8	[0.6–1.2]	0.6**	[0.4–0.8]	0.6	[0.4–1.1]	0.7*	[0.5–1.0]	0.9	[0.7–1.2]	0.8	[0.6–1.1]
2014	0.7	[0.5–1.1]	0.5**	[0.3–0.8]	1,0	[0.6–1.7]	1.1	[0.8–1.5]	0.7	[0.5–1.1]	0.9	[0.6–1.4]
2017	9,0	[0.6–1.3]	0.9	[0.7–1.2]	0.9**	[0.6–1.6]	1,0	[0.7–1.4]	0.9	[0.7–1.2]	1.2	[0.8–1.7]
2021	1.4	[1.0–1.9]	1.3*	[1.0–1.8]	1.7*	[1.1–2.9]	1.4*	[1.1–1.9]	1.7***	[1.3–2.2]	1.4	[0.9–2.2]
Age												
18–19	1.1	[0.6–2.3]	1.1	[0.7–1.9]	1.8	[0.9–3.5]	2.9***	[1.7–4.8]	0.9	[0.6–1.4]	1.6	[0.9–2.8]
20–21	1.1	[0.7–1.8]	1.1	[0.7–1.8]	0.9	[0.5–1.7]	1.7**	[1.1–2.5]	0.8	[0.5–1.2]	0.8	[0.5–1.4]
22–23	1.4	[0.9–2.0]	1.1	[0.6–1.8]	0.8	[0.4–1.4]	1.6**	[1.1–2.3]	0.7	[0.4–1.2]	1	[0.6–1.6]
24–25 (ref.)	- 1 -		- 1 -		- 1 -		- 1 -		- 1 -		- 1 -	
Sex												
Male (ref.)	- 1 -		- 1 -		- 1 -		- 1 -		- 1 -		- 1 -	
Female	1.5*	[1.1–2.1]	1.3*	[1.0–1.7]	1.2	[0.8–2.0]	2.9***	[2.2–3.9]	3.0***	[2.2–4.0]	2.5***	[1.7–3.8]
Lives alone												
No (ref.)	- 1 -		- 1 -		- 1 -		- 1 -		- 1 -		- 1 -	
Yes	1.8**	[1.2–2.6]	1.3	[1.0–1.8]	2.0*	[1.1–3.7]	1.5*	[1.1–2.1]	0.9	[0.7–1.3]	1.7*	[1.0–2.9]
Income level												
1st tercile	1.3	[0.8–2.2]	1.4	[1.0–2.0]	1.1	[0.5–2.1]	1.9**	[1.2–2.9]	1.2	[0.8–1.8]	1.1	[0.6–1.9]
2nd tercile	1.4	[0.8–2.3]	1.1	[0.7–1.7]	0.9	[0.5–1.9]	1.3	[0.9–2.1]	1.2	[0.8–1.9]	0.9	[0.5–1.7]
3rd tercile (ref.)	- 1 -		- 1 -		- 1 -		- 1 -		- 1 -		- 1 -	
Undisclosed	1.1	[0.5–2.2]	0.9	[0.6–1.3]	0.8	[0.3–1.9]	0.6	[0.3–1.3]	0.9	[0.5–1.4]	0.9	[0.4–1.8]
Region of residence												
Rural (ref.)	- 1 -		- 1 -		- 1 -		- 1 -		- 1 -		- 1 -	
Urban	1	[0.6–1.5]	1.1	[0.8–1.5]	0.9	[0.5–1.7]	1.2	[0.8–1.7]	1,0	[0.7–1.4]	1.3	[0.8–2.1]
Paris region	1.2	[0.7–2.0]	1.3	[0.9–2.0]	0.4	[0.1–1.1]	1.2	[0.7–1.9]	0.8	[0.5–1.2]	0.7	[0.3–1.5]

Note: ***: $p < .001$; **: $p < .01$; *: $p < .05$. Adjusted odds ratios (AOR) are adjusted for all variables presented in the table.

Differences in the patterns of STB were observed among males and females. Regarding suicidal thoughts, rates were similar between males and females in 2014 then increased sharply among females, with a quantifiably smaller increase among males. In contrast, the male to female ratio in suicidal behaviors has remained stable over the past 20 years, placing females at significantly greater risk of suicidal behaviors. A reduction in the male to female ratio in suicide deaths has been recently documented and shown to be particularly pronounced in younger individuals (Ruch et al., 2019), again pointing to the probable influence of societal factors including differential experiences with social media for male and female youth (Luby and Kertz, 2019). Observed sex differences are also likely to result from differential exposure to stressors, including exposure to discrimination and harassment (Steel-Fisher et al., 2019), within-job pay inequality (Penner et al., 2023), cyberbullying (Kim et al., 2018), sexual and domestic violence (Benjet et al., 2016; Hauw et al., 2020). Additional studies are needed to identify specific modifiable factors associated with elevated risk among young females.

Disparities regarding occupational status were observed, with NEETs consistently at highest risk of STB. These findings are consistent with studies from nationally representative surveys comparing the mental health of college students to that of their non-college attending peers both internationally and in France (Auerbach et al., 2016; Blanco et al., 2008; Gariépy and Iyer, 2019; Kovess-Masfety et al., 2016; Mortier et al., 2018). Data from the Health Barometer and examining the prevalence of 12-month major depressive episodes among young adults between 2005 and 2021 also showed that the prevalence of depression was the highest among NEETs (18.5 %) followed by students (14.3 %) and those employed (11.0 %) (Husky et al., 2023). NEETs likely comprise young adults who have either dropped out of higher education or failed to maintain employment due to mental health reasons or comorbid medical problems, as there is an increased risk of up to 40 % of being NEET with the presence of disability in young adults (Mascherini et al., 2012). Mental health problems are known to contribute to poor academic

achievement and to increased risk of dropping out of college (Bruffaerts et al., 2018), and contribute to lower odds of employment (Mojtabai et al., 2015). Conversely, poor academic performance contributes to mental health problems (Gustafsson et al., 2010), so does unemployment, or insecure employment (Hannerz et al., 2022). Although NEETs are harder to reach than college students, it may be particularly relevant to identify means through which they could be informed of available mental health resources in their community, and for whom access to appropriate care could be facilitated. A recent review underlined the need for prevention and early intervention of mental ill-health and the importance of integrated vocational programs within mental healthcare services for youth (Gariépy et al., 2022).

The present findings should be interpreted considering several limitations. Suicidal thoughts and behaviors severity, age of onset, number of attempts and intent to die were not assessed at every survey. Second, suicidal thoughts was only assessed in the past 12 months, therefore we could not differentiate incident from persistent cases. Due to the manner in which suicide attempts were assessed, it was not possible to know whether 12-months attempts occurred among those with or those without a history of prior attempts. That said, STB were assessed in the same way each survey with only one minute change regarding suicidal thoughts since 2010, which is highly unlikely to have been understood differently. Lastly, while the national Health Barometer surveys have used the same sampling strategy to identify eligible participants in all survey waves included in the present analyses, steady decreases in survey responses rates were observed from 2000 (RR=62.8 %) to 2021 (RR=44.3 %). Such decreases in survey response rates have been observed in other large epidemiologic surveys in high income countries. The potential for selection bias however was limited as the probability weights of participation considered in the analyses were also calculated based on post-stratification for non-response and auxiliary information including sex by age in decade intervals, size of urban unit, region of residence, level of education, and number of persons in household. Despite these limitations, the present data represent the soundest

estimates available in the country regarding the mental health status of young adults.

In conclusion, even though suicidal thoughts and behaviors in 2021 have not drastically increased when compared to 2000, a significant increase has occurred over the past 10 years among young adults and deserves attention. In addition, these increasing trends are particularly worrisome among young females and among NEETs. Taken together, it is important for clinicians, researchers, and policy makers to interpret the recent increases in suicidal thoughts and behaviors in light of longer time frames of reference so as not to neglect non-pandemic-related modifiable factors potentially at play. Future studies should focus on longitudinal cohorts of children, adolescents and young adults to better elucidate the temporal relationships between mental health, academic achievement, employment and being NEET in females and males. Lastly, it remains possible that the recent pandemic may have both increased distress and facilitated disclosure or reporting of said distress. Future national surveys will help in examining these issues.

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CRediT authorship contribution statement

Mathilde M. Husky: Conceptualization, Writing – original draft, Writing – review & editing. **Christophe Léon:** Formal analysis, Writing – review & editing. **Enguerrand du Roscoät:** Methodology, Writing – review & editing. **Helen-Maria Vasiliadis:** Conceptualization, Writing – review & editing.

Declaration of competing interest

The authors declare no conflict of interest.

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