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Understanding Pathways to Stimulant Use: a mixed-methods examination of the individual, social and cultural factors shaping illicit stimulant use across Europe (ATTUNE): study protocol

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ABSTRACT

Introduction

Amphetamine Type Stimulants (ATS) including amphetamine, MDMA/"ecstasy", methamphetamine, synthetic cathinones and "Ritalin" are the second most commonly used illicit drugs globally. Yet, there is little evidence on which factors are associated with the development of different patterns of ATS use over the life course. This study aims to examine which individual, social, and environmental factors shape different pathways and trajectories of ATS consumption. The study will be conducted in five European countries: Germany; the Netherlands; Poland; Czech Republic and the United Kingdom.

Methods and analysis

We will use a sequential mixed methods study design to investigate the multiple factors (familial, social and occupational situation, critical life events, general risk behaviour, mental and physical health, satisfaction with life) that shape individual ATS use pathways. A systematic literature review will be performed to provide an overview of the current academic literature on the topic. In Module 1, qualitative semi-structured interviews (n=ATS users and non-users) will be conducted to explore individual experiences of, and perspectives on, dynamics of change in stimulant consumption patterns. In Module 2, structured questionnaires (n=2000 ATS users and non-users) will be administered via tablet computers, to validate and enhance the generalisability of the interview findings. Data integration will take place at two key points. First, during the study, where the findings from the first qualitative interviews will inform the design of the structured questionnaire. Second, at the end of the study, where mixed methods data will be brought together to generate an in-depth, contextualised understanding of the research topic.

Ethics and dissemination

The study has been approved by the respective responsible ethics committee in each participating country. Data will be treated confidentially to ensure participants' anonymity. Findings will be disseminated in peer reviewed scientific journals, national and international conferences, and in briefings for policy and practice.

SUMMARY

Strengths and limitations of this study

- First study of its kind to examine different pathways of ATS use, and will thus expand an underdeveloped evidence base.
- Large qualitative and quantitative dataset collected in five European countries, which allows valuable inter-country comparisons.
- Applies a theory-based analytical framework to understand the individual, social and environmental influences shaping ATS use, which will provide important insights expedient for the development of tailored prevention and intervention measures.

- Cross-sectional design allows correlative but no causal conclusions.

For peer review only

INTRODUCTION

Amphetamine Type Stimulants (ATS) are the second most commonly used illicit drugs globally¹ as well as in Europe². ATS include amphetamines (“speed”), Methylenedioxymethamphetamine (“MDMA” or “ecstasy”), methamphetamine (“crystal meth”)³ and illicit use of amphetamine-type prescription drugs (e.g. “Ritalin®”). In recent years, there has also been a rise in new psychoactive substances that mimic the effects of stimulants in global drug markets⁴, including synthetic cathinones such as mephedrone (“bath salts”). Across Europe as a whole, 0.5% of those aged 15-64 reported using amphetamines in the past 12 months, with higher rates for MDMA use (0.8%). However, ATS use rates vary by country, with the highest consumption found in the Netherlands (amphetamine, 1.7%; MDMA, 3.6%). Data also suggest higher consumption rates for adolescents and younger adults compared to the general population, with one percent of those aged 15-34 reporting amphetamine consumption, and 1.8% MDMA consumption, over the previous year^{1 2}. Worldwide, quantities of ATS seized have doubled over the past decade⁵, with increased usage levels reflected in wastewater analyses conducted in several European countries⁶, and in a corresponding rise in numbers of first-time entrants for stimulant treatment across Europe, from about 7000 in 2006 to more than 12000 in 2016². Long term use of ATS can lead to a substance use disorder, including (psychological) dependency⁷. The global prevalence of substance use disorders related to amphetamines was estimated at nearly five million people in 2016. In Europe around 260.000 people are affected by amphetamine use disorder, with prevalence twice as high in Eastern Europe as in the central region.⁸

Methamphetamine use at dependent levels is associated with multiple co-morbidities, including HIV infection, hepatitis, cardiac effects, cognitive dysfunction, and prominent psychiatric consequences such as psychosis^{9 10}. Although MDMA is often viewed as a recreational drug, prolonged use is associated with neurological dysfunction and depression¹¹. Additional societal costs identified with ATS abuse include premature death, crime, lost productivity, environmental damage, disruption of family life, and infectious disease^{9 12 13}. However, despite the substantial harms associated with ATS use, increased prevalence in consumption rates, and rising number of treatment entries, there is little evidence regarding which factors shape different patterns of ATS use.

Some qualitative and very few quantitative studies exploring influences on ATS use have been published, primarily focussed on factors affecting initiation¹⁴. Important motives for the initiation of ATS consumption identified in previous research include: curiosity or propensity for experimentation¹⁵⁻¹⁸; self-management of stress, trauma, or other mental health issues^{16 18-24}; and to boost of performance at work/studies^{19 21 25-27} or in private settings (sexual relationships, endurance at dance events)^{18 26 28-30}. There is some evidence to suggest that continued and/or increased ATS consumption is often to support specific functional needs (improvement of stress management or reduced insecurity in social situations) and to help manage withdrawal effects^{15 20 22 27 29 31-34}. Experiencing critical life events (separation, death of a close friend or family member, domestic violence) also

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3 appears to be associated with sustained use^{19 26 32}. Reported factors connected with a
4 decrease (and in some cases, until abstinence) included an increased perception of negative
5 health impacts^{16 20 29 35 36}, changing social networks, and reduced availability of ATS^{28 37 38}.
6 However, there remains limited understanding of what influences different trajectories of
7 consumption over time, and whether this varies by type of ATS substance or user
8 characteristics, such as gender, age or socio-economic status.
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12 In the framework of the European Research Area Network on Illicit Drugs (ERANID), a
13 consortium of five research institutions from Germany, the United Kingdom, Poland, the
14 Netherlands and the Czech Republic, was formed to conduct a study to respond to this
15 evidence gap. The European ATTUNE study (Understanding Pathways to Stimulant Use: a
16 mixed-methods examination of the individual, social and cultural factors shaping illicit
17 stimulant use across Europe) is led by Germany, as the principal investigator.
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21 **Research objectives**

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23 The overall aim of the project is to improve our understanding of which factors shape
24 different pathways of ATS use in Europe. By examining interactions between individual,
25 social and environmental influencing factors, and the overall trajectory of drug use, this
26 study will explore individual motivations to use ATS and describe different patterns of
27 consumption over time. In doing so, the study seeks to identify potential protective factors
28 (e.g. personality traits, social integration) associated with the ability to control, decrease or
29 quit ATS use, as well as risk factors (e.g. critical life events) associated with the escalation of
30 ATS consumption patterns towards problematic use and/or dependence. Further, we aim to
31 explore why some individuals exposed to ATS select not to use these substances, as well as
32 examining the relationship that illicit stimulant users have with other illicit and licit
33 substances. Targeted recruitment of different ATS user groups with regard to frequency,
34 dependency, former or current use will ensure a sample that varies by type and level of ATS
35 use. Details about the different user groups targeted by this study are provided below.
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43 **METHODS AND ANALYSIS**

44 **Study design**

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46 ATTUNE is a sequential, exploratory, mixed-methods study. The design, implementation and
47 interpretation of the study is informed by the biopsychosocial model of substance use³⁹. This
48 model suggests that the change process of drug use pathways is influenced by the
49 interaction of three core domains: individual differences, social dynamics and the
50 environmental/cultural setting. The study comprises of three main components.
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55 First, a systematic review of the qualitative and quantitative published literature on which
56 individual, social and environmental influences shape different pathways of ATS use over the
57 life course. The qualitative literature review is completed and published¹⁴. We searched four
58 databases for peer-reviewed qualitative studies which explored the views of ATS users on
59 which factors have shaped their drug use careers. The search strategy was conducted in
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3 accordance with the SPIDER tool ⁴⁰. Further details can be found in the corresponding
4 publication. The ongoing systematic review of the quantitative literature (studies on ATS use
5 in adults and adolescents) aims to appraise the evidence on risk, protection, resilience, and
6 desistance. Search strategy as well as data extraction are analogous to the qualitative
7 review. The findings from these reviews will provide an insight into the existing international
8 literature that examines ATS users' perspectives on why they start, stop, increase, and/or
9 reduce their ATS consumption, whilst also exploring under which circumstances and
10 conditions stimulant users change their consumption patterns.
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15 Next, in Module 1 of the fieldwork, qualitative methods (semi-structured interviews) will be
16 used to explore individual experiences of and perspectives on dynamics of change in
17 stimulant consumption patterns. The topic guide will build in particular on the findings from
18 the review of qualitative literature conducted at the start of the project, as well as the
19 theoretical underpinning for the research (biopsychosocial model of drug use).
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23 Finally, in Module 2, the findings from the qualitative interviews will inform the
24 development of a structured questionnaire in order to validate and enhance the
25 generalisability of the results in a large sample of ATS users and non-users.
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28 The total length of the study is 36 months (September 2016 to August 2019). The estimated
29 duration of the recruitment as well as data collection for Module 1 is seven months, and for
30 Module 2 it will amount to 13 months.
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33 **Participants**

34 Eligibility criteria

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37 Individuals who have either used or had the opportunity to use ATS are eligible for inclusion
38 in both the qualitative interviews and survey questionnaire. This includes people who have
39 either consumed ATS at least once in their life, or people who have never used ATS but have
40 been exposed to ATS consumption (defined as having been present when family or friends
41 took ATS but refused to consume themselves). To ensure the inclusion of only those who
42 have had the opportunity to experience changes in the trajectory of their ATS use, the
43 participant's first ATS consumption (or exposure) needs to have taken place at least five
44 years before the interview or survey questionnaire. We also excluded people previously
45 diagnosed with opioid dependence (self-reported) to avoid overlap between pathways to
46 opioid use and pathways to ATS use. Excluding these participants also ensures that our
47 sample is not dominated by former or current opioid users who consume stimulants
48 primarily to complement their opioid use (e.g. in order to get a "kick" while in opioid
49 substitution therapy).
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56 Further inclusion criteria:

- 57 • Aged 18 years or older
- 58 • Resident in one of the five national sampling regions
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- Able to take part in the interview (not psychotic, no severe cognitive impairments or language barriers).

A screening website will be set up where interested persons can check their eligibility to participate in an interview or survey questionnaire. If a person is screened successfully, a message is displayed inviting the person to participate and offering different possibilities to contact the research team to arrange an interview appointment. A randomly chosen screening ID facilitates the connection of the screening data with the interview whilst maintaining anonymity.

Study Groups

Participants in both Module 1 and Module 2 will be recruited using convenience sampling (see below). To ensure a sufficient variety of ATS use patterns or ATS use trajectories, six study groups were predefined for Module 1 and five study groups for Module 2. This approach provides a stratified sample, in which each ATS use pattern (group) serves as a stratum.

Module 1: Qualitative semi-structured interviews

Eligible participants meeting the above criteria will be allocated to one of six study groups depending on their ATS consumption patterns (time, frequency, dependency). Table 1 shows an overview of the operationalisation of the six groups.

We defined current use as ATS consumption within the previous 12 month period. Frequent use was defined as those reporting ATS consumption on ten or more occasions (consumption days) during the previous 12 months (Groups 1 and 3) or any twelve month period prior to the past year (Groups 2 and 4). ATS dependency was assessed using the Severity of Dependence Scale (SDS)⁴¹. We chose a cut-off of 4 points or more to identify ATS dependency⁴².

Table 1: Operationalization of Study Groups in Module 1

Study groups in Module 1	Name	past 12 months prevalence	≥ 10 consumption days within past 12 months	≥ 10 consumption days within one year (at any time except past 12 months)	currently ATS dependent	formerly ATS dependent
Group 1	Currently dependent users	yes	yes	n.a.	yes	n.a.
Group 2	Formerly dependent users	n.a.	n.a.	yes	no	yes
Group 3	Currently frequent, non-dependent users	yes	yes	n.a.	no	no
Group 4	Formerly frequent, non-dependent users	no	n.a.	yes	no	no
Group 5	Non-frequent users (currently or formerly)	no	n.a.	no	no	no
Group 6	Exposed non-users	n.a.	n.a.	n.a.	n.a.	n.a.

Module 2: Survey questionnaire

Eligible participants meeting the above criteria will be allocated to one of five study groups depending on their ATS consumption patterns (time, frequency, dependency). Table 2 shows an overview of the operationalisation of the five groups. In order to allow us to distinguish clearly between current and previous use, we defined current use as ATS consumption in the past three months, and former use as no consumption in the past 12 months. This means that participants reporting ATS use over three but less than 12 months previously are excluded.

Table 2: Operationalization of study groups in Module 2

Study groups in Module 2	Name	past 12 months prevalence	past 3 months prevalence	≥ 10 consumption days within past 12 months	≥ 10 consumption days within one year (at any time except past 12 months)
Group A_1	Currently frequent users	yes	yes	yes	n.a.
Group A_2	Currently non-frequent users	yes	yes	no	n.a.
Group B_1	Formerly frequent users	no	n.a.	n.a.	yes
Group B_2	Formerly non-frequent users	no	n.a.	n.a.	no
Group C	Exposed non-users	n.a.	n.a.	n.a.	n.a.

Sample size

Module 1: Qualitative semi-structured interviews

45 persons per study group (n=270 for the total sample, see table 3) were considered sufficient for Module 1⁴³. As we plan to recruit participants via purposeful sampling⁴⁴, we expect to generate data that are rich enough to answer our research questions and inform the questionnaire used in Module 2 of the study.

Table 3: Sample sizes Module 1 by countries and study groups

Country	Partner institution	Data collection regions	Sample sizes						Total N countries
			Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	
			Currently dependent	Formerly dependent	Currently frequent, non-dependent	Formerly frequent, non-dependent	Non-frequent (currently or formerly)	Exposed	
Germany	ZIS	Border Region to Czech Republic /metropolitan region of Hamburg	10	10	10	10	10	10	60
United Kingdom	UNEW	Northern England	10	10	10	10	10	10	60
Poland	APS	Metropolitan region of Warsaw	10	10	10	10	10	10	60
Netherlands	RG	Amsterdam/the region of Eindhoven	10	10	10	10	10	10	60
Czech Republic	OGCR	Border region to Germany	5	5	5	5	5	5	30
Total N groups			45	45	45	45	45	45	270

Module 2 Survey questionnaire

Statistical analyses within the group of current users (A_1 and A_2) as well as within the group of former users (B_1 and B_2) are planned (see table 2). To facilitate this at country level, a group size of n=100 is sufficient to detect statistically significant small to medium effects for continuous distributed variables ($d \geq 0.40$, $\alpha = 0.05$, power=80%)⁴⁵. The sample sizes of the groups are planned as follows. For both, groups A and B, up to 200 participants in each country will be recruited. This allows us to analyse subgroups, e.g. dependent and non-dependent users in groups A as well as B. As group C consists of non-users only, the analyses will focus on comparison with one of the user groups (A or B), reducing the required size for this group to n=100. The total sample size for Module 2 for all countries will amount to 2000 persons (see table 4). Due to funding restraints, the sample size in the Netherlands and the Czech Republic is smaller, which might impede the production of statistically significant country specific intra-group comparisons.

Table 4: Sample sizes Module 2 by countries and study groups

Country	Partner institution	Data collection regions	Sample sizes					Total N countries
			Current ATS user		Former ATS user		Non ATS user	
			A_1: Frequent	A_2: Non-frequent	B_1: Frequent	B_2: Non-frequent	C: exposed	
Germany	ZIS	Border Region to Czech Republic /metropolitan region of Hamburg	100	100	100	100	100	500
United Kingdom	UNEW	Northern England	100	100	100	100	100	500
Poland	APS	Metropolitan region of Warsaw	100	100	100	100	100	500
Netherlands	RG	Amsterdam/the region of Eindhoven	50	50	50	50	50	250
Czech Republic	OGCR	Border region to Germany	50	50	50	50	50	250
Total N groups			400	400	400	400	400	2000

Recruitment

Sampling method and recruitment procedure

Participants in both Modules will be recruited by non-probability (convenience) sampling, which is an accepted means of accessing participants from 'hard-to-reach' as well as minority populations^{46 47}. Pre-identified sampling areas in each participating country (see table) are designed to include participants living in urban as well as rural areas.

Multiple methods and sites will be employed to identify and recruit participants for both Modules. Leaflets and posters containing information about the study, a link to the screening website, and contact details of the research teams, will be printed and distributed in substance use help and treatment facilities, on university black boards, in head shops, bars and nightclubs. Social media and substance use web forums will be used to share and circulate the request for participants. Participants will also be recruited actively at university campuses, drug service facilities and music festivals by directly approaching potential

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3 participants. All interested interviewees will be screened for eligibility prior to the interview.
4 If eligible to participate, each respondent will receive a screening-code, and the interview
5 can either be conducted straight away, or an appointment can be made for a later date. At
6 the end of each interview participants will be asked to recruit further participants from their
7 social network. This additional snowball sampling approach will be realized by handing over
8 study leaflets, as well as up to three numbered cards containing contact details of the
9 research team. The numbers on the cards will help to track the snowball sampling approach.
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13 **Procedure**

14 **Fieldwork**

15 *Module 1*

16 Face-to-face semi-structured interviews will be conducted by members of the research team
17 of each participating country. Prior to the interview, all participants will receive an
18 information leaflet containing details about the study, explaining what participation
19 involves: anonymity, confidentiality, the use of data, and data protection rules. The
20 participants will then be invited to complete a verbal consent form, should they wish to
21 participate. The interview will be audio recorded and will last approximately 45 to 60
22 minutes. On completion of the interview, each participant will receive an incentive (money
23 or vouchers, depending on country). All interviews will be transcribed in full, transferred to
24 appropriate software for analysis, and the audio file deleted.
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33 *Module 2*

34 The quantitative survey will be conducted with the CAPI method (Computer-assisted
35 personal interviewing). The questionnaire content will first be developed in Microsoft Word.
36 Once finalised, all questions will be programmed using survey software GessQ® to enable
37 administration via password-protected tablet computers. The survey instrument will be
38 translated and piloted in all partner countries and revised as necessary. The latest version of
39 the questionnaire will be hosted on a central server operating in the IT environment of
40 Hamburg University and can be downloaded to the tablets directly as necessary. This server
41 is also the recipient for the data uploads from the tablets.
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48 In each country, trained research assistants will recruit participants and conduct the
49 interviews face-to-face or via video-telephony (Skype®). Show cards containing relevant
50 prompts and additional information (e.g. lists of ATS, answering scales) will support the
51 conduct of the interviews.
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54 **Monitoring and data management**

55 The screening process and fieldwork progress will be monitored using a study-specific
56 coordination database. This database will be populated with screening data from each
57 participant as well as key information regarding the interviews or questionnaires, such as
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study group, duration of interview, gender distribution, sampling region, and contact with drug help services.

Module 1

The raw qualitative data from Module 1 will be managed, stored and analysed by the respective research teams in each participating country. Initial analyses will be conducted at country level using a common coding framework. Analysed data, including emerging interview themes, will be pooled, and provided to ATTUNE PI (Hamburg University).

Module 2

The raw quantitative data will be uploaded continuously to the central data management at the Hamburg University. The raw data will be cleaned, edited and transformed into SPSS datasets, one for each country, as well as one comprehensive dataset covering all five countries.

Survey instruments

Module 1: Interview guideline and time sheet

Two semi-structured interview guides will be used to conduct the in-depth interviews in Module 1: one for the ATS user groups plus an adapted topic guide for the non-user group. The topic guide will be based on key emergent themes from the systematic literature review as well as relevant theoretical considerations (biopsychosocial model of substance use). Participants will be asked about their experiences and their consumption patterns regarding ATS and other licit and illicit drugs. To obtain a detailed understanding of which influences have shaped these ATS use patterns, participants will be asked about drug use motives, effects/consequences, settings and occasions, and how these have changed during the period(s) in life where ATS use took place. The interview will end with questions about the (social) setting of use and its impact and the integration of ATS use into the respondent's lifestyle. The interview guidelines are provided in the supplementary material. Whilst the use of the interview guide will ensure that all central topics are covered, participants will have the opportunity to discuss additional issues or concerns where relevant. During the interviews, researchers will chart participants substance use over time, including age of onset, frequency and life stage, as well as positive and negative life events (e.g. family/partnership, education/work, illness, treatment, imprisonment).

Module 2: Quantitative questionnaire

The quantitative survey questionnaire will include questions based on the key themes emerging from the qualitative interviews, as well as a selection of standardised instruments to assess various substance use, health and psychological factors (see table 5).

Table 5: Overview of standardised measurement instruments

Name	Acronym	Content	Reliability: Cronbach's α	Validity: sensitivity/specificity (cut-off)
International Standard Classification of Education ⁴⁸	ISCED	Identification of highest educational level	-	-

Subjective social integration ⁴⁹	SSI	Subjective assessment of social integration	-	-
Subjective social position ⁴⁹	SSP	Subjective assessment of social position	-	-
CAGE questionnaire ⁵⁰	CAGE	Alcohol problems lifetime	0.8-0.98	0.71/0.90 (2)
Alcohol Use Disorders Identification Test ⁵¹	AUDIT-C	Alcohol problems past year	0.91	0.93/0.66 (4)
The Severity of Dependence Scale ⁴¹	SDS	ATS dependency lifetime	0.81–0.89	71.3/77.1 (4)
Brief Symptom Inventory-18 ⁵²	BSI-18	Measurement of somatization, anxiety, depression	0.87-0.94	91.2/92.6 (63)
Satisfaction with life scale ⁵³	SWLS	General life satisfaction	-	-
Big Five Inventory ⁵⁴	BFI-10	Assessment of five personality traits	0.58-0.84	-
Brief Sensation Seeking Scale ⁵⁵	BSSS-4	Measurement of sensation seeking	0.66	-
Generalized Self-Efficacy scale ⁵⁶	GSE	Measurement of self-efficacy	0.92	-
Connor-Davidson Resilience Scale ⁵⁷	CD-RISC-10	Measurement of resilience	0.89	-

The questionnaire will cover:

- a. Socio-demographics: These include sex, age, citizenship, migration background, relationship and children, living situation, educational (ISCED) and occupational situation, and social integration (SSI).
- b. Drug use: Detailed assessment of all illicit drugs ever used in life (lifetime prevalence, past 12-month prevalence, past 30 days prevalence, age at first and last use), test for alcohol dependence (CAGE, AUDIT-C) and tobacco smoking status.
- c. ATS use: Test for ATS dependence (SDS), injecting drug use and treatment experiences; usual setting of ATS use; patterns, motives and consequences of ATS use including (reasons for) changes.
- d. Judicial problems: times and reasons for imprisonment
- e. Physical and mental health assessment (BSI-18)
- f. Personality assessment (BFI-10, BSSS-4, GSE, CD-RISC-10) and critical life events

For group C (non-users), some questions will be omitted (e.g. questions about ATS use), and replaced with alternative questions focussed on their motives for non-use and exposure situation.

Planned analyses

Module 1

Qualitative data from the semi-structured interviews will be analysed using content analysis, and conducted with appropriate software, such as MAXQDA⁵⁸ or NVivo⁵⁹. Partners will develop a common, unified coding system to facilitate comparable findings from the interviews across all partner countries. In addition, the data collected with the timeline and chart on substance use and life events will be merged and analysed systematically. Each partner will conduct initial country level analysis separately, in the respective national language. Once this initial analysis has been completed, each partner will produce a report detailing the country-level findings, in English and following a common template. These

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3 reports will then be compiled and synthesised to produce a comprehensive, cross-national
4 analysis of the qualitative interviews.
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6 *Module 2*

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8 The quantitative data analysis will be conducted using the statistical software package SPSS
9 22⁶⁰. Descriptive, univariate analyses will be used to describe the socio-demographics, health
10 and personality assessment characteristics of the sample, alongside “consumption careers”
11 (substance use, motives of use, and changes of use patterns). Independent sample t-tests
12 and χ^2 -analyses, corrected for multiple testing, will be conducted to compare gender and age
13 characteristics among the ATS user groups. Multivariate approaches will be used to assess a
14 wide range of factors derived from the biopsychosocial model regarding their possible
15 influence on ATS use patterns. So, for example, by calculating a MANOVA, we can
16 simultaneously test if an individual factor like resilience, a social factor like social integration,
17 and an environmental factor like ATS availability is associated with the number of ATS
18 consumption days, the number of cannabis consumption days and the mental health
19 condition index. Furthermore, the MANOVA allows us to detect interactions between the
20 dependent variables. When it comes to an exploration of different ATS user groups such as
21 frequent users, non-frequent users and non-users, we will apply a multinomial logistic
22 regression and determine the association between e.g. traits and being a member of one of
23 those groups. If data permit, we will calculate latent class analyses to identify ATS user
24 groups which characteristics are unknown yet. Analyses will be conducted at country level,
25 as well as across the full European sample.
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34 **Patient and Public Involvement**

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36 Patients and members of the public will be involved in ATTUNE at various stages of the
37 study. Policymakers, European non-governmental organisations and service users helped
38 shape the design and focus of the study prior to obtaining funding. We will hold
39 information/discussion sessions about the study with statutory and non-statutory service
40 providers to acquire their insights into how the findings could potentially impact and shape
41 the everyday lives of their service users. Recruited participants enrolled into the study will
42 be invited to act as ‘seeds’ for the snowball sampling of additional survey interview subjects.
43 This inclusion of patients/public in this way not only helps with enhanced recruitment, but
44 also enables these participants to share their experiences of taking part with others and to
45 underline the importance of the study to people like themselves. ATS user representatives
46 and public representatives will be actively involved in disseminating the results of the
47 research.
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55 **Ethics and dissemination**

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58 Based on the regulations in each participating country, ethical approval was obtained.
59 Participant anonymity will be maintained in both the semi-structured interviews and the
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3 survey questionnaire. During the survey, no information will be collected that could link the
4 data to the participant concerns. All participants will be explicitly asked to provide informed
5 consent to taking part in the study and made aware of the data protection rules. A written
6 informed consent form, signed by the project leader, will be made available to each
7 participant before the interview. Verbal consent in Module 1 will then be asked for,
8 recorded, and documented in the transcription of the interview. The quantitative interview
9 (Module 2) starts with the question, if the participant has read the informed consent form
10 and if she/he is willing to give consent. The information about each participant's consent will
11 be saved in a dedicated variable of the dataset.
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16 Research findings of ATTUNE will be disseminated in peer reviewed, open access journals as
17 well as at national and international conferences and workshops. Each partner will also
18 deliver reports to their funding institutions under the specific terms of the respective
19 country. Additionally, an accessible report will be drafted and distributed to organisations
20 who express an interest in the study. A specific report that is accessible to substance users
21 will be developed for individuals. We intend to disseminate these findings through social
22 media in order to maximise impact and expand networks of interest.
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28 **Strengths and limitations**

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30 By using multiple methods (systematic literature reviews, qualitative interviews and survey
31 questionnaires), this study will generate in-depth, contextualised evidence in an under-
32 explored field of research. The use of stratified sampling will ensure a sufficient variety of
33 types of ATS users and non-users are included, reflecting different use patterns, current and
34 ex-users, dependent and non-dependent users as well as exposed non-users. In particular,
35 the views and experiences of non-users are rarely reflected in the evidence base, and could
36 help generate novel insights into which factors shape decisions not to consume ATS. The
37 application of standardised interview guides and questionnaires will result in a large
38 comprehensive sample that will allow us to compare ATS use in multiple and varied socio-
39 cultural, political and legal environments across Europe.
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45 A key limitation of the study is the cross-sectional design, which makes it difficult to trace
46 pathways and trajectories of ATS use over time. We address this by only including persons,
47 whose first contact with ATS consumption occurred at least five years ago, meaning they
48 have had the chance to develop different ATS use patterns. However, it is important to
49 stress that a cross-sectional design allows correlative but no causal conclusions. One further
50 issue concerns the convenience sampling approach employed in this study in predefined
51 sampling regions. At the same time, compared to representative general population surveys,
52 our method should ensure increased levels of inclusion of different ATS user types, allowing
53 for more detailed and in-depth insights into different use trajectories. Finally, by defining
54 multiple inclusion criteria as well as precise group strata, we aim to mitigate potential bias
55 that could emerge from this sampling approach.
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Implications for interventions and future policy

The findings from this research will enable policy makers and practitioners to improve existing ATS prevention and intervention programmes, and support the development of new approaches in the future. By examining different types of stimulant users (including ex-users and non-users), information will be generated which will be important for universal prevention (targeting general populations), selective prevention (focussing on vulnerable groups), and indicated prevention (aiming at groups that show early signs of problematic substance use). Furthermore, given the limited long-term efficacy of ATS treatment⁶¹, the findings of this study could support the development of ATS treatment programmes that are more effectively tailored to the needs of specific ATS populations and individual users.

Authors' contribution: MR, MSM, HZ, UV, AOD and MA planned and designed the study. All other authors contributed to the design of the study. UV is the principal investigator; MSM and MR are the overall project managers and coordinators of the study. Country specific study coordination in the United Kingdom is performed by AOD, MA and EK, in the Netherlands by NL, in Czech Republic by MB and BP, in Poland by MRow, and in Germany by MR, MSM, HZ and UV. MR wrote the first draft of the study protocol and led the revisions of the manuscript with substantial critical input from all co-authors. In addition to crucial input as regards content, AOD provided significant help to improve the article's language. All authors read and approved the final version of the manuscript.

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Ethics approval: In GER, UK, PL, CZ, the study has been reviewed and approved by the respective responsible ethics committee, in NL no ethical approval was required. The respective names of all ethics committees as well as reference numbers are as follows: GER: Ethics Committee of the Hamburg Medical Chamber WF-03/17; UK: National Health Service Health Research Authority North East - Newcastle and North Tyneside 2 Research Ethics Committee 17/NE/0283; PL: Academy of Special Education Ethical Committee 168-

2018/2019; CZ: Ethical Committee of the National Monitoring Centre for Drugs and
Addiction 180326_EK-NMS.

For peer review only

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Use for groups 1-5:

dependent; remitted; frequent; non-dependent; formerly frequent non-dependent, non-frequent

Interview Guideline 'A' – Attune**Interviewer:**

This study is about understanding pathways to stimulants use across Europe. You have agreed to participate in an interview as part of this study because you feel you would identify with one of the following statements, would you agree?

- a) Are **currently** using amphetamines (Group 1, 2, 3 and 5)
- b) **Stopped** using amphetamines (Group 2, 4 and 5)
- c) Never used amphetamines but have had the **opportunity** to in the past (Group 6 – USE Guideline B)

Introduction**Tell me a little about yourself and your life now.**

(Prompts – Age, individual situation (job, housing, income, education, health situation, emotional well-being), social life (partnership, family, friends) positive and negative impacts)

Drugs and alcohol

What is your experience of drug and alcohol use? [Interviewer use CHART tool for reporting on substances used in life until today]

(Prompts: *personal usage including: age of first use; type of drugs, frequency and quantity, motivations for use/non-use, levels and routes of use; negative impact (dependence, offending, imprisonment)*)

What effect are you hoping for from use of these substances?

(Prompts: socialising, coping strategy, behaviour change, health)

Tell me more about the circumstances of your drug and alcohol use since your first use [plot significant moments in the life events CHART]

(Prompts: *use of drugs/alcohol by others around them; any drug/alcohol offers; individual situation (work, housing, income, health), relationships (family, friends, romantic partners); critical life events (violence, separation from significant other, death, illness, chronic disease)*)

What is your use of drug and alcohol like now? Has this changed over time? [CHART tool for substances]

(Prompts: *type of substance and frequency of use; circumstances for changes (living, employment, education, income, health), lifestyle (leisure), relationships (friends, family, romantic partner, marriage, birth of children)*)

Stimulants – Firsts, effects, perceptions

What is your experience of Amphetamine Type Substances? E.g. amphetamine, ecstasy, MDMA, methamphetamine [REFER to ATS card and CHART for substances]

(Prompts: *, , personal usage including: age of first use; type of drugs; frequency levels and routes of use; and surrounding circumstances of use/non-use, motivations for use/non-use)*

Use for groups 1-5:

dependent; remitted; frequent; non-dependent; formerly frequent non-dependent, non-frequent

What was life like leading up to Amphetamine Type Stimulants being first used? [plot significant moments in the life events CHART]

(Prompt around family, friendships, relationships, education, employment, and social, offending behaviour, health and emotional well-being, housing, significant events)

What effect were you hoping for from these Amphetamine Type Stimulants? Why did you want this effect?

(Prompt: feelings, positive and negative experiences, change inhibitions, focus, control, euphoria)

What was happening in your life when you continue to use XXX (specify the different ATS the person has discussed)? [plot significant moments in the life events CHART]

(Prompts: *use of ATS by others around them, any ATS offers or availability* people in their social network and their use/non-use of ATS, *individual situation (work, housing, income, health), relationships (family, friends, romantic partners); critical life events (violence, separation from significant other, death, illness, chronic disease)*)

What do you personally think about ATS use?

(Prompts around positive and negative views- physical and mental health, lifestyle, personal plans, offending, social relations)

Stimulants – Source, availability, funding

How would/do you usually get Amphetamine Type Stimulants?

(Prompt: buy from/share with friends, dealer-user interactions, ease of interaction/introduction to dealer)

How easy or difficult are they to get? Give examples

How do you fund your use? Does funding imply any legal problems?

(Prompt: employment, welfare, criminal activity, deal, trouble with the police, criminal justice system)

Stimulants – lifestyle and relationships

How does your ATS use impact on your relationships with others? Give examples

How has your lifestyle changed since you started/stopped using ATS? [plot significant moments in the life events CHART]

(Prompt: significant life events (individual, social, lifestyle, health and well-being), increases/decreases in substance use since first usage of ATS; protective or harmful factors (dependence, offending)

How has your use of ATS changed over time? [Plot CHART for substances]

(Prompt: *type of substance and frequency of use*, increase in levels, decrease in levels, poly-substance use, changes in routes of administration, context of use)

What was happening at the time of the change in use? [plot significant moments in the life events CHART]

(Prompt: treatment, other service use, circumstances (living, employment, education, income, health), lifestyle (leisure), relationships (friends, family, romantic partner, marriage, birth of children), significant events)

What is important for your life now?

Use for groups 1-5:

dependent; remitted; frequent; non-dependent; formerly frequent non-dependent, non-frequent

(Prompt around family, marriage, children, romantic partners, friends, education, employment, social, offending behaviour, health and emotional well-being, housing, positive and negative impacts)

What do you hope for/expect for your life in the next 5-10 years?

(Prompt: change in substance use (including ATS), change in relationships, health, employment career, lifestyle)

Thank you for taking part in interview

(Check have consent form)

For peer review only

Use for group 6:

Non-stimulant user

Interview Guideline 'B' – Attune**Interviewer:**

This study is about understanding pathways to stimulants use across Europe. You have agreed to participate in an interview as part of this study because you feel you would identify with one of the following statements, would you agree?

- a) Are **currently** using amphetamines (Group 1, 2, 3, 5 – use Guideline A)
 b) **Stopped** using amphetamines (Group 2, 4 and 5 – use Guideline A)
 c) Never used amphetamines but have had the **opportunity** to in the past (Group 6 – USE Guideline B)

Introduction**Tell me a little about yourself and your life now.**

(Prompts – Age, individual situation (job, housing, income, education, health situation, emotional well-being), social life (partnership, family, friends) positive and negative impacts)

What is your experience of drug and alcohol use? [Interviewer use CHART tool for reporting on substances used in life until today]

(Prompts: *personal usage including: age of first use; type of drugs, frequency and quantity motivations for use/non-use, levels and routes of use; negative impact (dependence, offending, imprisonment)*)

What effect are you hoping for from use of these substances?

(Prompts: socialising, coping strategy, behaviour change, health)

Drugs and alcohol**Tell me more about the circumstances of your drug and alcohol use since your first use [plot significant moments in the life events CHART]**

(Prompts: *use of drugs/alcohol by others around them; any drug/alcohol offers; individual situation (work, housing, income, health), relationships (family, friends, romantic partners); critical life events (violence, separation from significant other, death, illness, chronic disease)*)

What is your use of drug and alcohol like now? Has this changed over time? [CHART tool for substances]

(Prompts: *type of substance and frequency of use; circumstances (living, employment, education, income, health), lifestyle (leisure), relationships (friends, family, romantic partner, marriage, birth of children)*)

Stimulants – Firsts, protective factors, perceptions**What is your experience with the use Amphetamine Type Substances? E.g. amphetamine, ecstasy, MDMA, methamphetamine in your social network?**

(Prompts: *use of ATS by others around them, any ATS offers or availability*)

Use for group 6:

Non-stimulant user

What was happening in your life when XXX (specify the different ATS the person has discussed by using the ATS card) was offered to you (ATS substances)? [plot significant moments in the life events CHART]

(Prompt: individual and social circumstances surrounding the non-use health and wellbeing, people in their social network and their use/non-use of ATS, specific life events)

Are others in your networks continuing to use ATS? How does this use impact on your relationship with them? Give examples

(Prompt: changes, life events, availability)

What was it like being around others who were using ATS?

(Prompt: impact on relationships, socialising, networks, and employment)

Has there ever been a situation where you thought about using ATS? [Plot [plot significant moments in the life events CHART] What was happening at this time for you?

(prompt: lifestyle, relationships, networks, employment, significant events)

How would you explain that you never used these ATS

(Prompt: costs, availability, opportunity, age, circumstances, health, fear of legal problems, fear of dependence, protective factors such as partner, employment, lifestyle, negative impact on other people)

What do you think about ATS use? Has that perception changed or stayed the same over time?

(Prompt around positive and negative views- physical and mental health, lifestyle, personal plans, offending, social relations)

Stimulants – Source, availability, funding

Would you know how to buy Amphetamine Type Stimulants?

(Prompt: buy from/share with friends, dealer-user interactions, ease of interaction/introduction to dealer)

How easy or difficult do you think they are to get? Give reasons

Lifestyle

What is important for your life now?

(Prompt around family, marriage, children, romantic partners, friends, education, employment, social, offending behaviour, health and emotional well-being, housing, positive and negative impacts)

What do you hope for/expect for your life in the next 5-10 years?

(Prompt: change in substance use (including ATS), change in relationships, health, employment career, lifestyle)

Thank you for taking part in interview

(Check have consent form)