Short Instruments to Screen for “Problematic” Cannabis Use in General Population Surveys

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SUMMARY POINTS

• A systematic review of the literature identified 20 self-administrable, brief, and simple instruments that assess a broad spectrum of cannabis-related problems.
• Eleven instruments which had not undergone validations outside the clinical context were subsequently removed from the preliminary list.
• The remaining nine instruments (ASSIST, CAST, CPQ-A, CRAFFT, CUDIT, CUPIT, DAST-10, PUM, SIP-AD) were subject to further in-depth analysis.
• Several instruments theoretically were very promising (eg, CUPIT, PUM). However, only few had proven their usefulness in empirical studies.
• CAST and CUDIT were finally selected as present-day’s most appropriate instruments for use in general population surveys.

KEY FACTS OF GENERAL POPULATION CANNABIS SCREENING INSTRUMENTS

Epidemiological research among the general population can usually afford neither the time nor the cost of complex, lengthy or face-to-face interviews. Thus, screening instruments should conform to the following criteria:
• be simple and easy to understand.

LIST OF ABBREVIATIONS

ADIS    Adolescent drug involvement scale
ASSIST   Alcohol, smoking and substance involvement screening test
AUDIT    Alcohol use disorders identification test
CAGE-AID Cut down-annoyed-guilty-eye opener—adapted to include drugs
CAST    Cannabis abuse screening test

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CPQ-A-S  Cannabis problems questionnaire, adolescent, short version
CRAFFT  Car-relax-alone-family-forget-trouble
CUDIT    Cannabis use disorders identification test
CUPIT    Cannabis use problems identification test
DAP      Drug and alcohol problem—quick screen
DAST     Drug abuse screening test
MPS      Marijuana problem scale
POSIT    Problem oriented screening instrument for teenagers
PUM      Problematic use of marijuana
RAFFT    Relax-alone-friends-family member with alcohol/drug problem-trouble
SASI     Substance abuse screening instrument
SIP-AD   Short inventory of problems—alcohol and drugs
SMAST-AID Short Michigan alcohol screening test—adapted to include drugs
SSI-SA/-AOD Single screening instrument for substance abuse/alcohol and other drugs
TICS     Two-item conjoint screening
THC      Tetrahydrocannabinol

WHY AND HOW TO ESTIMATE THE PREVALENCE OF “PROBLEMATIC” CANNABIS USE IN THE GENERAL POPULATION

This chapter identifies and analyzes existing screening instruments that are adequate for estimating the prevalence of “problematic” cannabis use in social-epidemiological, general population, studies.

Although illegal, using cannabis is widespread (see Chapter 19 in this handbook). Nevertheless, a majority of users smoke cannabis in moderation, and in a socially integrated manner. They use it for purposes of leisure, relaxation, or pleasure. For a minority of users, however, their cannabis use is more like a coping strategy to deal with the challenges of everyday life and can be associated with health, social, legal, financial, and other problems (e.g., Asbridge, Duff, Marsh, & Erickson, 2014; Beck & Legleye, 2008).

There is a public health interest in quantifying those people whose cannabis use is related to such problems, as it would make it possible to estimate the magnitude of the “cannabis problem” in the general population, and aid in the development of adequate prevention strategies and treatment measures. Although only a small proportion of cannabis users will ever require medical treatment, cannabis use is still important from a public health perspective due to the large number of users involved (e.g., Asbridge et al., 2014; Beck & Legleye, 2008). Furthermore, even recreational use can be linked to a series of potential health and psychosocial hazards (Hall, 2014). The field of public health, therefore, must have at its disposal instruments that estimate the proportion of individuals who encounter problems related to their cannabis use.

Screening seems an appropriate method to estimate the proportion of such individuals within the population and to observe trends over time. Screening does not produce formal diagnoses of substance use disorders. It is conducted in the preclinical phase of a disease and refers to a preliminary assessment which is designed to identify individuals in a broad population whose substance use is potentially harmful or problematic. Screening the general population usually involves short questionnaires, which enable the classification of respondents as either “positive” or “negative,” indicating substance use that is “problematic,” “harmful,” or “risks,” while the latter indicates “nonproblematic” or “controlled” use (Babor et al., 2007).

In contrast to tobacco and alcohol, where the use of Fagerström Test for Nicotine Dependence (Fagerström, 1978) and AUDIT (Saunders, Aasland, Babor, de la Fuente, & Grant, 1993) or CAGE (Ewing, 1984) are common, none of the existing instruments that screen for cannabis-related problems has yet to emerge as an international standard (Asbridge et al., 2014; Piontek, Kraus, & Klempova, 2008).

In the absence of an agreed-upon and validated screening instrument for cannabis-related problems, some scholars suggest to simply measure frequency and quantity of use, as is often done in alcohol research (Newton et al., 2011; Rehm et al., 2013). Yet, such instruments are not specific enough, and can lead to a high rate of false positive cases (see also Asbridge et al., 2014). Though this might be reasonable in the clinical context, for general population surveys, a screening instrument needs to show high specificity. With cannabis, measuring quantity is even more challenging than frequency of use. Quantity can vary widely with the same frequency. Daily use, for example, can mean having only one puff, or smoking several “joints” (cannabis-cigarettes) in 1 day. Additionally, THC content of consumed cannabis or cannabis-tobacco ratios of a joint can differ dramatically (Temple, Brown, & Hine, 2011; Zeisser et al., 2012). Evidence also suggests that potency of cannabis is increasing in many countries (McLaren, Swift, Dillon, & Allsop, 2008), thereby increasing the risk of adverse consequences. Furthermore, specific frequencies and quantities may be associated with a range of consequences whose severity can vary across individuals. These concerns point to the need for more sensitive means of determining “problematic” cannabis use, as opposed to...
simple quantity-frequency measures (see also Asbridge et al., 2014).

Another approach suggests using structured diagnostic interviews according to the International Classification of Diseases (ICD) or the Diagnostic and Statistical Manual of Mental Disorders (DSM). Again, while this approach might be suitable for the clinical context, it is less than satisfactory for social-epidemiological, general population surveys. First, since such tests are long, complex, and costly, they are often difficult to implement in large nationwide surveys. Self-administered surveys can be difficult for individuals with literacy problems (who are more at risk to present cannabis related problems) to complete. Others can also perceive self-administered surveys as boring, which can lead to a very high number of missing answers. Furthermore, face-to-face administration can require special training for interviewers. Second, in terms of public health, it makes more sense to assess a broader spectrum of cannabis-related problems. Thus, a strict focus on clinical diagnoses may exclude important information about users who do not fulfil the whole criteria for substance use disorders (Degenhardt, Coffey, Carlin, Swift, & Patton, 2008). On the contrary, a diagnosis of cannabis use disorder does not necessarily equate to concrete harm or problems (see Temple et al., 2011).

To this end, one can conclude that an early and rough estimation of the prevalence of “problematic” cannabis use through general population surveys is vital, and specific cannabis screening instruments are the most appropriate tools to employ.

General population screening must comply with a number of conditions. First, it must be short, quick, efficient, and as nonintrusive as possible (Pilowsky and Wu, 2013). General population screening instruments should be simple, easy to understand, and able to be self-administered, for a maximum degree of accuracy. As mentioned earlier, such instruments should encompass a broad spectrum of cannabis-related problems for the purposes of identifying individuals who display initial signs of problems, but have not necessarily reached a pathological level, yet. Optimally, such screening instruments should be suitable for adolescents, as well as adults, and in the public domain.

However, to this day, no consensus exists for a validated screening instrument that conforms to these criteria. A clear definition is also lacking regarding what constitutes “problematic” cannabis use. The European Monitoring Centre for Drugs and Drug Addictions (EMCDDA) has set up a working group to resolve the issue (EMCDDA, 2007). At present, and until a definition is agreed upon, the EMCDDA applies the term to simply refer to consumption patterns “...leading to negative consequences on a social or health level, both for the individual user and for the larger community” (Beck & Legleye, 2008, p. 31).

Although an agreed-upon and validated screening instrument for “problematic” cannabis use has yet to be established, many instruments already exist. While some were conceptualized for clinical screening and must therefore be administered by a trained professional, others are capable of being self-administered, making them ideally suited for general population studies where face-to-face interviews are not feasible. Certain instruments are cannabis-specific, while others cover all illegal drugs and, in some instances, alcohol as well. Several reviews of cannabis screening instruments have already been undertaken (Annaheim, 2013; Beck & Legleye, 2008; Bashford, 2010; Obradovic, 2013; Piontek et al., 2008; Stephens & Roffman, 2005; Mdege & Lang 2011). At present, however, none of these reviews includes all of the following criteria: up-to-date, cannabis-specific, focused on population-based (but not clinical) screening, exhaustive, and grounded on a systematic selection of screening instruments.

The present chapter contains a systematic review of the literature, and analyzes and selects the instrument best suited to screen for cannabis-related problems in general population surveys.

**SELECTION OF ADEQUATE INSTRUMENTS FROM THE LITERATURE**

To identify publications dealing with nonclinical cannabis screening instruments, we first searched in PubMed, and in Web of Science (these searches included publications in English, French, German and Spanish, dating from 1990 onward, ie, to July 2014). Then, we checked our findings by performing a Google Scholar search, restricted to recent publications (ie, from 2010 to July 2014) for reviews not previously discovered, with the EMCDDA Evaluation Instruments Bank and the US Alcohol and Drug Abuse Institute (ADAI) Library of the University of Washington.

All tests had to conform to the following criteria for eligibility and relevance (checklist): the tests had to be simple and easy to understand, brief (maximum 20 items/10 minimum), capable of being self-administered or not requiring specific training for administration. They also had to be in the public domain, measuring a broad concept of “problematic” cannabis use (not solely frequency of use, craving, or dependence, for example), as described in the preceding section. Tests that addressed drug use in general were excluded if the same test was available in its cannabis-specific version [eg, Drug Use Disorders Identification Test (DUDIT)] was excluded in favor of Cannabis Use Disorders Identification Test (CUDIT)]. Consequently, 20 brief cannabis screening instruments were preselected for closer inspection concerning their empirical approval.

VIII. SCREENING, DIAGNOSIS, AND TREATMENT
Thus, in a second step, 11 tests—although potentially useful—had to be excluded from the preselected list, because they had not yet undergone an evaluation in a general population sample. With lacking nonclinical empirical investigations, a concrete judgment about the suitability of those tests, for use in general population surveys, was not possible. Nine tests were finally selected. The detail about the literature search is provided in Figure e17.1.

CHARACTERISTICS OF SELECTED SCREENING INSTRUMENTS

The remaining nine instruments (see Fig. e17.1) were subjected to a more detailed analysis (see Table e17.1).

ASSIST: The Alcohol, Smoking and Substance Involvement Screening Test was developed by a working group of the World Health Organization (WHO) to identify...
<table>
<thead>
<tr>
<th>Name (acronym)</th>
<th>Basic reference/origin</th>
<th>Purpose (measured concept/dimensions/items)</th>
<th>Validation studies outside clinical context</th>
<th>Gold standard, cut-off, sensitivity/specificity</th>
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<tbody>
<tr>
<td>Alcohol, Smoking and Substance Involvement Screening Test (ASSIST)</td>
<td>WHO ASSIST Working Group (2002)</td>
<td>To detect psychoactive substance use and related (moderate and severe) problems, that is, risky, hazardous, harmful use (WHO ASSIST Working Group, 2002)</td>
<td>Davis, Thomas, Jesseman, and Mazan (2009): cannabis-specific validation in two Canadian adult general population samples ($n = 13,909/1235; n = 1181/160$ past 3 months users)</td>
<td>Any problem with cannabis in the last 12 months, cutoff 8, 77/67</td>
</tr>
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<td></td>
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<td>Theoretical dimensions (items): 1. Frequency of use (1, 2) 2. Abuse/dependence [craving (3), failed to do what expected (5), concerned others (6), loss of control (7)] 3. Problems [health, social, legal, financial (4)]</td>
<td>Thake and Davis (2011): cannabis-specific validation in Canadian adult general population sample ($n = 16,674; n = 1179$ past 3 months users)</td>
<td>Cannabis before driving, cutoff 8, 51/78; any other illicit drug use in the last 12 months, cutoff 8, 52/70; any harm because of use in the last 12 months, cutoff 8, 69/77</td>
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<tr>
<td></td>
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<td>Asbridge et al. (2014): cannabis-specific evaluation* in Canadian adult population sample ($n = 13,082; n = 775$ past 3 months users) and long-term, socially integrated regular cannabis users sample from four Canadian cities ($n = 165$)</td>
<td>None</td>
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<td></td>
<td>Barreto, de Oliveira Christoff, and Boerngen-Lacerda (2014): non-cannabis-specific validation (different psychoactive substances) in Brazilian convenience student sample ($n = 170$)</td>
<td>None: ASSIST (interview format) as gold standard for self-administered ASSIST</td>
</tr>
</tbody>
</table>
Cannabis Problems

**Cannabis Problems Questionnaire for adolescents, short version (CPQ-A-S)**


**Problems related to cannabis use**

(Proudfoot et al., 2010) [CPQ-A: intended to supplement DSM-IV diagnostic in exploration of cannabis-related problems

(Martin et al., 2006)]

(Proudfoot et al., 2010); cannabis-specific validation in Australian student sample ($n = 1734; n = 126$ past 3 months users), combined with a community sample ($n = 99$ past 3 months users aged 14–18)

- DSM-IV TR dependence, cutoff 5, 83/87
- DSM-IV TR (M-CIDI) dependence, cutoff 3, 84/72
- DSM-IV-TR (M-CIDI) abuse, cutoff 3, 79/81
- DSM-IV TR (PRISM-IV), SUD, cutoff 9, 74/69; dependence, cut-off 12, 57/84
- DSM-IV TR, dependence, cut-off 3, 85/77
- DSM-IV TR, ≥4 criteria, cut-off 7, 80/80
- Latent class analysis of DSM-IV TR (M-CIDI)
  - Moderate/severe, cut-off 3, 78/81
  - Severe, cut-off 7, 88/85
- DSM-IV TR (M-CIDI)
  - High school: CUD, cut-off 2, 62/97; dependence, cutoff 2, 86/95
  - College: CUD, cutoff 2, 68/97; dependence, cutoff 2, 78/94
- DSM-IV TR (M-CIDI), CUD, cut-off 3, 80/75, dependence, cutoff 5, 81/79
- Latent class analysis, moderate/severe, cut-off 3, 78/82; severe, cutoff 7, 97/86 or cutoff 8, 94/89

None: strong predictor of cannabis heavy use in logistic modeling

*(Continued)*
<table>
<thead>
<tr>
<th>Name (acronym)</th>
<th>Basic reference/origin</th>
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<th>Validation studies outside clinical context</th>
<th>Gold standard, cut-off, sensitivity/specificity</th>
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<tr>
<td></td>
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<td>Items: loss of control (1), paranoia (2, 11), concerned others (4), financial problems (5), social reduction (3, 12), trouble with police (6), health problems (7–10)</td>
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<td>Frequent cannabis use, cutoff 2, 100/75</td>
<td>Bernard et al. (2005): validation for alcohol and other drug use of a French version, in Swiss mixed, substance using treatment (n = 83) and general population (n = 80) adolescent sample (14–19 years)</td>
<td>ADAD, cutoff 4, 74/65; MINI, cutoff 3, 94/61</td>
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<td>Items: driving while intoxicated (1), motives for use (2), smoking alone (3), memory problems (4), concerned others (5), gotten into trouble (6)</td>
<td>Karila et al. (2007): validation for alcohol and other drug use, in French school student sample (n = 1728)</td>
<td>POSIT, cutoff 2, 93/77</td>
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<td>Subramaniam, Cheok, Verma, Wong, and Chong (2010): validation for alcohol and other drug use, in Singapore military recruits (16–26 years) male sample (n = 22,248)</td>
<td>CIDI auto 2.1, cutoff 1, 71/74</td>
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<td></td>
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<td></td>
<td>Pérez Gomez and Scoppeta Diaz-Grandos (2011): validation for alcohol and other drug use, in Colombian student (14-18 years) sample (n = 432)</td>
<td>None: item response analysis</td>
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<td>Skogen, Boe, Knudsen, and Hysing (2013): validation for alcohol and other drug use, in Norwegian general population adolescents (17–19 years) sample (n = 9680)</td>
<td>Self-report of “any problem with drug use,” cutoff 1, 81/72</td>
</tr>
<tr>
<td>Instrument</td>
<td>Description</td>
<td>Psychometric Properties</td>
<td>Notes</td>
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<tr>
<td>Cannabis Use Disorders Identification Test (CUDIT)</td>
<td>Originally: DSM-IV abuse and dependence (Adamson &amp; Sellman, 2003), when used in general population: “problematic cannabis use” (Annaheim, Rehm, &amp; Gmel, 2008; Annaheim, Scott, &amp; Gmel, 2010); CUDIT is based on AUDIT (see Saunders et al., 1993) that theoretically measures alcohol-related problems and the following three subconcepts: 1. original version (items): a. frequency/quantity (1–3) b. symptoms of dependence [loss of control (4), failed to do what expected (5), morning use (6)] c. negative consequences (guilt (7), memory problems (8), injuries (9), concerned others (10)) 2. revised version CUDIT-R (Adamson et al., 2010): deleting 2 and replacing 3 items (3, 5, 9, 10) with hazardous use, devoting a great deal of time, thoughts about quitting 3. revised version for general population (Annaheim et al., 2010): replacing 3 items (2, 8, 10) with motives for use, social reduction, difficulties at work/school</td>
<td>Annaheim et al. (2008): cannabis-specific validation in Swiss adolescents and young adults general population sample (n = 5025; n = 593 past 6 months users) Annaheim et al. (2010): cannabis-specific validation in Swiss adolescents and young adults general population sample (n = 5722; n = 558 past 6 months users) Thake and Davis (2011): cannabis-specific validation in Canadian adult general population sample (n = 16674; n = 1179 past 3 months users) Bruno, Marshall, and Adamson (2013): cannabis-specific validation among adult, non-treatment seeking cannabis users in New Zealand (n = 368)</td>
<td>Different accepted indicators of problematic use: smoking before school/work, cutoff 8, 64/69; smoking before driving, cutoff 6, 58/59; depressive symptoms, cutoff 6, 50/59; coping motives, cut-off 6, 66/67; self-evaluation, cutoff 7, 71/70. None: item response analysis</td>
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<tr>
<td>Cannabis Use Problems Identification Test (CUPIT)</td>
<td>Currently diagnostically and potentially problematic cannabis use Theoretically three sub-concepts according to DSM-IV/ICD-10 (items): 1. risky use [frequency (1, 2)] 2. dependence/using behavior [times using (3), morning use (4); being stoned (5), loss of control (9), craving (6, 7, 8, 10)] 3. health/social problems [work/school problems (11), lack of energy (12), social reduction (13, 14), memory problems (15), loss of control (16)]</td>
<td>Bashford et al. (2010): cannabis-specific validation among volunteers in New Zealand, who had been using cannabis at least once during the last 12 months, from general population (n = 36), drug treatment clinics (n = 36), justice system (n = 85), and students/job seekers (n = 83)</td>
<td>DSM-IV TR/ICD-10 CUD: cutoff 20, 87/79</td>
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<td>Name (acronym)</td>
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<tr>
<td>Drug Abuse Screening Test (DAST-10)</td>
<td>Skinner (1982): Adaption of Michigan Alcohol Screening Test (MAST) (Selzer, 1971)</td>
<td>Drug abuse or dependence: DAST-10 is the shortened version of the original DAST (28 items) and the DAST-20</td>
<td>Bedregal, Sobell, Sobell, and Simco (2006): noncannabis-specific validation among Spanish speaking individuals (Hispanics/Latinos) without alcohol/drug problems (n = 127), drug and (n = 60) alcohol abusers (n = 35) in the United States</td>
<td>Drug abusers in treatment programs: cutoff 4, 90/97</td>
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<td>Items: (poly-) drug use in general (1, 2), loss of control (3), “blackouts” (4), guilt (5), concerned others (6), social reduction (7), illegal activities (8), withdrawal (9), medical problems (10)</td>
<td>McCabe, Boyd, Cranford, Morales, and Slayden (2006): noncannabis-specific validation among undergraduate students in the United States (n = 4500; n = 1735) past 12 months drug users</td>
<td>None: correlation analyses</td>
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<td>Grekin et al. (2010): noncannabis-specific validation among 300 low-income (mostly African-American) women in the United States, recruited right after giving birth (in clinical setting)</td>
<td>Biological drug screening, sensitivity = 0.47</td>
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<td>Evren, Ogel, Evren, and Bozkurt (2014): noncannabis-specific validation of Turkish version among 202 prisoners (n = 78) with drug problems/(n = 124) without drug problems</td>
<td>Addiction Profile Index-Short, cutoff 4, 88/74</td>
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<td>Yongseok (2014): noncannabis-specific validation of Korean version in general population adults (n = 1000; n = 503) “normal” residents/(n = 497) at risk adults, ie, from prisons, on probation or working at bars</td>
<td>Being arrested because of use, cutoff 2, 66/93</td>
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</tbody>
</table>
### Problematic Use of Marijuana (Cannabis) [PUM (PUC)]

Okulicz-Kozaryn and Sieroslawski (2007) developed a tool for screening cannabis use with problematic outcomes. The tool assesses ICD-10 harmful use, problems in interpersonal relationships/psychophysical functioning and abuse (Bashford, 2010). The items include:
- Skipped school (1)
- Arguments with family/friends (2, 3)
- Bought cannabis (4)
- Memory problems (5)
- Smoking alone (6)
- Craving (7)
- Financial problems (8)

Okulicz-Kozaryn and Sieroslawski (2007) used cannabis-specific validation among general population cannabis using adolescents recruited through snowball sampling in Poland (n = 1277).

### ICD-10 dependence, cutoff 2, 81/88

#### Short Inventory of Problems—Alcohol and Drugs (SIP-AD)


Problems related to alcohol and substance use in general:
- Being unhappy (1)
- Physical appearance changed (2, 9)
- Failed to do what expected (3)
- Personality changes (4, 13)
- Risk taking (5)
- Impulsiveness (6, 7)
- Financial problems (8, 15)
- Family/friendship was hurt (10, 11)
- Activity reduction (12)
- Damaged reputation (14)


Hagman et al. (2009) used the tool for noncannabis-specific validation among 469 male regular "clubbers"/club drug users who have sex with men from New York City.

#### Problems related to alcohol and substance use in general

-Items: being unhappy (1), physical appearance changed (2, 9), failed to do what expected (3), personality changes (4, 13), risk taking (5), impulsiveness (6, 7), financial problems (8, 15), family/friendship was hurt (10, 11), activity reduction (12), damaged reputation (14)

#### DSM-IV TR, Diagnostic and Statistical Manual of Mental Disorders, Text Revision; M-CIDI, Munich Composite International Diagnostic Interview; PRISM, Psychiatric Research Interview for Substance and Mental Disorders (PRISM-IV); SUD, substance use disorders (dependence or abuse); CUD, Cannabis use disorders (same as SUD in this context).

The table lists basic reference, origins, purpose, and available nonclinical validation studies for every screening test selected after a checklist (see Key Facts).


a Not a validation in narrower sense of the word.
indicates the need for a higher threshold. Nevertheless, measures in the general population are available, today, and ability of extrapolation of their results to the general population or even university students in general. The authors emphasized, however, the inconvenience sample of Brazilian university students (Barreto et al., 2014). The authors confirmed that a greater balance of sensitivity with specificity could be obtained when using a higher threshold for “problematic” cannabis use than what was suggested in clinical applications of the instrument.

In a subsequent Canadian study, Thake and Davis (2011) confirmed the higher threshold for the nonclinical setting and declared ASSIST more successful in identifying harm than a simple frequency of use measure. At the same time, they found CUDIT (see “Cannabis Use Disorders Identification Test”) of better performance for use in general population surveys than ASSIST.

Asbridge et al. (2014) compared ASSIST to a frequency (and quantity) measure. Their results underline a disproportionately high impact that the inclusion of a simple measure of frequency into ASSIST has on defining “problematic” cannabis use. Moreover, they confirmed the higher threshold for general population surveys.

Finally, a new self-report format of ASSIST was compared to the original interview-format in a small convenience sample of Brazilian university students (Barreto et al., 2014). The authors emphasized, however, the inability of extrapolation of their results to the general population or even university students in general.

To conclude, data on ASSIST’s psychometric performance in the general population are available, today, and indicates the need for a higher threshold. Nevertheless, that data remain of a very limited nature (eg, no information on dimensionality of the scale). In addition, another short cannabis screening instrument (CUDIT) has shown better psychometric performance than ASSIST when tested in a large general population sample (Thake & Davis, 2011). Thus, based on the present state of knowledge, there is not enough evidence that would prove ASSIST’s usefulness outside the clinical setting.

CAST: The Cannabis Abuse Screening Test is a six-item cannabis-specific tool aimed at describing some patterns of use and at screening “problematic” use according to Beck and Legleye (2008) and ICD-10 diagnosis. Its items encompass patterns of potential nonrecreational use, symptoms of dependence, social aspects, memory, and other problems. The test originally used five ordered categories for answers (never, rarely, from time to time, fairly often, very often). It was initially designed for the entire lifespan, and used a dichotomization of the answers instead of a full range (Legleye et al., 2007). Subsequently, the time frame was restricted to “the past 12 months” and the dichotomization abandoned (Table e17.2). It was validated using adolescents and young adults (mostly students). Studies were conducted in various countries, including nationwide representative samples using two gold standards: the DSM-IV diagnoses (Bastiani et al., 2013; Cuenca-Royo et al., 2012; Gyepesi et al., 2014; Legleye et al., 2011), or an empirical gold standard obtained by latent class analysis of the DSM-IV (Legleye et al., 2013). Its validity was also assessed in the general population (aged 15–64) in France (Legleye et al., 2015). The difference between binary or full-range scorings were found low in French adolescents (Legleye et al., 2011), as were the gender differences (Legleye et al., 2013), and the same thresholds were found for adolescents and adults.

CAST appears to be unidimensional, and shows good internal consistency and high discriminative power.

### VIII. SCREENING, DIAGNOSIS, AND TREATMENT

#### TABLE e17.2 The Cannabis Abuse Screening Test (CAST)

<table>
<thead>
<tr>
<th>Questions</th>
<th>Answers (scoring)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Have you smoked cannabis before midday?</td>
<td>Never (0), rarely (1), from time to time (2), fairly often (3), very often (4)</td>
</tr>
<tr>
<td>2 Have you smoked cannabis when you were alone?</td>
<td>Never (0), rarely (1), from time to time (2), fairly often (3), very often (4)</td>
</tr>
<tr>
<td>3 Have you had memory problems when you smoked cannabis?</td>
<td>Never (0), rarely (1), from time to time (2), fairly often (3), very often (4)</td>
</tr>
<tr>
<td>4 Have friends or family members told you that you should reduce or stop your cannabis consumption?</td>
<td>Never (0), rarely (1), from time to time (2), fairly often (3), very often (4)</td>
</tr>
<tr>
<td>5 Have you tried to reduce or stop your cannabis use without succeeding?</td>
<td>Never (0), rarely (1), from time to time (2), fairly often (3), very often (4)</td>
</tr>
<tr>
<td>6 Have you had problems because of your cannabis use (argument, accident, poor results at school, etc.)?</td>
<td>Never (0), rarely (1), from time to time (2), fairly often (3), very often (4)</td>
</tr>
</tbody>
</table>

The table displays the CAST in its original, nondichotomized version (Legleye et al., 2011).
between diagnoses. Its test-retest reliability was found to be very good (Molinaro, Siciliano, Curzio, Denoth, & Mariani, 2012). It was used for the European School Survey Project on Alcohol and Other Drugs (ESPAD) Study (Pabst, Kraus, & Piontek, 2012), applying a binary scoring. Its structural equivalence across 13 countries was found to be high (Bougeard, Eslami, & Qannari, 2014).

At this time, CAST has proved its psychometric and screening properties in various populations and countries, and with various statistical methods and gold standards. Existing crossnational surveys allow studying its crosscultural invariance. It is the most widely used tool for research among general population adolescents and adults. According to the criteria of our review, it is considered to be one of the most useful tools for use in general population surveys.

CPQ-A-S: The Cannabis Problems Questionnaire for adolescents is a 27-item tool which has been found to be a reliable and valid screen for cannabis problems in adolescents. Originally, it was a clinician-administered interview (Martin et al., 2006). More adequate for our purposes, however, is its shortened, 12-item version, CPQ-A-S, which has been constructed also for research in the community, and is intended to identify young people at risk of harm due to their cannabis use (see Proudfoot et al., 2010). CPQ-A-S puts a high emphasize on health aspects, with about half of its items assessing physical or mental health problems (eg, chest infection, cough, paranoia). In addition, it contains items on patterns of use, social, legal, and financial aspects.

When validated in a student and adolescent community sample (Proudfoot et al., 2010), CPQ-A-S has shown good reliability and validity and loaded on a single factor. However, the test has shown rather moderate internal consistency.

Further, CPQ-A-S has been validated in a student sample and compared to CAST (Fernandez-Artamendi et al., 2012). The researchers defined both instruments as reliable and valid to identify “problematic” cannabis use in young people. CPQ-A-S appeared to be a better predictor of cannabis users with psychopathological symptoms and concern about their cannabis use, while CAST had higher internal consistency, as well as higher specificity to detect cannabis dependence according to DSM-IV diagnoses.

At this time, CPQ only has been validated in adolescent samples and there is no short form of the tool that is conceptualized also for adults. Moreover, outside the clinical setting, specificity is at least as important as sensitivity and other instruments (CAST) have shown higher specificity while encompassing less items (ie, take less time to be administered). Therefore, based on the present state of knowledge, CPQ-A-S cannot be counted as one of the most useful tools for research among general population adolescents and adults.

CRAFFT: CRAFFT is a mnemonic, based on six questions that ask for cannabis-related problems from a lifetime perspective. It was constructed by combining and modifying items from other screening tests and consequently validated in the clinical context (Knight et al., 1999). Its items encompass patterns of use, harmful use, cognitive and social aspects, although no health aspects.

The tool has been used in French (Bernard et al., 2005; Karila et al., 2007), Spanish (Pérez Gomez & Scoppeta Diaz-Grados, 2011), Norwegian (Skogen et al., 2013), and other language versions (Subramaniam et al., 2010). Thus, CRAFFT is a widely used screening instrument among adolescents that has generally been found of adequate psychometric performance (Dhalla, Zumbo, & Poole, 2011).

More specifically, however, among adolescents outside the clinical context, CRAFFT has shown insufficient internal consistency and relatively low specificity in several validation studies (see Bernard et al., 2005; Cummins et al., 2003; Karila et al., 2007; Knight et al., 1999; Pérez Gomez & Scoppeta Diaz-Grados, 2011; Skogen et al., 2013; Subramaniam et al., 2010). Yet, to the knowledge of the authors, CRAFFT has never been used and validated among general population adults older than 26 years. Although there are numerous validation studies from outside the clinical context, there seem to be hardly any studies using a representative general population sample, other than (school) students or military recruits. Moreover, there is, to the knowledge of the authors, not a single evaluation of CRAFFT that focuses on cannabis use instead of analyzing several illegal substances, and often also alcohol, at the same time.

For all these reasons, CRAFFT cannot be one of the most adequate screening instruments for use in general population surveys.

CUDIT: The Cannabis Use Disorders Identification Test was constructed as a brief 10-item screen to identify individuals who had used cannabis in a problematic or harmful way during the preceding 6 months (Adamson & Sellman, 2003). It was directly adapted from the established AUDIT (Saunders et al., 1993) and simply created by merely replacing the word “alcohol” with the word “cannabis.” CUDIT covers patterns of use, symptoms of dependence, and negative (social) consequences of cannabis use. Originally constructed (Adamson & Sellman, 2003) and revised (Adamson et al., 2010: CUDIT-R) for the clinical context, it was subsequently also used and validated for research in the general population (Table e17.3).

Annaheim et al. (2008) found CUDIT related to accepted concepts of “problematic” cannabis use (eg, coping motives for cannabis use, depressive symptoms), but with a modest internal consistency and a rather weak psychometric performance of some items. Thus,
in a follow-up study, Annaheim et al. (2010) suggested revising CUDIT for the social-epidemiological research context, replacing items of unsatisfactory psychometric properties with new ones. Corresponding results indicated generally improved psychometric performance.

In a general population study, Thake and Davis (2011) found—original—CUDIT of good psychometric performance. It outperformed a simple frequency measure, as well as ASSIST, with regards to sensitivity and specificity, when compared to different external criteria as indicators of “problematic” cannabis use (self-evaluation of harm, driving under the influence, use of other illicit drugs).

Recently, another revised version of the tool—CUDIT-R (Adamson et al., 2010), originally amended for the clinical context—was also tested in a community sample of cannabis users (Bruno et al., 2013). CUDIT-R showed unidimensionality, and strongly correlated with measures of frequency of use, as well as cannabis use disorder according to DSM-5.

To conclude, CUDIT is a cannabis-specific brief screening test that measures a broad spectrum of problems related to cannabis use among adolescents and adults. When validated in different (large) general population samples in Switzerland, Canada, and New Zealand, it has shown good psychometric performance.

CUPIT: The Cannabis Use Problems Identification Test is a 16-item screen for the detection of currently and future “risky” or “problematic” use, respectively. CUPIT was constructed for the treatment setting but also for use in the community and as a research tool. It is intended to measure a DSM/ICD tridimensional concept of risky use, dependence and using behavior, as well as health and social problems (Bashford et al., 2010). More concretely, its items cover patterns of use, symptoms of dependence, as well as social aspects.

CUPIT was found to be of excellent test-retest reliability, high internal consistency, a high ability to discriminate between different diagnostic subgroups (nonproblematic, risky, problematic use), and of highly significant

TABLE e17.3 The Cannabis Use Disorders Identification Test (CUDIT)

<table>
<thead>
<tr>
<th>Questions</th>
<th>Answers (scoring)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have you used any cannabis over the past 6 months? If YES, please answer</td>
<td></td>
</tr>
<tr>
<td>the following questions about your cannabis use: Over the past 6 months...</td>
<td></td>
</tr>
<tr>
<td>1 ... how often have you used cannabis?</td>
<td>Never (0), monthly</td>
</tr>
<tr>
<td></td>
<td>or less (1), 2–4</td>
</tr>
<tr>
<td></td>
<td>times a month (2),</td>
</tr>
<tr>
<td></td>
<td>2–3– times a week</td>
</tr>
<tr>
<td></td>
<td>(3), 4 or more</td>
</tr>
<tr>
<td></td>
<td>times a week (4)</td>
</tr>
<tr>
<td>2 Which of the following statements best fits your personal situation?</td>
<td>“I smoke cannabis</td>
</tr>
<tr>
<td></td>
<td>for fun, because</td>
</tr>
<tr>
<td></td>
<td>it’s something</td>
</tr>
<tr>
<td></td>
<td>special” (0), “I</td>
</tr>
<tr>
<td></td>
<td>smoke cannabis</td>
</tr>
<tr>
<td></td>
<td>out of habit,</td>
</tr>
<tr>
<td></td>
<td>because it’s part</td>
</tr>
<tr>
<td></td>
<td>of my daily life”</td>
</tr>
<tr>
<td></td>
<td>(4)</td>
</tr>
<tr>
<td>3 ... how often were you “stoned” for 6 or more hours?</td>
<td>Never (0), less</td>
</tr>
<tr>
<td></td>
<td>than monthly (1),</td>
</tr>
<tr>
<td></td>
<td>monthly (2), weekly</td>
</tr>
<tr>
<td></td>
<td>(3), daily or</td>
</tr>
<tr>
<td></td>
<td>almost daily (4)</td>
</tr>
<tr>
<td>4 How often during the past 6 months did you find that you were not</td>
<td>Never (0), less</td>
</tr>
<tr>
<td>able to stop using cannabis once you had started?</td>
<td>than monthly (1),</td>
</tr>
<tr>
<td></td>
<td>monthly (2), weekly</td>
</tr>
<tr>
<td></td>
<td>(3), daily or</td>
</tr>
<tr>
<td></td>
<td>almost daily (4)</td>
</tr>
<tr>
<td>5 How often during the past 6 months did you fail to do what was</td>
<td>Never (0), less</td>
</tr>
<tr>
<td>normally expected from you because of using cannabis?</td>
<td>than monthly (1),</td>
</tr>
<tr>
<td></td>
<td>monthly (2), weekly</td>
</tr>
<tr>
<td></td>
<td>(3), daily or</td>
</tr>
<tr>
<td></td>
<td>almost daily (4)</td>
</tr>
<tr>
<td>6 How often during the past 6 months did you need to use cannabis in</td>
<td>Never (0), less</td>
</tr>
<tr>
<td>the morning to get yourself going after a heavy session of using cannabis?</td>
<td>than monthly (1),</td>
</tr>
<tr>
<td></td>
<td>monthly (2), weekly</td>
</tr>
<tr>
<td></td>
<td>(3), daily or</td>
</tr>
<tr>
<td></td>
<td>almost daily (4)</td>
</tr>
<tr>
<td>7 How often during the past 6 months have you refrained from taking</td>
<td>Never (0), less</td>
</tr>
<tr>
<td>part in leisure time activities that you originally wanted to do, such</td>
<td>than monthly (1),</td>
</tr>
<tr>
<td>as going out, sports, hobbies, etc., because of using cannabis?</td>
<td>monthly (2), weekly</td>
</tr>
<tr>
<td></td>
<td>(3), daily or</td>
</tr>
<tr>
<td></td>
<td>almost daily (4)</td>
</tr>
<tr>
<td>8 How often during the past 6 months have you had a problem with your</td>
<td>Never (0), less</td>
</tr>
<tr>
<td>memory or concentration after using cannabis?</td>
<td>than monthly (1),</td>
</tr>
<tr>
<td></td>
<td>monthly (2), weekly</td>
</tr>
<tr>
<td></td>
<td>(3), daily or</td>
</tr>
<tr>
<td></td>
<td>almost daily (4)</td>
</tr>
<tr>
<td>9 How often during the past 6 months have you had difficulties at work</td>
<td>Never (0), less</td>
</tr>
<tr>
<td>or school, because of using cannabis?</td>
<td>than monthly (1),</td>
</tr>
<tr>
<td></td>
<td>monthly (2), weekly</td>
</tr>
<tr>
<td></td>
<td>(3), daily or</td>
</tr>
<tr>
<td></td>
<td>almost daily (4)</td>
</tr>
<tr>
<td>10 Has a relative, friend or a doctor or other health worker been</td>
<td>No (0), yes (4)</td>
</tr>
<tr>
<td>concerned about your use of cannabis or suggested you cut down over the</td>
<td></td>
</tr>
<tr>
<td>past 6 months?</td>
<td></td>
</tr>
</tbody>
</table>

The table displays a revised version of the CUDIT for use in general population surveys (Annaheim et al., 2010), based on the original CUDIT (Adamson & Sellman, 2003).
longitudinal predictive validity (Bashford et al., 2010). CUPIT’s potential to detect future “risky” or “problematic” use is probably its main advantages over other tests. None of the other tests, to the knowledge of the authors, has been tested for predictive validity in longitudinal studies, yet.

However, the only sample that was used to construct and validate CUPIT was of limited representativeness. It was rather small (n = 212), not random, and only consisted of 36 general population adolescents and adults (Bashford et al., 2010).

To this end, regardless of CUPIT’s novel capability to classify both currently diagnosable and also potentially problematic cannabis use and its good psychometric properties when tested in a particular sample, evidence from validation studies is lacking currently. Such validation studies could prove this test to be one of the most adequate screening instruments for use in general population surveys.

DAST-10: The Drug Abuse Screening Test was designed after the Michigan Alcohol Screening Test to provide a 28-item instrument for clinical and nonclinical screening to detect drug abuse or dependence disorders. Shortened, 20- and 10-item versions of the test are also available (see Skinner, 1982). Because of its brevity, the latest version is most relevant for our purposes of review. DAST-10 covers items on illegal (poly-) drug use in general, symptoms of dependence, in addition to health, social, and legal problems.

Outside the clinical setting, the psychometric performance of DAST-10 was analyzed among a small subgroup of Spanish-speaking individuals in the United States. The test was found to be reliable and unidimensional (Bedregal et al., 2006). At about the same time, its psychometric performance was tested among drug using undergraduate students in the United States, and declared a promising instrument for detecting drug abuse among college students (McCabe et al., 2006).

A few years later, it was validated against drug-biomarkers among 300 low-income women, immediately after having given birth, and found of low sensitivity (Grekin et al., 2010). Further, a Spanish version was validated among drug addicts and healthy controls (Pérez Gálvez et al., 2010).

Recently, Evren et al. (2014) have undertaken a validation of a Turkish version of DAST-10 among prisoners. Finally, a Korean version was validated in a sample of “normal” and “at risk” residents (Yongséok, 2014).

Although, not clinical samples in the narrowest sense, those samples cannot be considered representative for the community, as not probabilistic and mostly composed of “at risk” individuals—that is, alcohol and illegal drug users in general, or otherwise especially vulnerable (eg, low-income, prisoners) individuals. Moreover, DAST-10 has never been tested concerning its performance specifically among cannabis users. Therefore, the available studies hardly allow one to draw conclusions about its possible performance concerning cannabis use among general population adolescents and adults and in the (Western) European context. For those reasons, DAST-10 does not conform to this review’s preconditions for counting as one of the most adequate screeners.

PUM (PLIC): The Problematic Use of Marijuana (Cannabis) screening tool is an eight-item scale that intends to measure ICD-10 harmful use, along with problems in interpersonal relationships and psycho-physical functioning. Its items cover patterns of use, symptoms of dependence, as well as cognitive, social, and financial aspects.

PUM was constructed and validated in Poland among adolescent cannabis users, recruited by snowball-sampling, where it has shown good psychometric performance (Okulicz-Kozaryn & Sieroslawski, 2007; Piontek et al., 2008).

Although a promising cannabis-specific screening instrument, since its construction in 2007 and validation in a nonprobabilistic adolescent sample, it has not been further validated (Okulicz-Kozaryn, K., personal communication, Oct. 14, 2014). For that reason, evidence is lacking that would allow one to select the PUM as one of the most adequate screening instruments for use in general population surveys among adolescents and adults.

SIP-AD: The Short Inventory of Problems—Alcohol and Drugs was constructed by Blanchard et al. (2003). Its shortened 15-item version covers health, social and financial aspects, as well as risk taking and negative personality changes. Although recently validated in a multitude of clinical settings (Allensworth-Davies, Cheng, Smith, Samet, & Saitz, 2012), there is scarce information on its performance in the general population.

Gillespie et al. (2007) provide some empirical validity for SIP-AD as a useful measure for assessing negative consequences associated with substance use in general. However, they call the representativeness of their sample into question, and state that inferences can neither be drawn to other student bodies, and to an even lesser degree, the general population. Further, they assume that the extension of SIP-AD to nonclinical samples might be unmerited in the test’s present incarnation.

Hagman et al. (2009) refined a shortened, 10-item SIP-AD as a unidimensional construct, and found a high degree of reliability and validity. Yet, the results from their study sample—469 regular club drug-using males, who have sex with men—are hardly transferable to the general population.

Moreover, neither of the studies were cannabis-specific, but included a multitude of other illegal drugs, as well as alcohol. For those reasons, it cannot be decided how SIP-AD would actually perform for cannabis use in...
general population samples of adolescents and adults of both sexes.

CONCLUSIONS

At the time of this review, two screening tests were found to be sufficiently studied in general population surveys to be considered reliable or promising for adolescent and (young) adult populations: CAST and CUDIT.

CAST is the shortest and the most studied. It was validated in many different contexts toward different gold-standards derived from DSM-IV, and compared to another screening test. The test has proven good psychometric and screening performances, and the study of its transcultural equivalence has begun. However, it has not been yet validated toward DSM-5, nor studied in longitudinal settings.

CUDIT is somewhat longer, and also shows appealing performances in general population samples of three countries and was validated toward DSM-5, although only in a small sample. It has been compared to another screening test but, to date, has not been studied in longitudinal surveys nor studied in cross-national surveys.

CAST and CUDIT cover different aspects of cannabis use and its consequences. These tests have not been compared with each other. Validation studies of these tests used different survey methodologies (self-administered paper or Internet, telephone, etc.), focusing on different population targets (adolescents, young adults, general population). Additionally, despite the use of DSM-derived gold standard, no study focused on the commonalities of these tests and the gold standard: what do these tests measure that is common to DSM and what is not? In parallel, no thorough comparison of the CAST with agreed-upon concepts of problematic cannabis use was done. This is a general problem for all tests concerned by this review.

Further development of research may consider: (1) a study of the common structure of CAST and CUDIT and DSM-5, especially the description of what is common and what is not between them, regarding concepts and factorial structures; (2) a survey comparing the tests together; (3) a study of the added value of these tests, compared to frequency threshold and DSM diagnoses in cross-sectional studies; (4) the added value of these tests in predicting evolutions of cannabis use or psychosocial health damages, compared to frequency thresholds and DSM diagnoses; (5) the cultural invariance of these tests in cross-national surveys, especially the determination of specific thresholds for international comparisons. Of course, other compelling tests could also be studied that way.

MINI-DICTIONARY

General population survey In contrast to clinical investigations, a probability-based survey of people that are selected without any link with the topic of the study.

“Problematic” cannabis use There is no generally agreed-upon definition. Commonly, the expression is used to describe a broader concept of cannabis-use-related issues (including Cannabis use disorders as per the international classifications ICD or DSM) and refers to consumption patterns leading to negative consequences on a social or health level, for the individual cannabis user and the larger community.

Psychometric properties The characteristics of a test that is used for psychological, sociological or public health measurement and of its items (questions). Psychometric properties are examined with the intention to construct, develop and improve such tests.

Screening Research or clinical procedure that refers to a preliminary assessment and aims at identifying individuals in a broader population whose substance use is (potentially) harmful. Thus, screening is a method to estimate the prevalence of “problematic” cannabis use within the general population.

Screening instrument/test Brief questionnaires which enable the classification of respondents to a “positive” (problematic) and a “negative” (nonproblematic) group, depending on the answers they give. Screening tools do not produce formal diagnoses.

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VIII. SCREENING, DIAGNOSIS, AND TREATMENT