

The impact of economic recessions on the use of illicit drugs

Findings from a scoping literature review

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About this report

This report explores the intricate relationship between economic recessions and illicit drug use through an in-depth scoping review of the literature. Unravelling complexities among demographics and drug types, this analysis sheds light on potential impacts of economic downturns, suggesting that young and already socioeconomically vulnerable population groups appear to be most affected during economic downturns. Among young adults, several studies indicate that the use of cannabis may increase during economic downturns. In addition, there are indications that transitioning to more problematic patterns of drug use, such as from smoking or snorting to injecting, may also increase during times of economic turmoil.

About the EUDA

The European Union Drugs Agency (EUDA) is the leading authority on illicit drugs in the European Union. Formerly known as the European Monitoring Centre for Drugs and Drug Addiction, the Lisbon-based agency contributes to EU preparedness on drugs. Its work is organised around four service categories: anticipate, alert, respond and learn. The agency anticipates future drug-related challenges and their consequences; alerts in real-time on new drug risks and threats to health and security; helps the European Union and its Member States strengthen their responses to the drug phenomenon; and facilitates EU-wide knowledge exchange and learning for evidence-based policies and interventions.



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Introduction

The impact of economic downturns on public health and more specifically on the use of alcohol and tobacco has received significant attention in recent years. Studies have indicated that economic recessions are significantly associated with poor mental well-being and increased rates of common mental disorders (Frasquilho et al., 2016b). There is also a growing body of evidence to suggest that economic stressors may be associated with increases in alcohol consumption, which may be a coping mechanism to relieve stress (de Goeij et al., 2015; Dom et al., 2016; Henkel, 2011; Pacula, 2011; Rehm et al., 2020; Schmidt et al., 2021).

By comparison, however, our understanding of and insight into the impact of recessions on the use of illicit drugs remains under-researched and poorly understood. This is an issue with increasing relevance bearing in mind the global economic outlook has been particularly volatile in recent years. Recent global events including the COVID-19 pandemic and Russia's invasion of Ukraine have had negative impacts on socioeconomic indicators, and caused volatility in the global economy and a steep rise in inflation.

The existing literature on recessions and drug use highlights a relationship that is multifaceted and cannot be easily generalised. Studies indicate that economic recessions have the potential to impact on patterns of drug use through different channels, with a wide range of implications (Nagelhout et al., 2017). This impact may vary according to factors such as: the characteristics of the economic downturn and the underlying state of the economy; the types of drugs used and patterns of use; demographic characteristics (such as age and gender); and policy responses to the economic downturn and to drug use. In this context, the use of different variables to measure recessions (see the box [Indicators of economic activity: a brief overview of key terms](#)) and drug use may limit the comparability of studies. This raises the need for further research using comparable indicators. It also raises the need for more in-depth empirical analysis by demographic characteristics and patterns of use.

This report aims to contribute to this topic through a scoping review of the scientific literature. With a focus on studies up until 2020, the objective is also to provide useful insights that might help understand possible consequences of the more recent economic downturn, associated both with the COVID-19 pandemic and Russia's invasion of Ukraine, on patterns of illicit drug consumption. As a scoping review of the literature, preliminary findings are presented, potential gaps in current research are highlighted, and questions are raised for future work in this area.

The report begins with a discussion of the potential mechanisms that mediate the complex relationship between recessions and drug use. Subsequently, the research approach and methodology are presented, before a detailed analysis by age group and drug type is conducted. It concludes with a discussion based on the main findings emerging from the scoping review, viewed in light of the current COVID-19 recession and its possible consequences (see also the box [The COVID-19 recession: comparisons with the 2008 recession](#)), and raises questions for future research.

Indicators of economic activity: a brief overview of key terms

Economic changes, including economic recessions, can be measured through several different indicators. Some of these indicators, in particular unemployment data, are used in many of the studies surveyed in this report to estimate the impact of recessions on drug use (further details and limitations are provided in Search results).

The most common indicator to measure economic activity is gross domestic product (GDP). GDP is a measure of the overall size of a country's economy over a certain period of time. Annual GDP measures the gross value added by all residents engaged in the production of goods and services, plus taxes and minus subsidies on products, over a one-year period. 'Real GDP' measures economic activity after discounting for inflation.

Inflation is an increase in the general price level of goods and services. The inflation rate is the percentage change in the price index for such goods and services over a given time period: usually calculated on a year-on-year or annual basis. In contrast, deflation is a decrease in this general price level. A deflationary spiral is a downward price reaction following, for instance, an economic crisis.

There are several definitions of economic recessions, including how to measure them. As defined by the European Commission, an economic recession occurs when real GDP declines for two consecutive quarters, as compared to the previous quarter ([European Commission, 2021](#)). In the United States (US), the National Bureau of Economic Research (NBER) defines economic recessions in more general terms. They consider a recession to be a significant decline in economic activity spread across the economy, lasting more than a few months and normally visible in real GDP, real income, employment, industrial production and wholesale-retail sales.

Unemployment is also a frequently used indicator to assess economic activity. Eurostat defines the [unemployment rate](#) as the proportion of persons without work during a year and aged 15 to 74 years old. The rate of youth unemployment is the percentage of the unemployed in the age group 15 to 24 years old compared to the total labour force (both employed and unemployed) in that age group. It should be noted that a large share of people in this age group is outside the labour market (since many are in full-time studies and are thus not available for work), which should be taken into consideration when interpreting data.

The literature shows that unemployment growth is strongly correlated with changes in economic growth ⁽¹⁾. When overall GDP decreases, or its growth decelerates, unemployment tends to increase markedly ([Junankar, 2011](#); [Pissarides, 2013](#); [Velev, 2018](#)). Unemployment data are frequently used as a proxy for economic recessions for this reason, but also because of data availability and timeliness ⁽²⁾.

Source: Based upon [Eurostat \(2023\)](#).

- ⁽¹⁾ Changes in other areas may also impact on unemployment rates. For instance, changes in the labour market structure, which may, for example, be caused by migration policies or public interventions, may impact unemployment.
- ⁽²⁾ Among several factors that have led to the use of unemployment as a proxy for economic recessions is the relative timeliness in the publication of unemployment data compared to GDP data. In addition, time series for unemployment data are often more complete than time series for GDP data. For example, while unemployment data are often available for distinct age groups, as in the case of youth unemployment rates, GDP data are not available by age group. Another example of data completeness is that unemployment data are often published with high frequency (monthly unemployment rates, for instance), which is often not the case for GDP data.

Economic recessions and drug use: a complex relationship

The relationship between drug consumption and economic activity is by no means straightforward. Broadly speaking, the use of illicit drugs can be described as 'procyclical' or 'countercyclical' to economic activity. The relationship is procyclical if drug use decreases during economic downturns

(recessions) and increases during economic upturns (that is, if drug use follows the general trend of economic activity). On the other hand, the relationship is countercyclical if drug use increases during economic downturns and decreases during economic upturns.

Whether the results are procyclical or countercyclical, recessions have been demonstrated to impact on drug use through different mechanisms, with potentially different outcomes depending on the drug used, patterns of use or demographic characteristics (such as age or gender) (Nagelhout et al., 2017). Some of these potential mechanisms, related to income changes, socioeconomic stress, and supply-side changes, among others, are described in more detail below.

The COVID-19 recession: comparisons with the 2008 recession

While the COVID-19 economic recession has certain unique features, many are similar to the 2008 recession (including significant increases in unemployment, particularly among youth, and disproportionate negative impacts on lower income groups), and findings from earlier work may therefore be helpful to understand its potential impact ⁽¹⁾.

Roughly 12 years after the 2008 Great Recession, in the second quarter of 2020, the COVID-19 pandemic inflicted damage to the European economy unprecedented during peacetime (Cardani et al., 2021). During its peak, the GDP decrease was indeed higher than at the peak of the 2008 Great Recession (6.0 % in 2020, compared to 4.3 % in 2009).

This economic fallout from the COVID-19 pandemic was caused by several converging factors. These include the supply constraints to global trade caused by lockdowns and social distancing, the collapse of consumer spending across several industries due to travel restrictions, liquidity squeezes and extreme volatility and tensions in financial markets.

In response, governments introduced exceptional fiscal stabilisation packages and short-time work arrangements. While these interventions partially protected people against unemployment, the economic recovery from the COVID-19 recession has remained weak. In addition, while Europe was on the verge of emerging from the recession in early 2022, Russia's war on Ukraine introduced further volatility to economic recovery.

A unique aspect of the COVID-19 recession has been the negative impact on mental health directly related to the linked global public health crisis and associated lockdown measures. This includes negative mental health effects on those contracting COVID-19, including their family members, and trauma caused by the loss of life, but also the physical distancing and stay-at-home orders enacted by governments to mitigate the spread of the virus. Preliminary studies suggest that symptoms of anxiety and depressive disorders have increased considerably during the pandemic, disproportionately affecting young populations (Czeisler et al., 2020; Lancet Psychiatry, 2021; Pierce et al., 2020). These issues have likely been compounded by the COVID-19 recession, as economic downturns also impact negatively on mental health (Frasquilho et al., 2016a).

While Europe was on the verge of emerging from the COVID-19 recession in early 2022, with economic activity projected to increase at a relatively strong pace (European Central Bank, 2022), Russia's invasion of Ukraine in February 2022 caused renewed volatility in the global economy.

⁽¹⁾ The current scoping review includes articles published between January 2008 and December 2020. No articles were included in this review that looked at the specific impact of the COVID-19 economic recession on drug use.

For some people, participating in the legal economy during times of recession may become increasingly difficult as unemployment tends to rise, alternative jobs are harder to secure and wages tend to decrease. Simultaneously, public policies that support unemployed or socially excluded individuals are often affected by austerity (1) measures. At such times, certain subgroups of the general population, in particular, groups of socially excluded individuals such as people with problematic patterns of drug use, are more likely to have less available income. For some, this reduction in available income may lead to a decrease in drug use. This procyclical reaction of drug use to recessions is known as the 'income mechanism' (Dom et al., 2016).

However, some studies suggest that in periods of economic hardship, and when opportunities in the formal economy are reduced, some individuals may be tempted to earn money through illegal means. This could lead to more people being willing to produce, traffic or sell illicit drugs. In turn, an increase in the number of people involved in the drug market may lead to drugs becoming more readily available. This potentially countercyclical mechanism is known as the 'supply side mechanism'. For example, Arkes (2011) found that drug selling can become attractive during recessions, especially among teenagers, and that sellers may use it as a source of income to purchase drugs for themselves. Since more people are offering drugs, some of the drugs sold may become cheaper or of higher potency or purity (Costa Storti and Grauwe, 2009). Reduced prices of drugs (particularly when adjusted to potency or purity), compared with competing goods such as alcohol, could also lead to an increase in drug use (Bretteville-Jensen, 2011) (see also the box [Impact of recessions on alcohol use](#)).

Impact of recessions on alcohol use

Compared to the use of illicit drugs, research on the relationship between economic downturns and alcohol use is relatively extensive (de Goeij et al., 2015; Dom et al., 2016; Henkel, 2011; Pacula, 2011; Rehm et al., 2020; Schmidt et al., 2021). Some of the conclusions raised by these studies are worth highlighting, as they may provide useful insights to the relationship between recessions and drug use.

First, the mechanisms of transmission between the economic cycle and alcohol use are similar to those for illicit drug consumption. Economic stressors appear to increase alcohol prevalence, especially related to binge drinking. However, a fall in income may also lead to less alcohol consumption. This shows conflicting outcomes in studies in the alcohol field as well. According to Pacula (2011), such differences can, at least partly, be explained due to selection bias introduced with the set of countries chosen, methods employed and the inclusion or exclusion of particularly relevant control variables.

Second, the impact of economic activity on alcohol use appears to depend on the characteristics of the alcohol consumer. de Goeij et al. (2015) conducted a realist systematic review of the literature, which found that drinking as a coping mechanism to relieve distress was observed predominantly among men and primarily increased harmful drinking, including alcohol dependence, binge drinking, hazardous drinking and intoxication. Meanwhile, occasional and non-problematic alcohol use appeared to decline as income decreased.

While findings from the alcohol literature are not directly transferable to the use of drugs, there is evidence to suggest that in periods of economic downturns, particularly harmful types of substance use tend to increase.

(1) During economic recessions it is common that governments receive less tax revenue, due to a reduction in economic activity. The fall in government revenue, below expenditures, leads to public deficits. In these situations, governments frequently enter into periods of fiscal austerity, characterised by the implementation of policies aiming to reduce deficits through spending cuts, tax increases or a combination of both.

The psychological stress caused by periods of economic hardship has also been linked with a higher risk of initiating drug use and developing a substance use disorder (Lijffijt et al., 2014). Some individuals also report using drugs to deal with mental health issues caused or exacerbated by economic hardship (Frasquilho et al., 2016a). This countercyclical reaction of drug use to recessions is referred to as the 'economic-stress mechanism'. In addition, some individuals facing unemployment during these periods may be prone to spend more of their free time using drugs. This is known as the 'opportunity-cost mechanism' ⁽²⁾, as the 'cost' of spending time on activities other than work, such as using drugs, may decline.

Other mechanisms may result in relative price changes, and this has been associated with the substitution of the types of substances used. For example, during periods of economic hardship, some groups of people may substitute the use of more expensive drugs with the use of cheaper ones, or adopt riskier patterns of drug use (for example, modes of use that require smaller quantities of drugs, such as injecting compared with smoking or snorting). This is known as the 'substitution mechanism' (Lakhdar and Bastianic, 2011).

A final consideration is how public policies may moderate the impact of economic recessions on drug use and responses to it. For instance, after the 2008 Great Recession ⁽³⁾, many European countries introduced severe austerity programmes to reduce public spending. Due to a reduction in state funding, drug treatment services as well as health and social reintegration programmes in many European countries were greatly affected (EMCDDA, 2014).

So, in summary, it can be seen that economic recessions may trigger different mechanisms which may impact on drug use behaviours and patterns of use, some of which may increase the likelihood of consumption and others which may contribute to limiting its occurrence.

Recognising this, empirical analysis is required to better understand how these different mechanisms may operate in the real world, including on different groups of people who use drugs and across different substances.

Methodological approach

This scoping literature review draws on the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines. Details in relation to the limitations of the approach can be found in subsequent sections.

Search strategy

The articles considered for inclusion were original scientific studies and systematic reviews published in English between January 2008 and December 2020.

The databases used to run the searches were health/medicine (Medline, PubMed, Scielo, PsycINFO) and economic (Econlit) databases. Additional searches were made in Google Scholar and within the

⁽²⁾ However, Ruhm (2000) points to how a contraction of the economy can have a contrasting effect: as individuals who have lost their jobs may also be tempted to make time-intensive health investments to improve their well-being, potentially leading to a reduction of drug use. The dominant effect requires further empirical analysis.

⁽³⁾ The global economic crisis that occurred after a series of triggering events in the financial system in late-2007 is sometimes referred to as the 'Great Recession' European Parliamentary Research Service (2019).

reference lists of screened articles. Additionally, peer-reviewed studies and empirical analysis published by major international institutions were searched ⁽⁴⁾.

This strategy was developed based on preliminary reviews of the literature and the expertise of the review team. Three authors independently proposed a list of keywords. [Table 1](#) presents the list of keywords agreed upon. Study titles that contained at least one keyword from each category (related to ‘economy’ and ‘illicit drugs’) were considered for inclusion.

TABLE 1
The keywords used in the search

Category	Keywords
Economy	Economic recession Economic crisis Economic downturn Economic decline Economic cycle Economic constraint Macroeconomic condition Macroeconomic shock Macroeconomic fluctuation Economic condition Business cycle Unemployment Austerity Countercyclical/procyclical Inequality Gross domestic product (GDP) Gini coefficient Job loss / losing job Income
Illicit drugs	Addiction Illicit/illegal drug Psychotropic drug Psychoactive substance Substance use/abuse/consumption Drug use/abuse/consumption Cannabis/marijuana/marihuana Cocaine Heroin Opioids Ecstasy/MDMA Methamphetamine/amphetamine Crack

⁽⁴⁾ These searches were conducted in the publications of the Organisation for Economic Co-operation and Development (OECD), World Bank, World Health Organization (WHO) and European Centre for Disease Prevention and Control (ECDC).

Study selection and inclusion criteria

The studies found in the search were managed using Zotero (version 5.0.93). References were exported to a Zotero database and duplicates were removed. Subsequently, the authors independently reviewed titles and abstracts to verify their compliance with the pre-defined inclusion and exclusion criteria.

The included studies complied with the following criteria:

1. published over the 2008-2020 period;
2. associated macroeconomic conditions with the use of at least one illicit drug;
3. referred to at least one or more OECD country ⁽⁵⁾;
4. was an original scientific study or a scientific review of the literature;
5. published in a scientific journal in English (therefore, congress proceedings, editorials, critical reviews and other articles were excluded) or by an international organisation (if peer-reviewed and based on empirical analysis).

This search provided a list of studies. These were assessed for inclusion, based on which a final list of eligible studies was compiled ([Figure 1](#)).

Subsequently, the authors extracted data from each included study ⁽⁶⁾. These included:

- citation details (authors, year of publication, title and journal/institution);
- a general description of each study (countries or regions covered, time period, targeted populations and sample sizes; data sources; objectives of analysis);
- information about variables used to assess economic recessions and drug use;
- information on econometric methods and their statistical robustness;
- results (types of relationship between economic recession and drug use – countercyclical, procyclical or unrelated – and public policies recommended);
- limitations of each study.

When a study was excluded after a first assessment, the reasons for exclusion were registered. A frequent exclusion criterion was the lack of empirical association between economic cycles and drug use (for example, studies using descriptive analysis only). Any exclusion of a study required the agreement of at least two out of the three reviewing authors.

Limitations

Bearing in mind the aim of this review to identify from the literature insights that might help understand possible consequences of the more recent economic downturn, the reader should be aware of the limitations listed below when interpreting study results in the results section below. Further information on the quality of the included studies, including their methodology and limitations, can be found in the [Appendix](#). For ease of reading, the results are presented in a descriptive way, focusing on results that are statistically significant.

⁽⁵⁾ This criterion was chosen as the authors wanted to include most European countries and most ‘advanced economies’ similar or comparable to Europe.

⁽⁶⁾ See the [Appendix](#) for detailed information on each study.

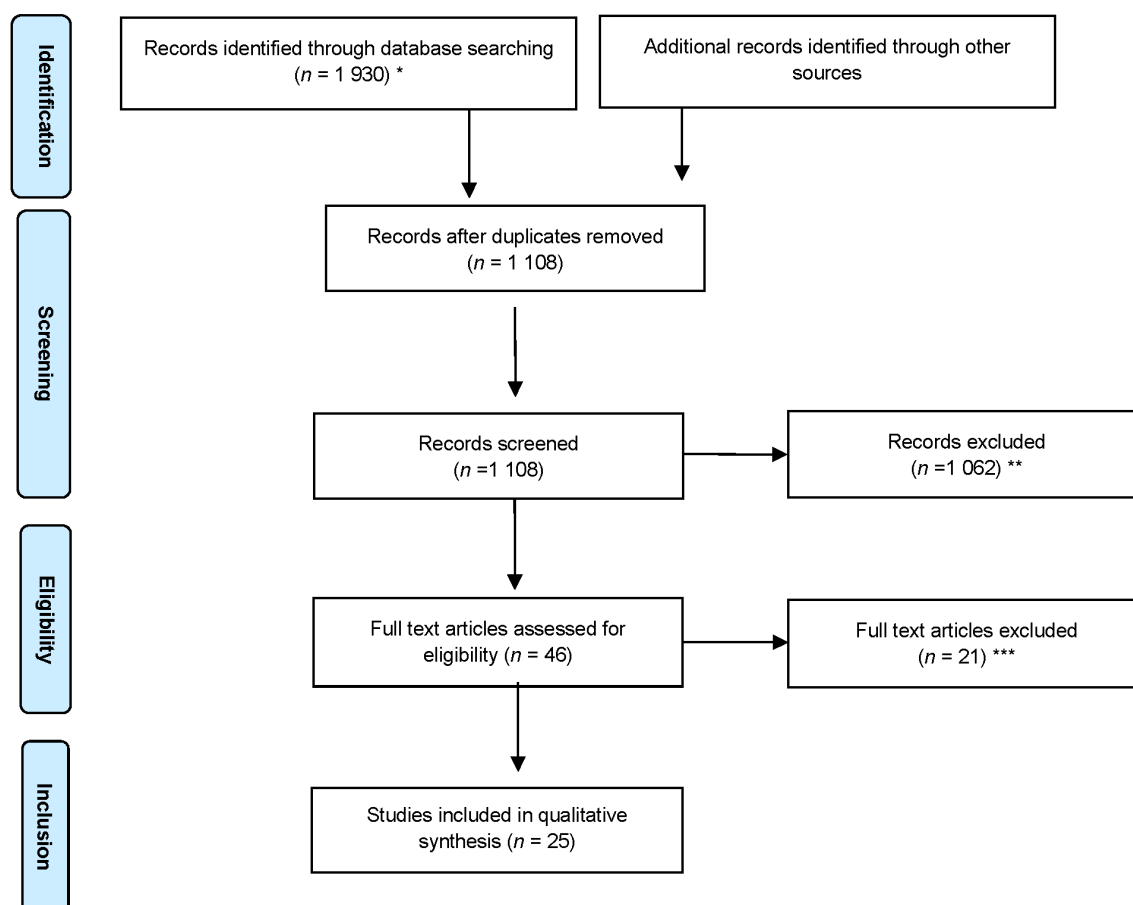
1. The authors followed the guidelines of the PRISMA checklist, which includes a minimum set of items for reporting in systematic reviews and meta-analyses. However, as the PRISMA checklist has been designed primarily for systematic reviews of studies that evaluate the effects of health interventions, not all items were fully addressed. As such, this report is classed as a scoping review of the literature, rather than a systematic literature review.
2. It is also important to consider potential information bias. Such bias can result from multiple sources. For instance, several studies base their analysis on self-reported use of drugs, collected in surveys among general and school populations. Self-reporting may lead to biased responses since people may report behaviour considering its social desirability (Macleod et al., 2005). This may lead to an underestimation of the level of drug use. Other studies use household surveys, which may exclude particularly vulnerable groups of individuals, such as people experiencing homelessness. This might have a particular bias toward excluding people with high-risk patterns of use from the respondent sample.
3. The studies included in this scoping review use different indicators to both measure economic recessions and drug use (the latter of which being the outcome variable). The use of different indicators not only likely affects their results, but importantly it also limits their comparability. The choice of indicators for measuring recessions, such as unemployment, may for example only capture one element of economic downturns. This in turn may bias analysis of the relationship between recessions and drug use to specific mechanisms (see [Economic recessions and drug use: a complex relationship](#)).
4. The different ways in which drug use is defined and measured also affects comparability and results. Some of the included studies provide different levels of detail on this outcome variable. While the EU Drugs Agency and other organisations have established detailed definitions and measurements in this area ⁽⁷⁾, in order to strengthen comparability and analysis of data, the included studies take various approaches. In sum, due to their heterogeneous nature, caution should be exercised in making any generalisations and in comparing study results.
5. A separate but related limitation concerns causality. Specifically, since some papers use cross-sectional data, it is impossible to test the causality of the association between variables measuring recession and drug use. In this case, panel data or pooled cross-sectional data would be ideal, in particular, if data are available for multiple years and for a wide set of geographical areas.
6. While the primary focus of this report is on the impact of economic recessions on drug use, the review also included studies estimating the impact of recessions on the consequences of drug use, such as drug-related deaths and emergency department visits. While the nature of these outcome variables is different, and while they cannot be directly compared with drug use prevalence, the authors decided not to exclude these studies in order to develop a better understanding of the impact of recessions on drug use, including its potential harms. To be transparent of this limitation, references to the specific outcome variable used in the included studies are made in the results section ([below](#)). Further details can also be found in the [Appendix](#).

⁽⁷⁾ See for example the EUDA's Statistical Bulletin – [Methods and definitions for prevalence of drug use statistics](#), for detailed definitions and limitations for data on prevalence of drug use.

Search results

The search strategy identified 1 930 records in electronic databases and 155 additional studies in other sources. Once duplicates were removed, 1 108 unique studies remained. Figure 1 outlines the search, screening and inclusion assessment process through a PRISMA-flow diagram.

FIGURE 1
PRISMA flowchart for selecting studies for the scoping literature review



* Scopus: 915; Medline: 495; PubMed: 224; PsycINFO: 211; Google Scholar: 65; Econlit: 12; Scielo: 8.

** Reasons for exclusions: focus on legal drugs and other health outcomes: 581; no variables and/or relationship of interest: 360; outside OECD countries: 70; not peer-reviewed: 26; no empirical evidence: 16; studies in any language other than English: 9.

*** Reasons for exclusion: not directly related to economic recessions: 7; no analysis of association (only descriptive analysis): 7; no analysis of illicit drugs: 7.

Articles were first screened based on their titles and abstracts, based on which 1 062 articles were immediately excluded and 46 full-text manuscripts were assessed for eligibility, out of which 21 studies did not meet the inclusion criteria. This resulted in 25 studies included in the qualitative synthesis, the results of which are summarised in the following sections.

Study characteristics

summarises the main characteristics of the 25 included studies ⁽⁸⁾. Out of these, 11 studies relate to the United States, while nine relate to Europe. The majority of studies (17 out of 25) study the 2008 Great Recession while four covered a recession before 2008. Fifteen out of 25 studies are based on general population surveys, while five studies analyse the drug use of teenagers and young adults.

The most commonly included drug in the selected studies is cannabis (14 out of 25 studies). Eight studies did not analyse the use of a specific drug, instead including the use of 'illicit drugs' broadly in their analysis.

While 21 articles use labour market variables (e.g. unemployment) as indicators of the economic cycle, five studies use domestic income as a proxy and seven use 'other' types of variables (e.g. median house price, Gini coefficient, household wealth, international trade shocks, among others).

Overall, 12 studies find a statistical association between economic recessions and drug use (nine studies estimate a countercyclical relationship while three studies estimate a procyclical one), while 13 studies find inconclusive or mixed results according to the use of specific drugs and the set of population analysed. Based on this, a more detailed analysis of sets of population and the use of specific drugs was undertaken.

⁽⁸⁾ The [Appendix](#) contains further information about each study, displaying the main findings concerning the relationship between economic recessions and the use of illicit drugs.

TABLE 2
Basic characteristics of the reviewed studies

	Number	Percent
Region		
Multinational (countries across more than one continent)	4	16
Europe (groups of European countries)	4	16
United States	11	44
Australia	1	4
Italy	1	4
Spain	4	16
Variables used to assess drug use^a		
Prevalence of drug use	16	67
Substance use disorders	4	17
Drug-related mortality	3	13
Wastewater-based epidemiology	1	4
Study years^a		
Before 2008	4	19
After 2008	4	19
Before and after 2008	13	62
Population		
General population (12 and older)	6	24
Teenagers and young adult population (<34)	5	20
Middle and older-aged individuals (>35)	1	4
Economically active individuals (15-64)	4	16
Population undergoing a treatment	2	8
Drug-related deaths	2	8
Other ^b	5	20
Type of illicit drug^c		
Cannabis	14	56
Cocaine	8	32
Opioids	8	32
Other illicit drugs (amphetamine, methamphetamine, ecstasy, inhalants, crack, new psychoactive substances)	8	32
Not specified (illicit drugs)	8	32
Variables used to assess the economic cycle^d		
Labour market variables	21	84
Income variable	5	20
Other economic variables (median house price, Gini coefficient, household wealth, international trade shocks, etc.)	7	28
Not specified	1	4
Effects of the economic cycle on drug use		
Procyclical	3	12
Countercyclical	9	36
Inconclusive or mixed results ^e	13	52

^a Four systematic literature reviews are not included here.

^b Includes four systematic literature reviews and one wastewater study.

^c Studies could include more than one type of drug.

^d Studies could include more than one type of economic variable.

^e Studies could indicate more than one type of effect.

Results from the scoping review: age groups and drugs of use

Overall, the studies suggest that the impact of economic downturns on drug use is complex and multifaceted and that the factors determining the type and intensity of impact are multi-layered. As such, the impact of economic recessions on drug use cannot be readily generalised. Based on this initial finding, a detailed analysis by age group and types of illicit drugs was undertaken.

For ease of reading, the results are presented in a descriptive way. The results are first presented by age group and then by type of substance. Further information on the quality of the included studies, including methodology and limitations, can be found in the [Appendix](#).

Results by age group

The age of people who use drugs appears to be important when considering the consequences of economic recessions. This may be because specific age groups are associated with different behaviours, income levels and time allocations (e.g. whether enrolled in school or working, in addition to their amount of leisure time). [Table 3](#) summarises the main statistically significant effects of economic recessions on drug use by age groups.

Teenagers and young adults

As seen in [Table 3](#), the impact of economic recessions on drug use among teenagers and young adults shows mixed results. Overall, roughly half of the studies find that in periods of higher levels of unemployment, teenagers and young adults appear to increase their use of cannabis and cocaine, indicating a countercyclical relationship between the use of these drugs and the economy. However, the evidence is weaker for other drugs and age groups. About one third of the studies covering these age groups find a procyclical relationship, where drug use decreases during economic downturns. Other studies find no statistical association between recessions and drug use.

Among the studies indicating a countercyclical relationship, several stress that when users have less money to spend, they may substitute more expensive drugs with cheaper ones ([Balbo et al., 2020](#); [Macleán et al., 2020](#); [Yang et al., 2018](#)). One study finds that during recessions young people are more likely to sell drugs, the income from which is then used to finance their drug consumption – mainly due to the lack of legal employment opportunities ([Arkes, 2011](#)).

Some studies suggest that in times of recession, more teenagers may experience stressful situations related to household financial uncertainty and instability ([Ananat et al., 2011](#); [Antillón et al., 2014](#)). Such stressors may in turn lead to a deterioration in adolescent mental health and an increase in substance misuse ([Martin Bassols and Vall Castelló, 2016](#); [Ruhm, 2015](#)). However, one study finds that if the adult in the household loses their job, the likelihood that their children will use drugs is reduced ([Paling and Vall Castello, 2017](#)). These authors suggest that this may be due to parents spending more time at home, thereby increasing parental supervision, and reducing the probability that their adolescents will engage in risky behaviour, including drugs use.

TABLE 3
Recession-related variables and drug use: effects by age

Age interval	Impact on drug use	Drug	Economic variable	Region/country	Drug use indicator	Authors	Notes
8-15	Inconclusive	Cannabis	Unemployment rate	Multinational	Prevalence of cannabis in the last 12 months or lifetime prevalence	Paling and Vall Castello (2017)	
14-24	Countercyclical	Cannabis	Unemployment rate	Australia	Past year participation in cannabis use	Chalmers and Ritter (2011)	Statistically significant findings reported for a frequency of use once or twice a week or 3 or 4 times a week.
14-24	Countercyclical	Cannabis	Real income per capita	Australia	Past year participation in cannabis use	Chalmers and Ritter (2011)	
15-17	Countercyclical	Cannabis	Unemployment rate	United States	Use of cannabis in the last 30 days	Pabilonia (2014)	Statistically significant findings reported for Hispanic and black male teenagers only.
15-17	Countercyclical	Cocaine and inhalants	Unemployment rate	Europe	Lifetime prevalence	Balbo et al. (2020)	
15-17	Procylical	Ecstasy	Unemployment rate	Europe	Lifetime prevalence	Balbo et al. (2020)	
15-19	Countercyclical	Cannabis and cocaine	Unemployment rate	United States	Use and heavy use of these drugs in the last month / last year	Arkes (2011)	
15-24	Countercyclical	Cannabis and new psychoactive substances (NPS)	Unemployment rate	Europe	Prevalence of cannabis use in the last 12 months and cannabis lifetime prevalence and; prevalence of NPS use more than 12 months prior	Ayllón and Ferreira-Batista (2018)	
15-30	Procylical	Cocaine	Unemployment rate	Spain	Prevalence of cocaine use in the last 12 months	Martin Bassols and Vall Castelló (2016)	Statistically significant findings reported for women only.
16-19	Procylical	Cannabis	Unemployment rate	Multinational	Prevalence of cannabis in the last 12 months	Paling and Vall Castello (2017)	
16-34	Inconclusive	Cannabis	Employment status	Spain	Heavy use (having used between 10 and 30 days, in the past 30 days)	Colell et al. (2015)	

Age interval	Impact on drug use	Drug	Economic variable	Region/country	Drug use indicator	Authors	Notes
16-34	Procyclical	Cannabis	Employment status	Spain	Sporadic use (having used between 1 to 9 days in the last 30 days)	Colell et al. (2015)	Statistically significant findings reported for young women only.
18-30	Countercyclical	Hallucinogens (ecstasy)	Unemployment rate	United States	Severe disorders ^b	Carpenter et al. (2017)	.
18-34	Countercyclical	Cocaine and heroin	Based on a comparison of periods	United States	Past-month cocaine and heroin use	Yang et al. (2018) ^a	Comparing with other older individuals.
18-34	Procyclical	Crack	Based on a comparison of periods	United States	Past-month crack use	Yang et al. (2018) ^a	Comparing with other older individuals.
20-24	Countercyclical	Cannabis	Unemployment rate	United States	Use and heavy use of cannabis in the last month or the last year	Arkes (2011)	
25-34	Countercyclical	Cannabis	Unemployment rate	Australia	Past year participation in cannabis use	Chalmers and Ritter (2011)	
25-34	Procyclical	Cannabis	Unemployment rate	Australia	Past year participation in cannabis use	Chalmers and Ritter (2011)	
25-34	Countercyclical	Cannabis	Real income per capita	Australia	Past year participation in cannabis use	Chalmers and Ritter (2011)	
30+	Countercyclical	Cocaine and cannabis	Unemployment rate	Spain	Prevalence of cocaine and cannabis in the last 12 months	Martin Bassols and Vall Castelló (2016)	Statistically significant findings were reported for men only.
31-64	Countercyclical	Cannabis	Unemployment rate	United States	Mild cannabis disorders	Carpenter et al. (2017)	Statistically significant findings were reported especially for non-whites.
31-64	Countercyclical	Hallucinogens (ecstasy)	Unemployment rate	United States	Severe ecstasy disorders	Carpenter et al. (2017)	Statistically significant findings were reported especially men, whites and less educated.
35+	Inconclusive	Drugs	Based on a comparison of periods (before and during the economic recession)	Spain	Drug-related mortality (ICD-10 classification)	Mateo-Urdiales et al. (2020) ^a	
35-49	Procyclical	Cannabis	Unemployment rate	Australia	Past year participation in cannabis use	Chalmers and Ritter (2011)	

Age interval	Impact on drug use	Drug	Economic variable	Region/country	Drug use indicator	Authors	Notes
35-49	Procyclical	Cannabis	Real income per capita	Australia	Past year participation in cannabis use	Chalmers and Ritter (2011)	
35-64	Countercyclical	Cannabis	Employment status	Spain	Sporadic cannabis use (having used cannabis between 1 to 9 days in the last 30 days)	Colell et al. (2015)	

Only effects that are statistically significant are presented here. See the [Appendix](#) for further details

^a Compares drug use and mortality between pre-crisis and economic crisis periods.

^b Defined according to the Diagnostic and Statistical Manual of Mental Disorders (DSM-4 and DSM-5 classification schemes).

In their study, [Ayllón and Ferreira-Batista \(2018\)](#), examine the relationship between different measures of unemployment, drug use and risk perception in 28 European countries, between 2004 and 2014. They estimate that an increase of one percent in the unemployment rate is associated with a 0.7-percentage point increase in the proportion of young people (15 to 24) using cannabis at some point in time. In the same study, the authors estimate that the proportion of young people using new psychoactive substances increases by 0.5 percentage points when unemployment rises by 1 %.

In examining the impact of economic conditions on cannabis use, similar results are presented by [Chalmers and Ritter \(2011\)](#) in Australia, in their study covering the period 1991 to 2007. Their econometric models use unemployment and real income per capita as explanatory variables. They find that, among the population aged 14 to 24, a one percentage point increase in the unemployment rate increases past 12 months cannabis use ⁽⁹⁾ by 0.5 %. When examining weekly cannabis use, a one percentage point increase in the unemployment rate increases the number of weekly users by 1.4 percentage points among those aged 14 to 24 and 0.5 percentage points among those aged 25 to 34.

[Balbo et al. \(2020\)](#) also find a countercyclical relationship for cocaine and inhalant use among young people, using the overall rate of unemployment as the economic indicator. They estimate that a one percentage point increase in the unemployment rate is associated with a 0.1 % increase in the probability of having tried cocaine at least once among adolescents aged 15 to 17.

[Pablonia \(2014\)](#) also finds a statistically significant relationship between unemployment and cannabis use among teenagers (aged 15 to 17). However, this countercyclical relationship is only found for Hispanic and black male teenagers. In these groups, a one percentage point increase in the unemployment rate is associated with an increase of 1.2 and 1.9 percentage points, respectively, in the past-30-day prevalence of cannabis use.

[Carpenter et al. \(2017\)](#) also examine the relationship between unemployment and different types of illicit drugs between 2002 and 2015 in the United States. They find that a one percentage point increase in the state unemployment rate is associated with a 0.022 % increase in the probability of young people aged 18 to 30 developing a severe substance use disorder (DSM-4 diagnostic criteria) involving hallucinogens and ecstasy. They also find the relationship between unemployment and mild cannabis disorders to be robust, for all types of econometric modelling used. However, their analysis does not obtain statistically significant results for the impact of unemployment on substance use disorders associated with other drugs such as cocaine or heroin.

Other studies find a mixed association between unemployment and cannabis use among teenagers. For example, [Paling and Vall Castello \(2017\)](#) conducted a multi-country analysis to assess the impact of unemployment on the number of young people using cannabis in the last 12 months or in their lifetime (8 to 19 years old). The authors conclude that there is no statistically significant effect among young people between 8 and 15 years old. However, they find a significant procyclical relationship among adolescents aged 16 to 19.

In their study covering the United States and the years 2007-2016, [Yang et al. \(2018\)](#) find that those aged 18 to 34 were particularly affected by the 2008 Great Recession, but that the impact on drug use varied by substance. Compared with older age groups, the study finds that the vulnerability to austerity of those aged 18 to 34 puts them at particular risk of increasing their use of cocaine and

⁽⁹⁾ Authors use the definition 'participation in cannabis use', which means use of cannabis in the past 12 months. For more detailed analysis, this frequency measurement is divided into four categories, namely 'once a week or more', 'monthly or more', 'every few months', and 'once or twice a year'.

heroin. At the same time, it shows that the risk of using crack cocaine decreases significantly among this age group.

Further, [Colell et al. \(2015\)](#) do not find strong evidence of an increase in cannabis use among individuals aged 16 to 34 years following the 2008 economic recession in Spain (comparing the pre-crisis years, 2005-2007, to the post-crisis years, 2009-2011). In this age group and considering different subsets of the population, the number of people using drugs (both sporadically and heavily) ⁽¹⁰⁾ remains stable. The exception was for young women who sporadically use cannabis, for which they find a procyclical association.

Overall, a smaller number of studies indicate a procyclical relationship between recessions and drug use among teenagers and young adults. Using data from Spain in relation to two pre-recession years (2005 and 2007) and two post-recession years (2009 and 2011), [Martin Bassols and Vall Castelló \(2016\)](#) find a reduced probability of using cocaine among young women (15 to 30 years old). [Paling and Vall Castello \(2017\)](#) find that a one percentage point increase in the unemployment rate is associated with a 0.7 percentage point decrease in the probability of smoking cannabis in the last 12 months, among adolescents aged 16 and over. In addition, [Balbo et al. \(2020\)](#) estimate that a one percentage point increase in the unemployment rate is associated with a decrease of 0.1 % in the probability of trying ecstasy (at least once). They explain this negative association with the large impact that income cuts have on drug use in recreational settings.

Adult population

[Table 3](#) shows that only four of the included studies analyse the relationship between economic recessions and drug use among adults. Two further studies analyse the relationship between recessions and drug-related mortality, which frequently affects older age groups ([EMCDDA, 2021a](#)). Overall, these studies also show mixed results.

Among the studies that indicate a countercyclical effect are [Martin Bassols and Vall Castelló \(2016\)](#), when studying men over the age of 30. They find that when province-level unemployment in Spain increases by 10 percentage points, the probability of consuming cannabis and cocaine increases by 5.2 percentage points and 3.7 percentage points, respectively. This impact is less pronounced among men aged 46 to 65 years old, with their probability of using cannabis and cocaine increasing by 2.0 percentage points and 2.3 percentage points, respectively. Similarly, [Carpenter et al. \(2017\)](#) find that among individuals aged 31 to 64 years old, a one percentage point increase in the unemployment rate is associated with 0.039 % increase in the probability of having a mild disorder involving cannabis, and a 0.033 % increase in the probability of having a severe disorder involving ecstasy.

Similar results are obtained by [Colell et al. \(2015\)](#). They conclude that the increase in sporadic use of cannabis ⁽¹¹⁾ is larger among unemployed individuals aged between 35 and 64 compared with their employed counterparts, when analysing the 2008 economic recession (comparing data from the pre-crisis period, 2005-2007, with data from 2009-2011).

[Yang et al. \(2018\)](#) observe that the 2008 Great Recession, based on US data covering 2007 to 2016, was associated significantly with higher rates of substance use. Using a composite variable to measure recessions, which they term 'socioeconomic vulnerability' ⁽¹²⁾, they observe a disproportional effect on younger people. As socioeconomic vulnerability increases, so does the risk of using drugs.

⁽¹⁰⁾ Authors categorise use on 1 to 9 days during the past 30 days as 'sporadic users' and use on 10 to 30 days during the past 30 days as 'heavy users'.

⁽¹¹⁾ That is, use on 1 to 9 days during the past 30 days.

⁽¹²⁾ The variable 'socioeconomic vulnerability' is based on a five-point scale composite variable which is comprised of: (1) health insurance status, (2) government assistance, (3) income, (4) self-rated health and (5) employment status.

The authors find that such vulnerability decreases with age, thus decreasing the risk of using drugs. For instance, compared with individuals between 18 and 34 years, they find a significantly reduced risk of cocaine use among those aged 35 or older. Further, for those over the age of 50, they find a significantly reduced risk of using all substances (cocaine, crack, heroin, methamphetamine and polydrug-use) compared with younger sets of population.

[Chalmers and Ritter \(2011\)](#) find that cannabis use is procyclical among Australian individuals aged 35 to 49, in their study covering 1991-2007. Regardless of income per capita, the study shows a decrease in last-year cannabis use with an increase in the unemployment rate. In this age group, a one percentage point increase in the unemployment rate is associated with a decrease in last-year cannabis use of between 7.4 % and 11 %.

Looking at harms associated with drug use, in their study focusing on drug-related mortality in the United States (in a period covering two recessions, 1994-2014), [Brown and Wehby \(2017\)](#) do not find a significant effect of unemployment or house prices on overdoses from opioids among individuals over the age of 45. Similarly, [Mateo-Urdiales et al. \(2020\)](#) find no significant association between the 2008 economic crisis and drug-related mortality among Spanish individuals over 35 years old.

Results by drug types

As shown in the analysis by age group, results are mixed, with some studies showing a countercyclical relationship, others showing a procyclical relationship and another group producing inconclusive results. To investigate further, and potentially fill some of the gaps emerging from the analysis by age group, this section analyses the impact on the use of individual drug types across all age groups. [Table 4](#) summarises the main effects of the selected economic variables, in the individual studies, on drug use by type of drugs.

The most commonly featured drug across the included studies is cannabis (14/25 studies) ⁽¹³⁾, followed by cocaine (8/25) ⁽¹⁴⁾; opioids (opioids, heroin) (7/25) ⁽¹⁵⁾; ecstasy and methamphetamine (6/25) ⁽¹⁶⁾; and inhalants (3/25) ⁽¹⁷⁾, while one study groups drugs with the classification 'injected drugs'. The remaining articles focus on illicit drug use prevalence in general ⁽¹⁸⁾.

⁽¹³⁾ See [Arkes \(2011\)](#); [Ayllón and Ferreira-Batista \(2018\)](#); [Carliner et al. \(2017\)](#); [Carpenter et al. \(2017\)](#); [Casal et al. \(2020\)](#); [Chalmers and Ritter \(2011\)](#); [Colell et al. \(2015\)](#); [Compton et al. \(2014\)](#); [Kalousova and Burgard \(2014\)](#); [Martin Bassols and Vall Castelló \(2016\)](#); [Pablonia \(2014\)](#); [Paling and Vall Castello \(2017\)](#); [Yang et al. \(2018\)](#); [Zuccato et al. \(2011\)](#).

⁽¹⁴⁾ See [Arkes \(2011\)](#); [Balbo et al. \(2020\)](#); [Carpenter et al. \(2017\)](#); [Casal et al., 2020](#); [Maclean et al. \(2020\)](#); [Martin Bassols and Vall Castelló, 2016](#); [Yang et al. \(2018\)](#); [Zuccato et al. \(2011\)](#).

⁽¹⁵⁾ See [Arkes \(2011\)](#); [Brown and Wehby \(2017\)](#); [Carpenter et al. \(2017\)](#); [Hines et al. \(2020\)](#); [Hollingsworth et al. \(2017\)](#); [Maclean et al. \(2020\)](#); [Yang et al. \(2018\)](#); [Zuccato et al. \(2011\)](#).

⁽¹⁶⁾ See [Balbo et al. \(2020\)](#); [Carpenter et al. \(2017\)](#); [Maclean et al. \(2020\)](#); [Martin Bassols and Vall Castelló \(2016\)](#); [Yang et al. \(2018\)](#); [Zuccato et al. \(2011\)](#).

⁽¹⁷⁾ See [Balbo et al. \(2020\)](#); [Carpenter et al. \(2017\)](#); [Maclean et al. \(2020\)](#).

⁽¹⁸⁾ See [Costa Storti and Grauwe \(2009\)](#); [Dom et al. \(2016\)](#); [Henkel \(2011\)](#); [Mateo-Urdiales et al. \(2020\)](#); [Nagelhout et al. \(2017\)](#).

TABLE 4
Recession-related variables and drug use: effects by type of drugs

Type of drug	Drug type	Impact of recessions on use	Economic variable	Author	Explanatory notes
Cannabis	Cannabis	Countercyclical	Unemployment rate	Arkes (2011)	
	Cannabis	Countercyclical	Unemployment rate	Ayllón and Ferreira-Batista (2018)	Effects increase when a longer period of consumption is considered.
	Cannabis	Countercyclical	Household income	Carliner et al. (2017)	Augmented effects among low-income men.
	Cannabis	Countercyclical	Unemployment rate	Carpenter et al. (2017)	Mild substance disorders, especially for non-whites.
	Cannabis	Countercyclical	Unemployment rate	Casal et al. (2020)	Reverse causation.
	Cannabis	Inconclusive	Unemployment rate, income per capita	Chalmers and Ritter (2011)	Countercyclical for young people and procyclical for older age groups, in relation to unemployment rate. Countercyclical in relation to income per capita.
	Cannabis	Countercyclical	Employment status	Colell et al. (2015)	Heterogeneity in results depending on gender and frequency use.
	Cannabis	Countercyclical	Employment status	Compton et al. (2014)	
	Cannabis	Inconclusive	Measured decline in economic resources, unemployment experience and perceived decline in economic resources	Kalousova and Burgard (2014)	Heterogeneity depending on economic variable: countercyclical with the unemployment rate; procyclical when measuring decline in economic resources; not significant with perceived decrease in economic resources.
	Cannabis	Countercyclical	Unemployment rate	Pabilonia (2014)	Intensity variations by gender and race/ethnicity.
	Cannabis	Procyclical	Unemployment rate	Chalmers and Ritter (2011)	Heterogeneity depending on age.
	Cannabis	Countercyclical	Unemployment rate	Martin Bassols and Vall Castelló (2016)	
	Cannabis	Procyclical	Measured decline in economic resources	Kalousova and Burgard (2014)	

Type of drug	Drug type	Impact of recessions on use	Economic variable	Author	Explanatory notes
Opioids	Any opioid	Inconclusive	Unemployment rate, house prices	Brown and Wehby (2017)	Unemployment rate showed positive but not significant effects.
	Heroin	Countercyclical	Unemployment rate	Arkes (2011)	Weak evidence.
	Heroin	Countercyclical	Unemployment rate	Carpenter et al. (2017)	
	Heroin	Procyclical	Unemployment rate	Maclean et al. (2020)	
	Heroin	Procyclical		Zuccato et al. (2011)	
	Opioids	Countercyclical	Unemployment rate	Hollingsworth et al. (2017)	
Stimulants and hallucinogens	Cocaine	Countercyclical	Unemployment rate	Arkes (2011)	
	Cocaine	Countercyclical	Unemployment rate	Balbo et al. (2020)	
	Cocaine	Countercyclical	Unemployment rate	Casal et al. (2020)	
	Cocaine	Countercyclical	Unemployment rate	Maclean et al. (2020)	
	Cocaine	Countercyclical	Unemployment rate	Martin Bassols and Vall Castelló (2016)	
	Cocaine	Procyclical		Zuccato et al. (2011)	
	Crack	Procyclical	Socioeconomic vulnerability	Yang et al. (2018)	
	Ecstasy	Procyclical	Unemployment rate	Balbo et al. (2020)	
	Ecstasy	Countercyclical	Unemployment rate	Carpenter et al. (2017)	Severe substance disorders, especially men, whites and less educated.
	Ecstasy	Countercyclical	Unemployment rate	Balbo et al. (2020)	
	Methamphetamine	Countercyclical		Zuccato et al. (2011)	
Injected drugs	Injected drugs	Countercyclical	National development indicators (GDP; urban population growth, Gini coefficient, youth employment rate)	Hines et al. (2020)	Heterogeneity depending on the economic indicator.

Note: Only effects that are statistically significant are listed here.

Cannabis

While the overall evidence is mixed, several of the studies indicate that there is a greater risk of starting cannabis use during economic recessions, for those not already using, while also the frequency of cannabis use, among those already using, tends to increase. These findings appear to depend on the characteristics of users. For example, people who use cannabis more frequently seem to increase their cannabis use more than infrequent users; unemployed people experience a higher increase in cannabis use compared with their employed counterparts; young people tend to increase their cannabis use more than older age groups; and low-income males may have a higher propensity to increase their cannabis use.

[Arkes \(2011\)](#) finds that a one percentage point rise in the unemployment rate increases last-year cannabis use among teenagers by 4.1 percentage points. Similarly, [Martin Bassols and Vall Castelló \(2016\)](#) find that the probability of using cannabis among individuals aged 15 to 64 increases by 3.1 percentage points for each increase of 10 percentage points in the Spanish regional unemployment rates. The authors also find a higher increase in the probability of cannabis use among the unemployed.

[Ayllón and Ferreira-Batista \(2018\)](#) find similar results in their analysis of the relationship between unemployment rates and drug use across 28 European countries in relation to the 2008 Great Recession. They show a countercyclical relationship for the use of cannabis among young Europeans, although the intensity of the effects depends on the variables used (such as the total unemployment rates at country or at NUTS-1 ⁽¹⁹⁾ regional level; and the youth unemployment rates at country or at NUTS-1 regional level).

[Pabilonia \(2014\)](#) finds that, in a sample of students aged 15 to 17, cannabis use is countercyclical, increasing as unemployment increases, but this effect varies by both gender and race/ethnicity. Meanwhile, [Colell et al. \(2015\)](#) show that unemployed people are more likely to increase the sporadic use of cannabis in periods of high unemployment, overall and in the older age group (35 to 64 years old), compared with those who are employed.

The longitudinal study carried out in Australia by [Chalmers and Ritter \(2011\)](#) shows that, when there was high unemployment during the 2008 economic recession, the impact on the frequency and on the participation of cannabis use depended on users' age: younger populations (14 to 24) tended to increase use while, conversely, older ones (35 to 49) tended to decrease.

Other studies suggest heterogeneity in the pathways that connect economic hardship with health behaviours. In a sample of 840 adult respondents, [Kalousova and Burgard \(2014\)](#) find different impacts on the use of cannabis depending on the variable introduced to assess individual economic situations during economic crises. They use financial strain as reported in a survey; periods of unemployment; or, changes in economic resources over time. They find that the experience of being unemployed is associated with a greater risk of starting cannabis use. If other conditions remained unchanged, a decline in income becomes a significant predictor of not starting cannabis use.

[Carliner et al. \(2017\)](#) analyse the impact of household income on time trends of cannabis prevalence, over the 2002-2014 period, finding increased cannabis use during times of economic insecurity. This is particularly marked among low-income males, who report higher increases in last-year cannabis use between 2007 and 2014, as compared with other males ⁽²⁰⁾. These results may support the hypothesis that

⁽¹⁹⁾ The [NUTS classification](#) (Nomenclature of territorial units for statistics) is a system for dividing the economic territory of the EU and the United Kingdom.

⁽²⁰⁾ The increase in cannabis use was of 6.2 %, 4.6 %, 3.25 % and 3.8 % for annual household incomes varying from USD 0-10 000; USD 20 000-49 999; 50 000-74 999 and more than USD 75 000, respectively.

substance use can be a way to cope with the stress and disempowerment associated with financial hardship (Brainerd and Cutler, 2004; Henkel, 2011; McKee-Ryan et al., 2005).

The countercyclical impact of economic recessions on the use of cannabis is also identified by Carpenter et al. (2017), when analysing clinical measures of substance use disorders. Using a set of substance use disorder assessment questions in a general population survey for the period 2002-2015, they conclude that economic downturns lead to an increase in mild cannabis use disorders. This is driven primarily by men, as a one percentage point increase in the state unemployment rate is associated with a 0.056 % increase in the probability of having a mild cannabis use disorder.

Opioids

The studies that looked at opioids found that economic recessions are associated with an increase in the use of these drugs, particularly among high-risk opioid users. The analysis suggests that higher unemployment rates are associated with an increase in heroin use, earlier initiation of injecting drug use, higher numbers of opioid-related deaths and more opioid-related visits to emergency departments. The same countercyclical relationship is found when house prices are used as a proxy for recessions, as decreases in house prices appear to be significantly associated with an increase in opioid-related deaths. However, similar to the analysis based on age groups or other drug types, the results of the studies vary depending on the variables used to assess both economic recessions (unemployment, income and house prices) and opioid use (e.g. treatment admissions due to opioid use, opioid overdose-related deaths and emergency visits for opioid use).

Hollingsworth et al. (2017) analyse how serious adverse health outcomes related to opioids vary with short-term economic fluctuations, estimating the effect of regional unemployment rates on opioid-related deaths and emergency department visits. As the unemployment rate increases by one percentage point, they find that the opioid death rate rises by 0.19 per 100 000 inhabitants. Further, they find that visits to emergency departments due to opioid overdoses increase by 0.95 per 100 000 emergency department visits. These findings are relatively stable, regardless of the timeframe considered, indicating a stable association between unemployment and the severe consequences of opioid abuse.

Brown and Wehby (2017) also estimate the impact of economic crises on opioid-related deaths. In their analysis, they include different economic variables, such as the unemployment rate and house prices, median household income, insurance coverage and work time (between 1999 and 2014). The authors show that rapid declines in house values are associated with increases in opioid-related deaths and conversely, increasing house values are significantly associated with declines in such deaths. In particular, an increase in the median house price by USD 10 000 is associated with a decline in opioid overdose-related deaths by 0.15 per 100 000 people. While they also estimate that the unemployment rate is positively associated with opioid-related deaths, this is not statistically significant.

Further, Brown and Wehby (2017) find that the intensity of the house price effect depends on the age of the individuals, with the younger subgroup (under 45 years) being the most affected. According to the authors, one explanation for the strong impact of house prices on opioid mortality is that during recessions there is an increase in 'underwater' mortgages⁽²¹⁾. Such situations pose a greater burden on younger home-owners because, on average, these individuals have purchased their homes more recently and the cost of their mortgages is generally a larger percentage of their available income, compared with older home-owners. These stress factors potentially contribute to an increase in the use of drugs and, possibly, to higher overdose death rates among adults below the age of 45.

⁽²¹⁾ Underwater mortgages are loans given by financial institutions to individuals to purchase homes where the amount of debt is higher than the free-market value of those homes. This situation tends to occur when property values are falling.

Several of the included studies warn about the effects of economic crises on risky behaviours, particularly related to injecting drug use. Injecting drug use requires smaller quantities to achieve the same psychoactive effects compared with other modes of consumption, for example sniffing or smoking. Therefore, injecting may become the preferred mode of consumption among particularly economically vulnerable individuals in times of increasing prices (Bretteville-Jensen, 2011) or income shortages (Lakhdar and Bastianic, 2011), despite the high risks it poses to the health of users.

Hines et al. (2020) conducted a meta-analysis to identify country-level factors associated with injecting drug use. Their results indicate that a higher national youth unemployment is associated with a lower age of starting injecting drug use. The earlier someone starts injecting drugs the riskier it becomes, overdoses become more likely and there may be a faster progression to regular injecting drug use. The authors also find that treatment acceptance is lower among people who started using drugs at an early age. When GDP is used to assess economic crises, Hines et al. (2020) also estimate that a higher GDP is positively associated with a longer duration of injecting drug use and with a lower median age of injecting drugs. When income inequality is considered, the Gini coefficient⁽²²⁾ is not associated with any of the indicators of injecting drug use.

Cocaine and ecstasy

The review also found that the impact of economic recessions on the use of drugs such as cocaine and ecstasy is mixed. There are few studies on these drugs, and as such the quality of the evidence is low.

Martin Bassols and Vall Castelló (2016) estimate that cocaine use among the population aged 15 to 64 increases by 1.2 percentage points for a ten-percentage point increase in the unemployment rate. Arkes (2011) estimates the same type of impact, that is, a positive and significant effect of unemployment on cocaine use among different population cohorts. Maclean et al. (2020) also estimate that an increase in unemployment is associated with a rise in stimulants-related treatment admissions.

In the study by Balbo et al. (2020), using unemployment and public expenditure on social protection as economic indicators, the authors conclude that adolescents may seek to cope with uncertainty about their future and related stress by increasing the consumption of cocaine.

Finally, Casal et al. (2020) find that the probability of cocaine users being unemployed intensifies during economic crises. They conclude that cocaine users are more affected than non-users by the overall macroeconomic conditions.

The results from studies on the impact of recessions on ecstasy use are also mixed. Balbo et al. (2020) find a procyclical relationship between the business cycle and ecstasy use among teenagers, potentially due to income falls and budget constraints. In contrast, Carpenter et al. (2017) find a countercyclical relationship.

Discussion

As this scoping literature review has shown, the impact of economic recessions on the use of drugs is multifaceted and not always easy to generalise. This discussion will further explore some of the preliminary findings, highlight potential gaps in current research and raise questions for future work in this area, but no attempt is made to provide definitive conclusions.

⁽²²⁾ The Gini coefficient is a measure to assess the extent to which the distribution of income within a country deviates from a perfectly equal distribution. A coefficient of 0 expresses perfect equality where everyone has the same income, while a coefficient of 1 expresses full inequality where only one person has all the income.

Opportunities and challenges of using unemployment as an indicator of economic activity

Unemployment has frequently been theorised to be associated with changes in patterns of substance use and is the variable most commonly used to assess the impact of recessions on illicit drug use. In this review, 21 out of 25 studies used labour variables, such as unemployment, while the four remaining studies used income variables or other types of economic indicators, such as median house prices.

Since detailed data sets for unemployment are also publicly available, comparable and timely, it is unsurprising that this is the indicator most commonly used to estimate the impact of the economic climate on drug use. Unemployment is also a helpful indicator as it is one of the most important determinants of income, or of its absence, and it is also a source of stress which may provoke anxiety and mental health disorders and stimulate drug use (de Goeij et al., 2015; Nagelhout et al., 2017). It may also reduce the opportunity cost, for some but certainly not all, of spending more free time using drugs (Brown and Wehby, 2017; Colell et al., 2015).

While useful, the focus on unemployment in a large number of studies may still only capture some elements of recessions, and in turn bias the impact on the use of drugs. Moreover, while there are international definitions and guidelines for measuring unemployment, such as those by Eurostat and the OECD, these data are not necessarily always collected and defined in the same way across national jurisdictions. While this may not have affected the studies included in this review, this may be of importance for future research.

Moreover, no study has considered the impact of underemployment⁽²³⁾ on drug use. This is an issue that may particularly affect young adult populations, since the jobs they are offered might be particularly precarious, poorly paid and part-time (Chalmers and Ritter, 2011). Most likely, the lack of systematically published data explains this absence. Some statistics related to underemployment are published by the International Labour Organization (ILO)⁽²⁴⁾, but there is a limited number of countries with data available, and time trends are difficult to produce. Particularly in the current situation and due to the economic fallout from the COVID-19 pandemic, it may be important to strengthen data collection on underemployment among young people especially as the available data point to a countercyclical relationship between recessions and the use of drugs among this group.

Importance of remaining vigilant: the impact of recessions on youth substance use behaviours

In the current context it will be important to closely monitor the impact of recession on youth substance use behaviours. The use of drugs by teenagers and young adults (under 35) was analysed in 18 out of the 25 studies included in this review. While results were mixed, a considerable number of studies found a countercyclical association between the business cycle and the use of drugs among teenagers and young adults, that is, that use of illicit substances increased in periods of economic recession.

However, the results vary significantly by substance, with this countercyclical effect being larger for cannabis use, the most commonly used illicit drug by young adults in Europe, compared with the use of other drugs.

⁽²³⁾ According to Eurostat, an [underemployed part-time worker](#) is someone aged 15-74 who is working part-time and who would like to work additional hours and is available to do so. Furthermore, 'This statistical indicator covers persons who, in spite of being employed, do not work full-time and lack a sufficient volume of work, which is somewhat similar to being unemployed. The part-time requirement in the definition is important because the people who work full-time and still want to work more hours have a different profile: in spite of working many hours they have insufficient income; underemployed part-time, on the other hand, highlights situations of insufficient volume of work and underutilised labour among persons already employed.'

⁽²⁴⁾ See, for example, [Statistics on unemployment and labour underutilization](#).

The potential reason for this apparent countercyclical relationship between recessions and the use of cannabis among this age group may be that younger people face more severe difficulties coping with the economic stress caused by recessions. This may be related to scarce job opportunities and higher levels of psychological discomfort, which appear to be stronger contributing factors than the fall in available income to purchase drugs.

There is a potential risk for a vicious cycle here with higher levels of drug use potentially leading to worse educational performance, which in turn can lead to fewer years of completed education and reduced employment opportunities (Marie and Zölitz, 2017; McCaffrey et al., 2010). Overall, lower levels of human capital and limited work experience may lead to higher rates of unemployment but also of temporary and precarious jobs among these groups. This in turn increases vulnerability to changes in macroeconomic conditions and increases the risk of social exclusion. In this negative cycle, teenagers and young adults may be more likely to resort to or increase their levels of drug use. Previous systematic reviews have also indicated this negative spiral, as Dom et al. (2016), for example, have shown that young men in long-term unemployment are at a higher risk of substance use disorders during economic crises compared with older populations.

While evidence appears to point to a countercyclical relationship between the business cycle and cannabis use among teenagers and young adults, the results for use among adult populations are more varied. The reason for this may be that the fall in available income plays a more significant role, compared with other mechanisms. While Colell et al. (2015) and Martin Bassols and Vall Castelló (2016) find a countercyclical effect for cannabis use, Chalmers and Ritter (2011) estimate less frequent cannabis use among individuals aged 35 to 49 as the unemployment rate rises. Overall, further research is needed among older age groups to establish a better understanding of the impact of the business cycle on drug use.

Importance of studying drug use patterns and price elasticities

As shown by this review, the results were mixed when comparing the use of different substances. This could be partly explained by factors such as the desired impact of use (e.g. to relax to cope with the stress caused by economic factors) and the relative price or availability of drugs during recessions. The results of the scoping review and the unique nature of the COVID-19 pandemic, such as related to government policies implemented to limit the free movement of people and the closing of nightlife venues associated with the use of certain types of illicit drugs, underscore the importance of further analysing the relationship between recessions and different drug use patterns, in particular the use of individual drug types beyond cannabis, which has thus far been the focus of many studies (see the box [The COVID-19 recession: further comparisons with earlier economic downturns](#)).

The COVID-19 recession: further comparisons with earlier economic downturns

While there are some unique aspects related to the COVID-19 recession, many of its core features, such as impacts on youth unemployment, have been similar to those of previous recessions and therefore the results of our current review should be applicable. Youth tend to have less employment stability, such as fewer permanent employment contracts, and be employed in industries particularly sensitive to volatility in the economy, such as new information and telecommunication industries and in small and medium-sized companies. This may partly explain the disproportionate impact of recessions on youth unemployment (Ghoshray et al., 2016; Ryan, 2001).

Further, as with previous recessions, the most vulnerable were hit harder by the COVID-19 recession (OECD, 2021).

Socially excluded groups of people, including those with problematic patterns of drug use, often have less access to information and may find themselves at the fringes of recovery policies implemented due to economic downturns (OECD, 2020a). This is of concern, as available data show that lower income and wealth classes have been impacted disproportionately due to the COVID-19 crisis, with a severe impact on health inequality in particular (Bambra et al., 2020; Eichengreen et al., 2020). A large number of low-wage earners lost their jobs during the COVID-19 recession, with social security coverage limited in some countries, risking a rapid build-up of long-term unemployment (OECD, 2021). During the worst waves of the COVID-19 pandemic, many governments also allocated a high level of resources to reduce the health impact of the virus, which may have shifted focus away from other health programmes and services for people who use drugs, including those related to social protection and drug treatment (EMCDDA, 2021b).

Another important factor may be price elasticities, that is, changes in use dependent on changes in the prices of that drug or of changes in the prices of that drug relative to changes in prices of other illicit drugs or legal substances such as alcohol. For example, in a systematic review on the price elasticity of the demand for illicit drugs, Payne et al. (2020) conclude that methamphetamine demand is highly sensitive to price changes. Meanwhile, they find that demand for cannabis, cocaine and heroin is relatively inelastic towards income.

It may be expected that prolonged and intense income constraints increase the probability of substituting expensive drugs with cheaper ones, which may merit further research and analysis. Some studies appear to indicate this relationship. For example, Zuccato et al. (2011) find that economic crises are associated with a downward trend in the use of more expensive drugs (cocaine and heroin) towards an increase in the use of cheaper drugs (methamphetamines), based on data from urban wastewater treatment plants in cities in northern Italy.

Riskier patterns of drug use appear to become more frequent

The scoping review also found that recessions may lead to riskier patterns of use among some groups of people, and this is something we should watch out for in the current context. The move from smoking or snorting heroin to injecting, for example, may be influenced by falls in available income, as more risky modes of consumption (such as injecting) require smaller quantities to achieve comparable psychoactive effects (Mateo-Urdiales et al., 2020).

While outside the main focus of the report, the review also found indications that economic hardship may increase the incidence of drug-related deaths, overdoses and the incidence of substance use disorders (Brown and Wehby, 2017; Carpenter et al., 2017; Hollingsworth et al., 2017). These results should be interpreted with caution, as causal pathways are complex. Changes in the availability of drug treatment caused by austerity measures may, for example, also play an important role in mediating the relationship between recessions and drug overdoses (EMCDDA, 2014).

Limitations and methodological challenges of the scoping review

Some of the limitations and knowledge gaps merit further discussion, both related to the studies included in this scoping review and the methodology of the review itself. This includes the variables used to measure both recession and drug use. Overall, the choice of variable to measure recessions likely has an impact on the outcome variable (drug use). This should be borne in mind when interpreting results. For example, changes in unemployment rates, the most commonly used economic indicator in the studies included in this review, may bias the relationship between recessions and drug use to specific mechanisms (see [Economic recessions and drug use: a complex relationship](#)). This includes, for example, the 'income mechanism' (Dom et al., 2016), whereby a reduction in available income, such as caused by unemployment, may lead to a decrease in drug use, the 'economic-stress mechanism', when stress caused by periods of economic hardship and the loss of employment may lead to the initiation of drug use or development of a substance use disorder (Lijffijt et al., 2014), and the 'opportunity-cost mechanism', whereby individuals facing unemployment during these periods may be prone to spend more (or less) of their free time using drugs. However, since unemployment can at least theoretically trigger both countercyclical and procyclical mechanisms, as outlined previously, any potential bias is of undetermined direction. In the future, it may be useful to analyse other employment-related variables such as job security, types of working patterns (full- or part-time) and income levels. Such analysis could refine the results of this scoping review.

Moreover, people who use drugs are a heterogeneous group. Therefore, their reaction to changes in economic factors, such as employment, differ accordingly. Consequently, when drug use is measured, it is necessary to consider this heterogeneity including demographics such as age and gender, but also patterns of use. However, some of the selected studies did not include such elements in their analysis. This may reduce the comparability of the studies.

Further, as some studies use cross-sectional data, meaning that it was also not possible to test the causality of the association between variables measuring recessions and drug use, it may be useful to apply panel data or pooled cross-sectional data in future research. This may be particularly beneficial if data are available for multiple years and for a broader set of geographical areas. For example, it remains unclear to what extent unemployment and drug use may be self-reinforcing. Circumstances may trap certain groups of unemployed in a vicious cycle, leading to continued deterioration of their socioeconomic situations. Simultaneously, individuals with problematic patterns of drug use may be more likely to lose their jobs. In turn, for these groups of people, their substance use may worsen during unemployment, impacting their job search and reducing future prospects in the labour market. Taken together, these circumstances can culminate in a vicious spiral of continued job and social exclusion, combined with problematic patterns of drug use. Further research may be useful in examining these complex interactions in greater detail.

As previously raised, a limitation of many of the studies reviewed is that they could be potentially biased, first, by self-reported data which under-reports socially undesirable behaviours such as using drugs and, second, by excluding particularly vulnerable groups, such as people experiencing homelessness. However, this limitation was partially mitigated since all of the studies included in this scoping review conduct a time series analysis. Therefore, should an under-reporting bias exist, it should theoretically be stable across the full period and not affect the rate of change of these variables. As such, the topic of this analysis, namely the change in drug use due to recessions, should not be particularly affected by this bias.

One way in which this report sought to overcome the potential information bias, in relation to socially excluded communities, was to include studies using different variables as proxies for different types of drug use (such as overdoses, drug-related deaths and substance use disorders). This is an approach that has been well established. For instance, data for new entrants in drug treatment have been used as a proxy for ascertaining the characteristics of people experiencing drug problems (Mounteney et al., 2016). In addition, data on drug-related deaths have been used to assess trends in high-risk patterns of drug use. However, it is important to note that interpreting such data can be complicated by a range of factors, including

systematic under-reporting in some countries, process-induced delays and different definitions and measurements ([Mounteney et al., 2016](#); [Ruhm, 2005](#)).

The unique nature of the COVID-19 recession means that future research should also seek to include analysis on the policies that were implemented to dampen the economic impact caused by the pandemic, and how these may have impacted on mitigating or aggravating drug use during the economic downturn. This includes the programmes that sought to safeguard employment, such as national furlough schemes, other income and housing protection policies, restrictions to accessing certain social and health services, among others ([OECD, 2020b](#)). These policies likely had a major influence on the impact of the COVID-19 recession on people's lives, such as related to financial security and stress, and may also have played a role in shaping attitudes and desire to the use of illicit drugs.

Another issue worth highlighting for future research, of specific relevance to the COVID-19 recession, is the lack of studies on the impact of social isolation on drug use. Studies undertaken on the impact of social isolation on mental health may provide some insights on this issue. For example, two recent rapid systematic reviews conclude that children and adolescents are more likely to experience high rates of depression and anxiety during and after enforced isolation ([Loades et al., 2020](#); [Meherali et al., 2021](#)). Among elderly people, studies also indicate negative impacts on mental and physical health during social distancing for COVID-19 ([Grolli et al., 2021](#); [Sepúlveda-Loyola et al., 2020](#)). One systematic review and meta-analysis also concludes that there is an overall high psychological impact of the pandemic among healthcare workers, the general public and patients with pre-existing conditions or COVID-19 ([Luo et al., 2020](#)). These issues may merit further research, with specific focus on the impact of the pandemic on drug use. Relatedly, the national and international policies implemented to contain the pandemic and to protect the income and job security of individuals have likely influenced mental health and household financial stability. Future analysis on the impact of the COVID-19 recession on drug use may be strengthened by considering the potential of the recession with these policies in impacting on patterns of drug use.

Conclusion

As this scoping review of the literature shows, it is difficult to make generalisations in relation to the impact of economic recessions on the use of illicit drugs. However, when studying certain population groups and types of drugs in greater detail, some patterns of potential significance do emerge. Young and already vulnerable population groups appear to be most affected, as is also the case for recessions in general, where already socioeconomically vulnerable sub-populations tend to be disproportionately affected by economic downturns. Among young adults, several studies indicate that the use of cannabis may increase during economic downturns. Furthermore, some studies indicate that certain problematic patterns of substance use, such as switching from smoking or snorting to injecting drugs, may increase during periods of economic turmoil.

While decreases in the use of drugs have been noted among some cohorts of occasional users during economic downturns, conversely recessions also appear to be linked with increasing drug consumption among groups with already higher-frequency drug use behaviours. A number of studies suggest, for example, an increase in the use of opioids among groups with pre-existing high-risk opioid consumption patterns. Earlier initiation of injecting drug use, a higher frequency of emergency department visits and higher rates of reported opioid-related deaths have also been observed in the literature. These tentative results indicate that governments may benefit from directing further resources toward harm reduction and drug treatment during periods of economic downturn to prevent an increase in drug-related harms.

While these findings are informative, it is necessary to underscore the caveats and limitations inherent in current research. For example, the patterns identified for cannabis use among young people are not clear for other age groups and drug types. Even among the studies focusing on cannabis use among teenagers and

young adults there are mixed results. Moreover, the choice of indicators to measure recessions, such as unemployment or income, appear to influence the results – as does the choice of variables to measure drug use, or the consequences of drug use. Importantly, this initial scoping review shows that further research is needed in this area. This includes more granular and detailed analysis by demographic characteristics, such as age and gender, and patterns of drug use. While the results raised by this report are mixed, they contribute to a better understanding of the possible impact of the COVID-19 recession on the drugs situation in Europe, and by developing a stronger understanding of how the macroeconomic environment may impact on drug use and supply, the effectiveness of Europe's responses to emerging threats to health and security will be strengthened.

References

- Ananat, E., Gassman-Pines, A., Francis, D. and Gibson-Davis, C. (2011), 'Children left behind: the effects of statewide job loss on student achievement', *NBER Working Papers* 17104, doi:[10.3386/w17104](https://doi.org/10.3386/w17104).
- Antillón, M., Lauderdale, D. S. and Mullahy, J. (2014), 'Sleep behavior and unemployment conditions', *Economics & Human Biology* 14, pp. 22-32.
- Arkes, J. (2011), 'Recessions and the participation of youth in the selling and use of illicit drugs', *International Journal of Drug Policy* 22(5), pp. 335-340, doi:[10.1016/j.drugpo.2011.03.001](https://doi.org/10.1016/j.drugpo.2011.03.001).
- Ayllón, S. and Ferreira-Batista, N. (2018), 'Unemployment, drugs and attitudes among European youth', *Journal of Health Economics* 57, pp. 236-248, doi:[10.1016/j.jhealeco.2017.08.005](https://doi.org/10.1016/j.jhealeco.2017.08.005).
- Balbo, N., Carapella, P. and Toffolutti, V. (2020), 'Trends in the use of mind-altering drugs among European adolescents during the Great Recession', *Health Policy* 124(5), pp. 568-574, doi:[10.1016/j.healthpol.2020.03.004](https://doi.org/10.1016/j.healthpol.2020.03.004).
- Bambra, C., Riordan, R. and Ford, J. (2020), 'The COVID-19 pandemic and health inequalities', *Journal of Epidemiology Community Health* 74, pp. 964-968.
- Brainerd, E. and Cutler, D. (2004), 'Autopsy on an empire: understanding mortality in Russia and the former Soviet Union', *NBER Working Paper* 10868, doi:[10.3386/w10868](https://doi.org/10.3386/w10868).
- Bretteville-Jensen, A. L. (2011), 'Illegal drug use and the economic recession: What can we learn from the existing research?', *International Journal of Drug Policy* 22(5), pp. 353-359, doi:[10.1016/j.drugpo.2011.03.009](https://doi.org/10.1016/j.drugpo.2011.03.009).
- Brown, E. and Wehby, G. L. (2017), 'Economic conditions and drug and opioid overdose deaths', *Medical Care Research and Review* 76(4), pp. 462-477, doi:[10.1177/1077558717722592](https://doi.org/10.1177/1077558717722592).
- Cardani, R., Croitorov, O., Giovannini, M., Pfeiffer, P., Ratto, M. and Vogel, L. (2021), 'The Euro Area's pandemic recession: a DSGE-based interpretation', *Journal of Economic Dynamics and Control* 143, p. 104512, doi:[10.1016/j.jedc.2022.104512](https://doi.org/10.1016/j.jedc.2022.104512).
- Carliner, H., Mauro, P. M., Brown, Q. L., Shmulewitz, D., Rahim-Juwel, R., Sarvet, A. L., Wall, M. M., Martins, S. S., et al. (2017), 'The widening gender gap in marijuana use prevalence in the U.S. during a period of economic change, 2002–2014', *Drug and Alcohol Dependence* 170, pp. 51-58, doi:[10.1016/j.drugalcdep.2016.10.042](https://doi.org/10.1016/j.drugalcdep.2016.10.042).
- Carpenter, C. S., McClellan, C. B. and Rees, D. I. (2017), 'Economic conditions, illicit drug use, and substance use disorders in the United States', *Journal of Health Economics* 52, pp. 63-73, doi:[10.1016/j.jhealeco.2016.12.009](https://doi.org/10.1016/j.jhealeco.2016.12.009).
- Casal, B., Rivera, B. and Currais, L. (2020), 'Economic crisis, unemployment and illegal drug consumption in Spain', *Applied Economic Analysis* 28(83), pp. 153-170, doi:[10.1108/AEA-07-2019-0014](https://doi.org/10.1108/AEA-07-2019-0014).
- Chalmers, J. and Ritter, A. (2011), 'The business cycle and drug use in Australia: Evidence from repeated cross-sections of individual level data', *International Journal of Drug Policy* 22(5), pp. 341-352, doi:[10.1016/j.drugpo.2011.03.006](https://doi.org/10.1016/j.drugpo.2011.03.006).
- Colell, E., Sánchez-Niubò, A., Delclos, G. L., Benavides, F. G. and Domingo-Salvany, A. (2015), 'Economic crisis and changes in drug use in the Spanish economically active population', *Addiction* 110(7), pp. 1129-1137, doi:[10.1111/add.12923](https://doi.org/10.1111/add.12923).

- Compton, W. M., Gfroerer, J., Conway, K. P. and Finger, M. S. (2014), 'Unemployment and substance outcomes in the United States 2002-2010', *Drug and Alcohol Dependence* 142, pp. 350-353, doi:[10.1016/j.drugalcdep.2014.06.012](https://doi.org/10.1016/j.drugalcdep.2014.06.012).
- Costa Storti, C. and Grauwe, P. (2009), 'The cocaine and heroin markets in the era of globalisation and drug reduction policies', *International Journal of Drug Policy* 20(6), pp. 488-496, doi:[10.1016/j.drugpo.2009.02.004](https://doi.org/10.1016/j.drugpo.2009.02.004).
- Costa Storti, C., Grauwe, P., Sabadash, A. and Montanari, L. (2011), 'Unemployment and drug treatment', *International Journal of Drug Policy* 22(5), pp. 366-373, doi:[10.1016/j.drugpo.2011.05.002](https://doi.org/10.1016/j.drugpo.2011.05.002).
- Czeisler, M., Lane, R. and Petrosky, E. (2020), 'Mental health, substance use, and suicidal ideation during the COVID-19 pandemic: United States, June 24-30, 2020', *Morbidity and Mortality Weekly Report* 69, pp. 1049-1057, doi:[10.15585/mmwr.mm6932a1external](https://doi.org/10.15585/mmwr.mm6932a1external).
- de Goeij, M., Suhrcke, M., Toffolutti, V., Mheen, D., Schoenmakers, T. and Kunst, A. (2015), 'How economic crises affect alcohol consumption and alcohol-related health problems: a realist systematic review', *Social Science & Medicine* 131, pp. 131-146, doi:[10.1016/j.socscimed.2015.02.025](https://doi.org/10.1016/j.socscimed.2015.02.025).
- Dom, G., Samochowiec, J., Evans-Lacko, S., Wahlbeck, K., Hal, G. and McDaid, D. (2016), 'The impact of the 2008 economic crisis on substance use patterns in the countries of the European Union', *International Journal of Environmental Research and Public Health* 13(1), doi:[10.3390/ijerph13010122](https://doi.org/10.3390/ijerph13010122).
- Dubanowicz, A. L., P. (2015), 'Impact of the economic recession on addiction-prone behaviours', in Anderson, P. R., J; Room, R (editor), *Impact of addictive substances and behaviours on individual and societal well-being*, Oxford University Press, Oxford, doi:[10.1093/acprof:oso/9780198714002.001.0001](https://doi.org/10.1093/acprof:oso/9780198714002.001.0001).
- Eichengreen, B., Saka, O. and Aksoy, C. G. (2020), 'The political scar of epidemics', *NBER Working Papers* 27401, doi:[10.3386/w27401](https://doi.org/10.3386/w27401).
- EMCDDA (2014), *Financing drug policy in Europe in the wake of the economic recession*, EMCDDA Papers, Publications Office of the European Union, Luxembourg, doi:[10.2810/221114](https://doi.org/10.2810/221114).
- EMCDDA (2021a), *Drug-related deaths and mortality in Europe: update from the EMCDDA expert network*, Technical Report, Publications Office of the European Union, Luxembourg, doi:[10.2810/777564](https://doi.org/10.2810/777564)
- EMCDDA (2021b), *Impact of COVID-19 on drug markets, use, harms and drug services in the community and prison: results from an EMCDDA trendspotter study*, Publications Office of the European Union, Luxembourg, doi:[10.2810/498734](https://doi.org/10.2810/498734).
- European Central Bank (2022), [Macroeconomic projections](#).
- European Commission (2021), [Spring 2021 economic forecast: rolling up sleeves](#).
- European Parliamentary Research Service (2019), [A decade on from the crisis: main responses and remaining challenges](#).
- Eurostat (2023), [Statistics explained](#).
- Frasquilho, D., Matos, M., Gaspar, T. and Almeida, J. M. (2016a), 'Young people's well-being and the economic crisis: How does parental unemployment and family wealth affect the downturn experience?', *Children and Youth Services Review* 69, pp. 219-222, doi:[10.1016/j.childyouth.2016.08.018](https://doi.org/10.1016/j.childyouth.2016.08.018).
- Frasquilho, D., Matos, M. G., Salonna, F., Guerreiro, D., Storti, C. C., Gaspar, T. and Caldas-de-Almeida, J. M. (2016b), 'Mental health outcomes in times of economic recession: a systematic literature review', *BMC Public Health* 16(115), doi:[10.1186/s12889-016-2720-y](https://doi.org/10.1186/s12889-016-2720-y).

Ghoshray, A., Ordóñez, J. and Sala, H. (2016), 'Euro, crisis and unemployment: Youth patterns, youth policies?', *Economic Modelling* 58, pp. 442-453.

Grolli, R. E., Mingoti, M. E. D., Bertollo, A. G., Luzardo, A. R., Quevedo, J., Réus, G. Z. and Ignácio, Z. M. (2021), 'Impact of COVID-19 in the mental health in elderly: psychological and biological updates', *Molecular Neurobiology* 58(5), pp. 1905-1916, doi:[10.1007/s12035-020-02249-x](https://doi.org/10.1007/s12035-020-02249-x).

Henkel, D. (2011), 'Unemployment and substance use: a review of the Literature (1990-2010)', *Current Drug Abuse Reviews* 4(1), pp. 4-27, doi:[10.2174/1874473711104010004](https://doi.org/10.2174/1874473711104010004).

Hines, L., Trickey, A., Leung, J., Larney, S., Peacock, A., Degenhardt, L., Colledge, S., Hickman, M., et al. (2020), 'Associations between national development indicators and the age profile of people who inject drugs: results from a global systematic review and meta-analysis', *The Lancet Global Health* 8(1), pp. e76-e91.

Hollingsworth, A., Ruhm, C. J. and Simon, K. (2017), 'Macroeconomic conditions and opioid abuse', *Journal of Health Economics* 56, pp. 222-233, doi:[10.1016/j.jhealeco.2017.07.009](https://doi.org/10.1016/j.jhealeco.2017.07.009).

Junankar, P. (2011), 'The global economic crisis: long-term unemployment in the OECD', *Discussion Paper*, Institute for the Study of Labor, Bonn.

Kalousova, L. and Burgard, S. A. (2014), 'Unemployment, measured and perceived decline of economic resources: contrasting three measures of recessionary hardships and their implications for adopting negative health behaviors', *Social Science and Medicine* 106, pp. 28-34, doi:[10.1016/j.socscimed.2014.01.007](https://doi.org/10.1016/j.socscimed.2014.01.007).

Lakhdar, C. B. and Bastianic, T. (2011), 'Economic constraint and modes of consumption of addictive goods', *International Journal of Drug Policy* 22(5), pp. 360-365, doi:[10.1016/j.drugpo.2011.03.004](https://doi.org/10.1016/j.drugpo.2011.03.004).

Lancet Psychiatry (2021), 'COVID-19 and mental health', *Lancet Psychiatry* 8(2), p. 87, doi:[10.1016/S2215-0366\(21\)00005-5](https://doi.org/10.1016/S2215-0366(21)00005-5).

Lijffijt, M., Hu, K. and Swann, A. C. (2014), 'Stress modulates illness-course of substance use disorders: A translational review', *Frontiers in Psychiatry* 5, doi:[10.3389/fpsy.2014.00083](https://doi.org/10.3389/fpsy.2014.00083).

Loades, M. E., Chatburn, E., Higson-Sweeney, N., Reynolds, S., Shafran, R., Brigden, A., Linney, C., McManus, M. N., et al. (2020), 'Rapid systematic review: The impact of social isolation and loneliness on the mental health of children and adolescents in the context of COVID-19', *Journal of the American Academy of Child and Adolescent Psychiatry* 59(11), pp. 1218-1239, doi:[10.1016/j.jaac.2020.05.009](https://doi.org/10.1016/j.jaac.2020.05.009).

Luo, M., Guo, L., Yu, M., Jiang, W. and Wang, H. (2020), 'The psychological and mental impact of coronavirus disease 2019 (COVID-19) on medical staff and general public: a systematic review and meta-analysis', *Psychiatry Research* 291(113190), doi:[10.1016/j.psychres.2020.113190](https://doi.org/10.1016/j.psychres.2020.113190).

Macleod, J. C., Horn, B. P. and Cantor, J. H. (2020), 'Business cycles and admissions to substance abuse treatment', *Contemporary Economic Policy* 38(1), pp. 139-154, doi:[10.1111/coep.12439](https://doi.org/10.1111/coep.12439).

Macleod, J., Hickman, M. and Smith, G. D. (2005), 'Reporting bias and self-reported drug use', *Addiction* 100, pp. 562-563, doi:[10.1111/j.1360-0443.2005.01099.x](https://doi.org/10.1111/j.1360-0443.2005.01099.x).

Marie, O. and Zöllitz, U. (2017), "'High" achievers? Cannabis access and academic performance', *The Review of Economic Studies* 84(3), pp. 1210-1237.

Martin Bassols, N. and Vall Castelló, J. (2016), 'Effects of the great recession on drugs consumption in Spain', *Economics & Human Biology* 22, pp. 103-116, doi:[10.1016/j.ehb.2016.03.005](https://doi.org/10.1016/j.ehb.2016.03.005).

Mateo-Urdiales, A., Barrio, G., Belza, M. J., Guerras, J. M. and Regidor, E. (2020), 'Changes in drug and alcohol-related mortality by educational status during the 2008-2011 economic crisis: results from a Spanish longitudinal study', *Addictive Behaviors* 104, p. 106255, doi:[10.1016/j.addbeh.2019.106255](https://doi.org/10.1016/j.addbeh.2019.106255).

McCaffrey, D. F., Liccardo Pacula, R., Han, B. and Ellickson, P. (2010), 'Marijuana use and high school dropout: the influence of unobservables', *Health Economics* 19, pp. 1281-1299.

McKee-Ryan, F., Song, Z., Wanberg, C. R. and Kinicki, A. J. (2005), 'Psychological and physical well-being during unemployment: a meta-analytic study', *Journal of Applied Psychology* 90(1), pp. 53-76, doi:[10.1037/0021-9010.90.1.53](https://doi.org/10.1037/0021-9010.90.1.53).

Meherali, S., Punjani, N., Louie-Poon, S., Abdul Rahim, K., Das, J. K., Salam, R. A. and Lassi, Z. S. (2021), 'Mental health of children and adolescents amidst COVID-19 and past pandemics: a rapid systematic review', *International Journal of Environmental Research and Public Health* 18(7), p. 3432, doi:[10.3390/ijerph18073432](https://doi.org/10.3390/ijerph18073432).

Mounteney, J., Griffiths, P., Sedefov, R., Noor, A., Vicente, J. and Simon, R. (2016), 'The drug situation in Europe: an overview of data available on illicit drugs and new psychoactive substances from European monitoring in 2015', *Addiction* 111(1), pp. 34-48, doi:[10.1111/add.13056](https://doi.org/10.1111/add.13056).

Nagelhout, G. E., Hummel, K., Goeij, M. C. M., Vries, H., Kaner, E. and Lemmens, P. (2017), 'How economic recessions and unemployment affect illegal drug use: a systematic realist literature review', *International Journal of Drug Policy* 44, pp. 69-83, doi:[10.1016/j.drugpo.2017.03.013](https://doi.org/10.1016/j.drugpo.2017.03.013).

OECD (2020a), *Inequalities in household wealth and financial insecurity of households*, OECD Publishing, Paris, doi:[10.1787/b60226a0-en](https://doi.org/10.1787/b60226a0-en).

OECD (2020b), *Supporting people and companies to deal with the COVID-19 virus: options for an immediate employment and social-policy response*, OECD Publishing, Paris, doi:[10.1787/d33dffe6-en](https://doi.org/10.1787/d33dffe6-en).

OECD (2021), *OECD employment outlook 2021: navigating the COVID-19 crisis and recovery*, OECD Publishing, Paris, doi:[10.1787/5a700c4b-en](https://doi.org/10.1787/5a700c4b-en).

Pabilonia, S. W. (2014), 'The effects of the Great Recession on teenagers' risky health behaviors and time use', *Discussion Papers*, Institute for the Study of Labor, Bonn.

Pacula, R. (2011), 'Substance use and recessions: What can be learned from economic analysis of alcohol?', *International Journal of Drug Policy*, doi:[10.1016/j.drugpo.2011.07.008](https://doi.org/10.1016/j.drugpo.2011.07.008).

Paling, T. and Vall Castello, J. (2017), 'Business cycle impacts on substance use of adolescents: a multi-country analysis', *Economics of Human Biology* 27, pp. 1-11, doi:[10.1016/j.ehb.2017.04.005](https://doi.org/10.1016/j.ehb.2017.04.005).

Payne, J., Manning, M., Fleming, C. and Pham, H.-T. (2020), *The price elasticity of demand for illicit drugs: a systematic review*, Trends & Issues in Crime and Criminal Justice, Australian Institute of Criminology, Canberra.

Pierce, M., Hope, H., Ford, T., Hatch, S., Hotopf, M., John, A., Kontopantelis, E., Webb, R., et al. (2020), 'Mental health before and during the COVID-19 pandemic: a longitudinal probability sample survey of the UK population', *Lancet Psychiatry* 7(10), pp. 883-892, doi:[10.1016/S2215-0366\(20\)30308-4](https://doi.org/10.1016/S2215-0366(20)30308-4).

Pissarides, C. A. (2013), 'Unemployment in the Great Recession', *Economica* 80(319), pp. 385-403.

Rehm, J., Kilian, C., Ferreira-Borges, C., Jernigan, D., Monteiro, M., Parry, C., Sanchez, Z. M. and Manthey, J. (2020), 'Alcohol use in times of the COVID 19: implications for monitoring and policy', *Drug and Alcohol Review* 39(4), pp. 301-304, doi:[10.1111/dar.13074](https://doi.org/10.1111/dar.13074).

Ruhm, C. J. (2000), 'Are recessions good for your health?', *Quarterly Journal of Economics* 115(2), pp. 617-650.

Ruhm, C. J. (2005), 'Healthy living in hard times', *Journal of Health Economics* 24(2), pp. 341-361, doi:[10.1016/j.jhealeco.2004.09.007](https://doi.org/10.1016/j.jhealeco.2004.09.007).

Ruhm, C. J. (2015), 'Recessions, healthy no more?', *Journal of Health Economics* 42, pp. 17-28.

Ruhm, C. J. (2018), 'Deaths of despair or drug problems?', National Bureau of Economic Research.

Ryan, P. (2001), 'The school-to-work transition: a cross-national perspective', *Journal of Economic Literature* 39(1), pp. 34-92.

Schmidt, R. A., Genois, R., Jin, J., Vigo, D., Rehm, J. and Rush, B. (2021), 'The early impact of COVID-19 on the incidence, prevalence, and severity of alcohol use and other drugs: a systematic review', *Drug and Alcohol Dependence* 228(109065), doi:[10.1016/j.drugalcdep.2021.109065](https://doi.org/10.1016/j.drugalcdep.2021.109065).

Sepúlveda-Loyola, W., Rodríguez-Sánchez, I., Pérez-Rodríguez, P., Ganz, F., Torralba, R., Oliveira, D. V. and Rodríguez-Mañas, L. (2020), 'Impact of social isolation due to COVID-19 on health in older people: mental and physical Effects and recommendations', *Journal of Nutrition, Health and Aging* 24(9), pp. 938-947, doi:[10.1007/s12603-020-1469-2](https://doi.org/10.1007/s12603-020-1469-2).

Velev, M. (2018), 'Unemployment and economic growth: is there a relationship in the European Union?', *Acta Oeconomica Pragensia* 2018(4), pp. 12-29, doi:[10.18267/j.aop.609](https://doi.org/10.18267/j.aop.609).

Yang, J. C., Roman-Urrestarazu, A. and Brayne, C. (2018), 'Binge alcohol and substance use across birth cohorts and the global financial crisis in the United States', *PLoS ONE* 13(6), doi:[10.1371/journal.pone.0199741](https://doi.org/10.1371/journal.pone.0199741).

Zuccato, E., Castiglioni, S., Tettamanti, M., Olandese, R., Bagnati, R., Melis, M. and Fanelli, R. (2011), 'Changes in illicit drug consumption patterns in 2009 detected by wastewater analysis', *Drug and Alcohol Dependence* 118(2-3), pp. 464-469, doi:[10.1016/j.drugalcdep.2011.05.007](https://doi.org/10.1016/j.drugalcdep.2011.05.007).

Appendix

Summary of the studies included in the scoping literature review

References	Region/ country	Time period	Study population	Methodology	Variables used to assess drug use	Variables used to assess recession	Substances	Main results and findings	Limitations
Arkes (2011)	United States	Two periods: 1996-2004 and 2000-2007	Teenagers (15-19) and young adults (20-24)	Panel data analysis, with state fixed effects, for unobserved time-invariant differences across states and year fixed effects	General/school population surveys on drug use (National Longitudinal Survey of Youth – NLSY)	Unemployment	Cannabis Other drugs (cocaine, or crack or heroin, or any other substance not prescribed by a doctor)	The expanded sample of teenagers (15- to 19-year-olds) shows countercyclical cannabis and cocaine use, with six of the seven estimates being positive and significant. The magnitude of the effects is generally smaller for the 15- to 19-year-olds than for the sample of 16- to 18-year-olds from the original study. For the young adults (20-24 years old), all estimates for cannabis are positive and highly significant. Only one of the three estimates of other drugs is significant, so there is weak evidence of its effects on young adults.	For young adults (20-24 years old), only one of the three estimates of other drugs than cannabis is significant. So, there is weak evidence of effects on their use among this set of population. No data available to conduct the analysis for adults. Data limitations did not permit to separately identify specific illicit drugs, and the relevant question in the NLSY also explicitly excludes the use of drugs prescribed by physicians, which is of particular interest to public health officials in light of the increase in prescription drug misuse – conversely to the NSDUH data. Model was estimated based on a time period when the national unemployment ranged from 4% to about 7%. The unemployment rate in the US peaked at 10% during recession. One can imagine that there are non-linear effects of the unemployment rate, yet estimating those would be difficult given the multicollinearity involved in having a quadratic term.

References	Region/ country	Time period	Study population	Methodology	Variables used to assess drug use	Variables used to assess recession	Substances	Main results and findings	Limitations
Ayllón and Ferreira-Batista (2018)	European (28 countries)	Years 2004, 2008, 2011, 2014	Young people (aged 15-24 years), leading to progressive dependence (<i>N</i> = 45 412)	Logit and generalised ordered logit models with fixed effects	General/school population surveys on drug use (Eurobarometer surveys on 'Young people and drugs')	Four variables are used to assess recession. (1) Total unemployment rate at country level (2) Total unemployment rate at regional level (3) Youth unemployment rate (15-24) at country level (4) Youth unemployment rate at regional level	Cannabis, new psychoactive substances, ecstasy, cocaine and heroin	An increase of 1% in the regional unemployment rate is associated with an increase of 0.7 percentage points in the ratio of young people who state that they have consumed cannabis at some point in time. Moreover, higher unemployment may be associated with more young people perceiving that access to drugs has become more difficult, particularly access to ecstasy, cocaine and heroin.	Results are limited to the information available and the degree of harmonisation within four rounds of annual surveys. It is possible that the observed changes in drug use were larger than would have been the case if the business cycle fluctuation had been smoother – exceptional situations lead to exceptional outcomes.

References	Region/ country	Time period	Study population	Methodology	Variables used to assess drug use	Variables used to assess recession	Substances	Main results and findings	Limitations
Balbo et al. (2020)	25 European countries	Years 2007 and 2011	Adolescents (aged 15 to 17 years); (<i>N</i> = 137 989 individuals)	Linear probability model, with time and country fixed effects.	General/school population surveys on drug use: European School Survey Project on Alcohol and Other Drugs (ESPAD)	Adult unemployment rate – country level and social-protection expenditure per capita indexed to 2010	Inhalants, cocaine and ecstasy	<p>The article finds that the use of the three substances is more common among adolescents in the lowest socio-economic status (SES). Adolescents from higher SES have increased consumption in inhalants, while they decreased their consumption of both cocaine and ecstasy. The decrease in ecstasy consumption for the medium SES between 2007 and 2011 is particularly evident. Inhalants and cocaine consumption appear to be countercyclical. More precisely, a one percentage point increase in the unemployment rate is associated with an increase in the probability of having tried inhalants and cocaine at least once. Conversely, ecstasy consumption appears to be procyclical. A one percentage point increase in the unemployment rate is associated with a decreased probability of having tried ecstasy at least once. The results obtained of both cocaine and inhalant consumption suggests that during economic downturns adolescents tend to cope with uncertainty about their future, and related stress, by increasing the consumption of both substances. However, as the rise in inhalants was the largest, this suggests that adolescents have adapted to their tighter budget and swapped to cheaper substances, such as inhalants.</p>	<p>Results cannot provide causal relationships, but only associations: this is essentially the case with all studies in this field.</p> <p>Second, data are limited to 2011. Hence were unable to capture the long-term effects of the 2008 recession and its aftermath.</p> <p>ESPAD is a cross-sectional survey, hence we are unable to analyse changes in an individual's behaviour.</p> <p>Adolescents who are full-time students represent our sample of interest. Therefore, estimates might be conservative, as were unable to capture the effect of the labour market on them.</p> <p>Only data on lifetime consumption was collected, without distinguishing between occasional and regular substance use.</p>

References	Region/ country	Time period	Study population	Methodology	Variables used to assess drug use	Variables used to assess recession	Substances	Main results and findings	Limitations
Brown and Wehby (2017)	United States, 50 US states and the District of Columbia	From 1999 to 2014	Population counts for states by year, age-group, race, ethnicity, and sex (<i>N</i> : the number of observations for the main analyses ranged from 778 state-year observations for prescription opioid deaths to 811 state-year observations)	Regression model, ordinary least squares with robust standard errors clustered at the state level, with state fixed effects	Mortality dataset: Centers for Disease Control and Prevention detailed mortality file (DMF)	Unemployment rate, median house income, house price index annual weeks worked, usual work hours, proportion with health coverage proportion construction jobs, proportion manufacturing jobs proportion farming/fishing jobs	All drugs and opioids	Unemployment was positively but non-significantly associated with all-drug overdose deaths and opioid-related deaths (any opioid and prescription opioids). In contrast, an increase in house price was significantly associated with a decline in deaths from any opioid or prescription opioid drugs. An increase in median house price by USD 10 000 was associated with a decline in any opioid overdose deaths by 0.15 per 100 000 and a decline of 0.17 deaths per 100 000 for prescription opioid deaths or by nearly 3% and 4% of any opioid and prescriptions opioid-related deaths, respectively. A drop in median house prices by about USD 70 000 as observed during the Great Recession could potentially contribute to nearly 25% rise in opioid death rates with larger effects among males, non-Hispanic whites, and younger adults.	The use of state-level data may mask within-states variations – a problem transversal to all country-level analysis.

References	Region/ country	Time period	Study population	Methodology	Variables used to assess drug use	Variables used to assess recession	Substances	Main results and findings	Limitations
Carliner et al. (2017)	United States	From 2002 to 2014	Cross-sectional national data on substance use in a sample of the US population over age 12, living in households and non-institutional group quarters (N = 492 831)	Logistic regressions	General/school population surveys on drug use (National Survey on Drug Use and Health)	Household income level	Cannabis	Prevalence of cannabis use increased for both men and women between 2007 and 2014, but more for men, leading to a widening of this gender gap. Sensitivity analyses highlight that these changes occurred among daily and non-daily cannabis users. Stratified analyses and tests of statistical interaction showed that the gender gap in cannabis use prevalence only increased in households earning less than USD 50 000 annually. Men at the lowest income levels reported the greatest increases in cannabis use (+6.2%) between 2007 and 2014, even after controlling for sociodemographic differences in income strata. This corresponds with national economic trends including the beginning of the Great Recession.	The survey relies on self-reported substance use, which can be subject to bias due to its historically illicit status and the government-sponsored nature of the survey – a problem transversal to all country-level analysis. Possibility of reverse causation in the association between unemployment and income loss.
Carpenter et al. (2017)	United States	From 2002 to 2015	NSDUH respondents age 12 and older (N = 950 000)	Standard two-way fixed effects models	General/school population surveys on drug use (National Survey on Drug Use and Health)	State unemployment rates	7 mutually exclusive categories of illicit drugs: cocaine (including crack); other stimulants (including methamphetamine); analgesics (i.e., prescription pain relievers); heroin; sedatives and tranquillisers; hallucinogens; and inhalants	Results from difference-in-differences models relating past-year use to past-year state unemployment rates provide evidence that recent use of ecstasy and heroin is significantly countercyclical, while use of LSD, crack, and cocaine is significantly procyclical. Results for other classes of drugs are mixed and not consistent. The authors find clear evidence that substance use disorders involving alcohol, cannabis, analgesics, and hallucinogens are strongly countercyclical.	After 2015, the NSDUH questionnaire has DSM-5 criteria for a revised set of questions as part of a larger redesign of the survey. However, when the study was concluded only DSM-4 criteria was available. Therefore, to reflect the new understanding that substance use disorder is not separable into abuse and dependence but instead should be viewed on a continuum, they used the DSM-4 diagnostic criteria that overlap with the DSM-5 criteria for questions asked during the period 2002-2015 to produce substance use disorder measures that are consistent with the current DSM-5 algorithm.

References	Region/ country	Time period	Study population	Methodology	Variables used to assess drug use	Variables used to assess recession	Substances	Main results and findings	Limitations
Casal et al. (2020)	Spain	Years 2007 and 2013	Spanish households (aged 15 to 64) (<i>N</i> = 23 258 in 2007 and 22 862 in 2013)	Matching methods and differences-in- differences (DID) estimation method between the two periods of analysis	General/school population surveys on drug use (Observatorio Español sobre Drogas (EDADES) survey)	Employability	Cannabis and cocaine	Of the three types of consumption considered, and for both years, cannabis users show lower increases in their probability of being jobless. There is a rise of 3.4 percentage points (pp) for those who report using this substance in the past 12 months in 2007 with respect to non-users. Considering the indicator of consumption, the ATT reaches a value of 8.64 pp, in the case of cannabis users; 9.73 pp among those who consume cocaine and 9.73 pp for those who claim to have consumed both substances in the past year. The economic crisis intensified the negative effects of drug use on employment (the effect is higher for poly-drug users). The study concludes that drug consumption during an economic downturn intensified the negative effects on an individual's employability.	Possibility of bias due to the use of cross-sectional data.

References	Region/ country	Time period	Study population	Methodology	Variables used to assess drug use	Variables used to assess recession	Substances	Main results and findings	Limitations
Chalmers and Ritter (2011)	Australia	From 1991 to 2007	Population (aged 14-49) (<i>N</i> = 56 347 for cannabis and <i>N</i> = 53 340 for alcohol prevalence, respectively; <i>N</i> = 53 340 for alcohol participation, <i>N</i> = 10 187 for cannabis frequency use; <i>N</i> = 48 385 for frequency of drinking)	Probit models and ordered probit models	General/school population surveys on drug use (Australia's National Drug Strategy Household Survey (NDSHS))	Unemployment rate and real income per capita	Cannabis and alcohol	Recent participation in cannabis use (within the last year) increases with falls in income per capita regardless of age, although the increase is less marked for young people (14-24 years). Whereas the participation rate of people aged 25-49 years also falls with rising unemployment rates, the participation of younger people increases. Cannabis users younger than 35 will use more frequently as the unemployment rate rises. In contrast, older Australians will use less frequently. Regardless of income per capita people aged 35-49 years use less frequently during downturns whilst those aged 25-34 years use a little more frequently. There is no gender difference. A one percentage point increase in the unemployment rate would reduce the frequency of weekly use amongst users in their late 30s and 40s by 2.1 percentage points from the mean of 43.9 per cent to 41.8 per cent. In contrast it would increase the proportion of weekly users amongst younger users. The estimated increase for the 14-24 years age group would be 1.4 percentage points from 35.4 per cent to 36.8 per cent. Whereas, the 25-34 year age group is estimated to experience a 0.5 percentage point increase.	The long period (16 years) of observations had data gaps of two to three years between surveys. The period includes only one classical Australia-wide recession followed by a decade or more of reasonably steady economic growth. The use of regional variations in unemployment rates alleviates this concern somewhat, since several of the state economies experienced more than one economic downturn during that period. But, all of the states experienced positive growth in real per capita income between each of the surveys; uncertainty about the relevance of that period for the more recent slowdown in economic activity. Whilst it is true that the unemployment rate rise is well within the bounds of rises experienced in the observation period, there may be different forces in play regarding supply. Rigorous investigation of the importance of the various theoretical claims for the relationship between recession and illicit drug use necessitates following people over time. This would allow differentiation between the impacts of job loss, reduced income from work, reduced wealth, and increased anxiety about job loss and, for the longer term unemployed, the reduction in the opportunity to find work.

References	Region/ country	Time period	Study population	Methodology	Variables used to assess drug use	Variables used to assess recession	Substances	Main results and findings	Limitations
Colell et al. (2015)	Spain	Two periods: 2005-2007 and 2009-2011	Economically active individuals (N = 62 440 individuals)	Cross-sectional data Poisson regression models (prevalence ratios) and multinomial regression models (relative risk ratios)	General/school population surveys on drug use (Spanish Household Survey on Alcohol and Drugs – EDADES)	Employment status	Alcohol Cannabis and of hypnotics/sedatives	<p>In men, no significant differences between periods were found for cannabis (5.6% and 5.2% for sporadic use and 6.0% and 5.7% for heavy use, respectively), while in women differences between periods were significant for sporadic use (3.1% in period 1 and 2.4% in period 2, but not for heavy use (approximately 2%).</p> <p>Unemployed men and women were more likely to have increased sporadic use of cannabis in period 2 (compared with their employed counterparts). Unemployed individuals were more likely to have increased sporadic use of cannabis in period 2 compared to their employed counterparts</p> <p>Regarding heavy cannabis use, differences between periods were not significant, while it was significantly more likely among unemployed men both overall and by age group, and overall and in the older group only in women.</p> <p>Sporadic and heavy use of cannabis remained stable among the younger group between both periods (sporadic used even decreased among younger women)</p>	<p>Since data are cross-sectional, the model cannot test causality but association between use and explanatory variables only.</p> <p>Database information deficits prevented authors from considering possible clustering effects due to the sample design, which may have biased estimates. However, as this would typically affect results with borderline significance and most of the associations obtained were robust, we believe the impact of this is very small.</p> <p>Possibility of reporting bias affecting the validity of self-reported measures of drug use. However, the under-reporting derived from shared modules would affect both periods of study alike.</p> <p>The high rate of non-response might be affecting prevalence estimates as people unavailable or refusing to participate may share specific characteristics with respect to drug use. However, this selection bias would affect both periods similarly.</p> <p>Similarly, unemployed individuals could be over-represented in our sample, as they would be more available to participate in the survey.</p>

References	Region/ country	Time period	Study population	Methodology	Variables used to assess drug use	Variables used to assess recession	Substances	Main results and findings	Limitations
Compton et al. (2014)	United States	Four periods: 2002-2004, 2005-2007, 2008, 2009-2010	Non-institutionalised adults (age 18 or older) (<i>N</i> = 405 000 individuals)	Multivariate logistic regression models	General/school population surveys on drug use: National Survey on Drug Use and Health (NSDUH) For analysis of the timing of cannabis use by unemployed, self-report information about any use of cannabis during the period from 13 to 24 months prior to interview was used in the past 12 months	Employment status	Alcohol Tobacco Illicit drugs	<p>For every time period, each category of problematic substance use was more prevalent among the unemployed. The association between unemployment and substance use was consistent (exception of alcohol abuse/dependence for the 18-25 subgroup).</p> <p>For illicit drug use, abuse and dependence, a higher rate was found for the unemployed (compared to the employed).</p> <p>Unemployed compared to employed persons were more likely to report illicit drug use, and drug abuse or dependence. None of the odds ratios from 2009-2010 were significantly different than odds ratios from earlier time periods for any outcome.</p> <p>During a period of macroeconomic distress, the relationship of unemployment to problematic substance use persisted.</p>	<p>Since data are cross-sectional, the model cannot test causality but association between use and explanatory variables only.</p> <p>The model did not analyse the impact of 'part-time jobs' or 'unemployment' on the drug use.</p>

References	Region/ country	Time period	Study population	Methodology	Variables used to assess drug use	Variables used to assess recession	Substances	Main results and findings	Limitations
Costa Storti et al. (2011)	Europe	From 2002 to 2007	Persons entering treatment during the calendar year regardless of having been treated before (during their lifetime). Inpatient/residential services are excluded from the database	Panel data analysis, with state fixed effects	Drug treatment datasets: European data: number of persons entering in treatment (excluding Inpatient/residential services) – EMCDDA treatment database German data: number of persons entering treatment (excluding Inpatient/residential services) – IFT Institut für Therapieforschung	Economy-wide unemployment rate	Opioids, cocaine, stimulants (amphetamines, MDMA and others), hypnotics and sedatives, hallucinogens, volatile inhalants and cannabis	<p>Authors found that the unemployment rate had a significant negative effect on the total number of drug treatment clients. A decline in unemployment increases the number of unemployed drug clients. This increase is the result of the incentive effect (unemployed people who use drugs have better incentives to seek treatment when employment prospects improve) and of the supply effect (better economic conditions lead to an increase in the supply of treatment centres).</p> <p>The unemployment rate had a significant negative effect on the number of unemployed drug clients seeking treatment. The negative effect of unemployment on the total number of drug clients comes exclusively from the structural component of unemployment. The cyclical component of unemployment has no significant effect on the total number of drug treatment clients.</p> <p>For heroin, the authors found a positive and significant effect of unemployment on the number of drug treatment clients (heroin users tend to be people with problematic patterns of use, for which the incentive effect is very weak).</p>	<p>Comparability across countries of drug treatment data for EU countries is somehow limited.</p> <p>The coverage of the EU drug treatment centres and the percentage of total clients accounted for can differ from country to country.</p> <p>Treatment data for EU countries include mostly clients who benefit from specialist treatment. As a result, they do not generally consider those receiving treatment from non-specialists such as hospital emergency rooms, general practitioners, other primary care or psychiatric services and low threshold facilities.</p> <p>The German dataset overcomes most of the previous limitations.</p>

References	Region/ country	Time period	Study population	Methodology	Variables used to assess drug use	Variables used to assess recession	Substances	Main results and findings	Limitations
Dom et al. (2016)	European Union	Studies published from 1 January 2008 to 31 May 2015	Pubmed database 17 studies were included in the qualitative analysis	Literature review (PRISMA methodology)	Search terms: (alcohol or drugs or nicotine or smoking) or (alcohol or drugs or nicotine) abuse or dependence and (economic crisis or business cycles) and Europe, within the title or abstract	Different variables related to economic crisis	Alcohol Tobacco Illicit drugs	<p>Reductions in population's overall substance use and increase in harmful use and negative effects is found within specific subgroups within the society. Risk factors included, such as job-loss and long-term unemployment, and pre-existing vulnerabilities.</p> <p>Overall, a majority of the studies state that the economic crisis has been paralleled with a reduction of use and heavy use in the general population. This accounts specifically for drinking alcohol and cigarette smoking but not for illicit drugs.</p> <p>Specific subgroups are very negatively affected by the economic crisis. Most studies in this overview highlight the negative effect of job-loss and unemployment on substance use patterns; more risky use (binge drinking), alcohol-related hospitalisation and mortality, and illicit drug use. Young men confronted with enduring longer standing unemployment may be at higher risk for substance use disorders and related problems during economic crises.</p> <p>Limited number of studies on drugs shows a consistent increase of use during the economic crisis. Compared to alcohol use the relationship between unemployment and increases in illicit drug use is much more consistent.</p>	<p>Low number of studies found (partly due to limited search to Pubmed engine).</p> <p>Limited to conventional substances of use (leaving out prescribed drugs or legal highs).</p> <p>Limited the review to EU countries.</p>

References	Region/ country	Time period	Study population	Methodology	Variables used to assess drug use	Variables used to assess recession	Substances	Main results and findings	Limitations
Henkel (2011)	International studies (different countries)	Studies published from 1990 to 2010	Medline, Pubmed, Embase, Psycit, Web of science, Google, Google scholar	Literature review	Search terms: unemployment, job loss, unemployment rate, employment, business cycle, labour force outcome, combined with: alcohol (use, abuse, dependence), hazardous, binge, heavy drinking, alcohol-related mortality, illicit drugs (use, abuse, dependence), prescription drugs (medical, nonmedical use), tobacco (smoking, nicotine dependence), relapse (therapy, rehabilitation), smoking, smoking cessation	Employment status	Alcohol (use, abuse, dependence) Illicit drugs (use, abuse, dependence) Prescription drugs (medical, non-medical use) Tobacco	<p>Illicit drug consumption is more prevalent among the unemployed. They are also more likely to drug disorders (abuse, dependence).</p> <p>Problematic substance use increases the likelihood of unemployment and decreases the chance of finding and holding down a job.</p> <p>Unemployment is a significant risk factor for substance use and the subsequent development of substance use disorders.</p> <p>Unemployment increases the risk of relapse after drug addiction treatment.</p> <p>A countercyclical trend was observed amongst adolescents.</p> <p>Only one study could be located that investigated the relationship between economic changes and illicit drug use. The study findings provided strong evidence that links a weaker economy to increased consumption of cannabis, alcohol, cocaine and other hard drugs amongst adolescents.</p>	<p>Some studies failed to provide a sufficiently strong theoretical or empirical rationale when identifying potential confounders and controlling for these in their analyses.</p> <p>Not all studies collected data about why and how their participants became unemployed (voluntary versus involuntary).</p>

References	Region/ country	Time period	Study population	Methodology	Variables used to assess drug use	Variables used to assess recession	Substances	Main results and findings	Limitations
Hines et al. (2020)	World	Studies published from January 2008 to June 2017	741 studies across 93 countries	Literature review (PRISMA methodology) Meta-analysis using generalised linear models to test for associations	Literature survey	GDP per capita Youth unemployment Urban population growth Gini coefficient	Opioids	<p>Higher national youth unemployment was associated with lower age of injecting drug use onset in univariable analyses, but this association was attenuated after adjustment. No associations were identified between the level of youth unemployment and indicators of youth injecting drug use in univariable and multivariable analyses.</p> <p>Higher GDP was positively associated with longer duration of injecting drug use and the median age of people who inject drugs in both univariable analyses, and multivariable analyses. No associations were identified between the GDP and other indicators of youth injecting drug use.</p> <p>Gini coefficient was not associated with any of the indicators of youth injecting drug use in the univariable analyses.</p>	<p>High heterogeneity among studies when defining the age groups of young people who inject drugs.</p> <p>Studies focus on certain groups of populations. Therefore, studies do not necessarily represent the people who inject drugs in the overall population.</p> <p>Unable to account for heterogeneity at the study level for injecting duration, median age of people who inject drugs, and age at onset of injecting.</p> <p>Unable to account for heterogeneity at the country level for all indicators of youth injecting drug use.</p> <p>Data missing for many EU countries.</p>

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Hollingsworth et al. (2017)	United States	From 1999 to 2014	<p>Mortality datasets and visits to the emergency department</p> <p>Mortality data from the Centers for Disease Control and Prevention multiple cause of death</p> <p>Emergency department data State emergency department databases (Agency for Healthcare Research and Quality and HCUPnet system) (N = 50 148 and 1 873, respectively)</p>	Regression analysis including state-by-year fixed effects	Mortality data and emergency department (ED) visits	<p>Unemployment rate</p> <p>Unemployment to population ratios</p>	Opioids	<p>Strong evidence that opioid-related deaths and emergency department visits increase during times of economic weakness. In the main county-level models, one percentage point increase in the unemployment rate raises predicted opioid-involved mortality rates by 0.19 per 100 000. Opioid-related ED visits are also anticipated to rise in economic downturns.</p> <p>Negative economic shocks have larger adverse effects on drug related mortality and emergency department visits when the analysis is conducted at the state (rather than county) level. A one-point rise unemployment is predicted to increase overall opioid-related mortality by 0.33 per 100 000.</p> <p>The dominant factor linking macroeconomic conditions to adverse drug outcomes is that abuse of opioids often reflects a physical manifestation of mental health problems that have long been known to rise during periods of economic decline.</p>	<p>Information about 'ED visit's is restricted, especially in the county-level analysis.</p> <p>The use of changes over time in manufacturing employment or of import penetration as a proxy for macroeconomic conditions is somehow limited and; a variety of other macroeconomic variables could be considered (ex., foreclosures at the zip-code level or stock market losses at the national level).</p> <p>There could be errors in the recording of the specific drugs involved in fatal overdoses and in the reasons for ED visits.</p> <p>It is unclear which model specification or unit of analysis are the 'best to use'. Authors have attempted to address this issue by providing estimates for various models and samples. Most results are robust to tested alternatives.</p>

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Kalousova and Burgard (2014)	Michigan (US)	From 2009 to 2010 period, with a follow-up in 2011	Stratified random sample of English-speaking adults aged 19 to 64 who lived in South-eastern Michigan (Macomb, Oakland, and Wayne counties) (N = 840)	Logistic regression models	Targeted survey: face-to-face interviews of a stratified random sample of English-speaking adults aged 19 to 64, living in South-eastern Michigan (Macomb, Oakland, and Wayne counties)	Unemployment experience, measured decline in economic resources, and perceived decline in economic resources	Tobacco, smoking, harmful and hazardous alcohol consumption, and cannabis use	<p>Having experienced unemployment was associated with an increased hazard of becoming a cannabis user. Authors also showed that measured decrease in economic resources was associated with lower likelihood of starting cannabis use.</p> <p>Simultaneously, authors showed that measured decrease in economic resources was associated with greater hazard of starting to smoke cigarettes, but at the same time, a lower likelihood of starting cannabis use. Results showed that different types of hardships had varying types of associations supporting the hypothesis that there are multiple pathways between recessionary hardships and health behaviours, and these are not likely to be successfully reduced to a simple competition between stress vs. belt-tightening explanations.</p>	<p>The use of self-reported substance use might lead to an underestimation of their levels: since drug use can be considered socially undesirable, especially concerning the use of cannabis for non-medical purposes, self-reporting may lead to an under-reporting.</p> <p>Moreover, unemployed respondents may be especially motivated to not disclose their substance use, in fear of jeopardising their job search or adding to the stigma they already face due to their disengagement from the paid labour force. That could lead to under-reporting of negative health behaviours in our survey.</p>

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Mateo-Urdiales et al. (2020)	Spain	Two periods: 2004-2007 and 2008-2011	Residents in Spain aged ≥ 35 ($N = 40\,847\,371$)	Poisson regression models and generalised linear models	General/school population surveys on drug use: Spanish Longitudinal Mortality Study of the 2001 Census, which included all people residing in Spain on 1 November 2001. Individuals were followed-up until 31 December 2011; national mortality registry.	Based on the periods before the economic crisis and after the economic crisis	Drug-related mortality and deaths directly attributable to alcohol	<p>In men, the annual percentage change in mortality risk from drug-related causes was positive in 2004-2007 and negative in 2008-2011, whereas in women both were positive. There was no significant change in mortality risk from drug-related causes during the crisis compared with the four years pre-crisis.</p> <p>Mortality rates from drug-related causes and causes directly attributable to alcohol at age ≥ 35 was significantly higher during the first period of economic crisis (2008-2011) than before (2004-2007) only among women with tertiary studies.</p> <p>Study results do not clearly support the countercyclical relationship between drug use and economic cycle. Authors did not find a clear and consistent procyclical relationship between the economy and drug-related mortality.</p>	<p>Authors did not include the period 2012-2014, because data were not available.</p> <p>Time-lags between the recession and its impact on mortality (for this they did not capture the impact of the recession in the study period).</p> <p>Authors only included causes of death where drugs/alcohol were explicitly mentioned as the first diagnosis. This may have underestimated the burden of drug and alcohol related mortality because they contribute substantially to several other causes of death.</p> <p>Estimated drugs/alcohol related deaths might be underestimated due to poor communication between forensic and mortality data.</p>

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Maclean et al. (2020)	United States	1992-2015: two recessions (mild recession of 2001 and the severe recession of 2007-2009), and two growth periods: the mid- to late-1990s and the mid-2000s	Substance abuse treatment episodes ($N = 42\,901\,509$)	Linear panel data model with state- and year fixed-effects	Drug treatment admissions	Unemployment rate	Alcohol, cocaine, cannabis, heroin, prescription opioids, hallucinogens, stimulants, sedatives, tranquilisers, inhalants, and substances not classified elsewhere	<p>The study finds that the overall rate of specialty substance abuse treatment does not vary across the business cycle.</p> <p>The authors identify substance-specific treatment effects associated with business cycles: a one percentage point increase in the state unemployment rate leads to a 5.9% decrease in admissions for heroin (countercyclical) and a 7.7% increase in admissions for stimulants (procyclical).</p>	<p>Admissions to specialty substance abuse treatment is a function of both supply and demand. Therefore, results might be biased by shortage of supply of drug treatment.</p> <p>Providers of treatment episodes (TEDS) disproportionately receive public financing, therefore there might be an overestimation of their services.</p> <p>State reporting practices and/or the type of facility that receives government financing and appears in the TEDS data may vary across the business cycle.</p> <p>The findings for specific substances (heroin and stimulants) are somewhat sensitive to model specifications.</p> <p>Authors capture one modality of substance use treatment only. Therefore, they cannot capture substitution between different modalities of treatment.</p> <p>Authors do not assess the quality of care provided, expenditure on treatment, and length of stay in treatment periods.</p>
Martin Bassols and Vall Castelló (2016)	Spain	From 2005 to 2011	Individuals (aged 15 and 64): ($N = 27\,400$ individuals for 2005, 23 276 for 2007, 19 713 for 2009 and 21 713 for 2011)	Logit models	General/school population surveys on drug use (Observatorio Español sobre Drogas (EDADES) survey)	Unemployment rate	Alcohol, tobacco, marihuana, cocaine, crack, inhalants, ecstasy, hallucinogens and heroin (illegal)	<p>Marijuana and cocaine behave strongly countercyclically: when the local unemployment rate increases by 10 percentage points, marihuana use increases by 3 percentage points and consumption of cocaine increases by 1.2 percentage points.</p> <p>The authors also found find important heterogeneity effects along several dimensions such as education, age, gender, nationality, labour market status, and type of occupation.</p>	<p>Data based on general population surveys may have difficulties to reach more excluded sets of population, such as people with problematic patterns of use: a problem transversal to all general or school population surveys.</p> <p>The use of state-level data may mask within-state variations – a problem common to all country-level analyses.</p>

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Nagelhout et al. (2017)	Different countries	Studies published between 1990 and 2015	28 studies	Literature review	Literature survey	Unemployment	Cannabis; cocaine; ecstasy; and heroin	<p>Supportive evidence was found for the mechanism that hypothesised that recessions and unemployment increase psychological stress, which, in turn, increases illicit drug use. Supportive evidence was found in a diverse set of countries.</p> <p>No supportive evidence was found for the procyclical mechanism that recessions and unemployment decrease illicit drug use by decreasing income.</p> <p>Recessions and unemployment were hypothesised to increase non-working time and social exclusion, which would in turn increase drug use.</p>	<p>Most studies examined the influence of unemployment without examining the influence of economic recessions on employed individuals.</p> <p>Studies make analyses to individual-level mechanisms while there can also be relevant mechanisms at the population-level. For example, prices and availability of illicit drugs may change during an economic recession (Bretteville-Jensen, 2011; Dubanowicz, 2015). They treated these population-level mechanisms as context for individual-level mechanisms. However, a systematic literature review of evidence for these population-level mechanisms would increase our understanding of how recessions affect illicit drug use.</p> <p>Authors only included studies that examined a recession or unemployment, one of our mediators and the use of illicit drugs. More literature examines recessions or unemployment and one of our mediators without examining drug use, and other literature examines one of our mediators and drug use without examining recessions or unemployment.</p>

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Pablonia (2014)	United States	From 2003 to 2011	The YRBS interviews a sample of high school students aged 15-17 twice a year ($N = 27\,894$ males and $26\,770$ females).	Linear probability models using Ordinary Least Squares (OLS)	General/school population surveys on drug use	State yearly unemployment rate	Cannabis and alcohol	Significant positive effects of weakening economic conditions upon drug and alcohol use. Hispanic male teenagers were 2.2 percentage points more likely to have drunk any alcohol in the last 30 days for each one-percentage-point increase in the unemployment rate. For each one-percentage-point increase in the unemployment rate, black male teenagers were 1.9 percentage points more likely to have used cannabis. Hispanic male teenagers were 1.2 percentage points more likely to have used cannabis, but the estimate was not significant at conventional levels.	The use of self-reported substance use might lead to an underestimation of their levels: since drug use can be considered socially undesirable. Self-reporting may lead to an under-reporting. Limited demographic information collected. Cannot capture the effects of changes in state-level economic conditions on risky behaviours that may operate through changes in school enrolment. No individual data collected for this.
Paling and Vail Castello (2017)	38 countries across Europe and North America	From 1990 until 2006	Adolescent students aged between 8 and 19; $N = 306\,673$ females and $N = 290\,867$ males	Logistic regression models	General/school population surveys on drug use: Health Behaviour in School-aged Children (HBSC) survey	Family car, own bedroom, annual vacation, family computer, father has a job, mother has a job, unemployment rate (variation in unemployment rates for several years: 1989, 1990, 1993, 1994, 1997, 1998, 2001, 2002, 2005 and 2006)	Alcohol, tobacco and cannabis	Measures of cannabis consumption showed a procyclical but statistically insignificant response in results: younger individuals have lower probabilities of having tried cannabis; those adolescents born in the first months of the years and males have higher probabilities of having tried cannabis; Adolescents whose mother and father are not employed decrease their consumption of cannabis when the economy deteriorates. The reduction in the consumption of cannabis for adolescent's whose fathers are employed is significantly milder than the reduction for adolescents with both parents unemployed. Finally, a significant procyclical cannabis consumption pattern is reported for females, adolescents age 16 or more and those in countries with a high minimum legal drinking age.	The use of self-reported substance use might lead to an underestimation of their levels: since drug use can be considered socially undesirable. Self-reporting may lead to an under-reporting.

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Ruhm (2018)	United States	From 1999 until 2015	Death certificates provided on the multiple cause of death (MCO) of files (the US Centers for Disease Control and Prevention) (<i>N</i> varies between 36 207 and 895 depending on the model applied)	Panel data models with fixed effects	Mortality dataset: Centers for Disease Control and Prevention detailed mortality file (DMF)	Unemployment, poverty rates, median household incomes and home prices, and exposure to imports	Opioid analgesics and illicit opioids, which include both heroin and synthetic opioids (fentanyl)	After controlling for confounding factors, less than one-tenth of the increase in drug mortality rates was explained by changes in economic factors and none of these due to nondrug suicides or alcoholic liver disease. These results suggest that the 'deaths of despair' framing, probably do not explain the main sources of the fatal drug epidemic, and imply that efforts to improve economic conditions in distressed locations, are unlikely to yield significant reductions in drug mortality. Results show that changes in economic conditions explain less than one-tenth of the observed increase in drug deaths occurring from 1999-2015 and even less of the growth in opioid analgesic or illicit opioid-involved mortality.	Results are based on self-reported use of drugs, which could be subject to recall bias or have been over-reported by one gender or age group compared to the other. The presence of a clinical diagnosis and the appropriateness of prescription were not evaluated, and psychotropic drugs may have been used without a formal DSM diagnosis, for a wide range of emotional problems, or patients with mental disorders may not have been treated with psychotropic drugs.

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Yang et al. (2018)	United States	From 2007 to 2016	Millennials (respondents aged 18 to 34), Generation X (respondents aged 35 to 49), and Baby Boomers (respondents 50 or older), (N = 307 935)	Bivariate descriptive analysis and logit regressions with weighted least squares	General/school population surveys on drug use (National Survey on Drug Use and Health)	Ethnicity, education, annual income, health and insurance characteristics and socioeconomic vulnerability	Binge alcohol, cocaine, crack, heroin, recreational use of oxycontin (non-prescription), methamphetamine	Use of binge alcohol/cocaine varied significantly between generational cohorts from 2007-16. Millennials were at significantly increased risk of use of binge alcohol, cocaine, heroin, and oxycontin than Gen X while Baby Boomers were at significantly reduced risk of all substances. Nevertheless, Millennials were at significantly reduced risk of crack use and poly-use compared to Gen X. These differences may be related to measures of austerity and socioeconomic vulnerability. Increases social and economic vulnerability after the 2007 crisis is strongly associated with higher rates of substance in all generations. Increased social and economic vulnerability after the 2007 crisis is strongly associated with higher rates of substance use in all generations. Increasing vulnerability is associated with increased risk of cocaine, crack, heroin, oxycontin, and methamphetamine with particularly pronounced effects on crack, heroin, and methamphetamine use. For all three generational cohorts, increasing vulnerability appears to be linked with increased prevalence of poly-use.	The use of survey data to ascertain both socioeconomic and demographic characteristics of the study population, as well as the use of self-reported substance use as an outcome variable. underreporting of substance use may affect the accuracy of prevalence estimates for past-month binge alcohol and substance use as no objective or clinical measure of substance use was collected with the survey. Moreover, small samples for specific subpopulations in this study. The design of the NSDUH as a household survey, moreover, does not permit for the ability to sample homeless or institutionalised persons who may exhibit markedly different patterns of substance use. Finally, the use of repeated, cross-sectional data does not allow for an assessment of individuals over time and, consequently, no causality can be established between the outcome variables and the exposures of interest.

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Zuccato et al. (2011)	Milan and Como (Italy)	From 2005 to 2009	Estimates are based on measuring the metabolic residues of illicit drugs excreted in persons' urine and ending up in wastewater flows from a mean of 1 250 000 people from the central and eastern parts of Milan, while in Como wastewater is collected for a mean of 101 000 people.	Analyses of variance (ANOVAs), Tukey-Kramer HSD test and <i>t</i> -test. Non normal distributions were analysed using a non-parametric Kruskal-Wallis test followed by a Steel-Dwass multiple comparison test or a Mann-Whitney test.	Analysis of untreated wastewater in urban wastewater treatment plants	Time periods	Cocaine, heroin, methamphetamine, and cannabis	Consumption trends in Milan, which were stable from 2005 to 2008 for cocaine and heroin, progressively dropping for tetrahydrocannabinol (THC) and increasing for methamphetamine, changed abruptly in 2009, with significant drops in cocaine and heroin consumption, partially compensated by increases in IDTHC and methamphetamine use. These changes were partially confirmed in Como, where the 2008 and 2009 data indicated significant drops for cocaine and heroin. Global recession and money worries, ID consumption might well be considered a luxury that many consumers cannot afford any longer, particularly the expensive ID such as cocaine and heroin.	Results can be influenced by the sampling strategy, pharmacokinetics and metabolism, route of ingestion, drug purity, etc. Wastewater analysis can provide the total consumption of a population but no information about the number of consumers or daily doses; changes in mean doses, route of administration, or the proportion of heavy to recreational users.