ISDUP and EUPC on prevention of alcohol and illicit drugs use among youth via:

1. Parenting skills programs/Family-based programs, 2. Prevention education based on social competence/social influence models /School-based programs, and 3. Programs addressing individual vulnerabilities/School-based programs

A foundation document

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Contents

Introduction

This document reviews the scientific evidence for efficacy or effectiveness of three types of interventions aiming to prevent/reduce the use of alcohol and illicit drugs in underage populations as described in UNODC's International Standards of Drug Use Prevention (ISDUP) updated 2nd edition and in EMCDDA's/EUDA's European Prevention Curriculum (EUPC):

1. Parenting skills programs/Family-based programs,
2. Prevention education based on social competence and/or social influence models/School-based programs,

and,

3. Programs addressing individual vulnerabilities/School-based programs.

As these reports are important guidelines for evidence-based prevention work to reduce alcohol and drug related harms among children and adolescents, it is essential that the referenced evidence base is accurate and reliable.

This document serves as a reference document (or foundation document) for a shorter and less detailed version in Norwegian. This document is produced as part of project, involving collaboration between the Norwegian Directorate of Health and the Norwegian Public Health Institute (NIPH). In addition to examining the evidence base for effective prevention of alcohol and drug use among youth, which is the focus of the present document, the collaborative project will include also an assessment of suitability for implementation of effective interventions in a Norwegian context.

Description of method employed for the evaluation of the referenced literature

This document reviews the scientific evidence for efficacy or effectiveness of three types of interventions aiming to prevent/reduce the use of alcohol and/or illicit drugs in underage populations as described in UNODC's International Standards of Drug Use Prevention (ISDUP) updated 2nd edition and in EMCDDA's/EUDA's European Prevention Curriculum (EUPC):

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As these reports are important guidelines for evidence-based prevention work aiming to reduce alcohol and drug related harms among children and adolescents, it is essential that the referenced evidence base is accurate and reliable. For this reason, this evaluation focused only on the scientific literature referenced in the ISDUP 2nd updated edition from 2018, as it was considered both more recent and more relevant. Programs designed to prevent and/or reduce tobacco use were also excluded from this evaluation. All scientific evidence was evaluated in relation to ISDUP's own definitions and conclusions concerning a given intervention.

Our point of departure and governing principles lay primarily in the set of criteria for evidence of efficacy or effectiveness as presented by Flay and colleagues[1] and later updated by Gottfredson et al.[2]. In International Standards for Drug Use Prevention (ISDUP), criteria for assessment of evidence do mainly resemble those of Flay et al.[1] and Gottfredson et al.[2]. That is, overall, there is a resemblance regarding the guiding principles pertaining to: - outcome of interest; - study design and causal inference; - duration of effect; - replication and consistency of findings; - assessment of any adverse effects; and - distinction between efficacy and effectiveness studies.

However, there are some notable differences in what we have chosen in our assessment. First, while the outcome of interest in both Flay et al.[1]/Gottfredson et al.[2] and ISDUP is elimination or reduction of substance use or/and substance related harms (i.e. our interpretation of[1,2] in this specific context), ISDUP includes also mediating outcomes for interventions targeting young children. In this evaluation, we considered only primary outcomes; that is, only those reports where substance use/and or substance use related harms were assessed as outcome(s). Second, Flay et al.[1] and Gottfredson et al.[2] included practical value (i.e. practical significance in terms of public health impact) as a criterion for efficacy/effectiveness, which is not evident in ISDUP. In our assessment, we will also include an assessment of practical value whenever feasible. Third, we prioritized meta-analyses and systematic reviews as first level of evidence, and RCTs/ non-randomised control studies/ time series analysis as second level of evidence in accordance with ISDUP guidelines (see Flowchart 1 in Annex on description of the methodology utilised for the collection, assessment and utilization of the scientific literature included 1st ISDUP edition). Fourth, as part of its 1st edition, ISDUP provides ratings of the strength of the evidence of efficacy or effectiveness (e.g. strong evidence, good evidence, promising evidence), which neither found in Flay et al.[1]/Gottfredson et al.[2] nor provided in ISDUP's 2nd edition.

In addition, we have -- to some extent -- taken into consideration possible conflict of interest (CoI) in our assessments of studies. For studies where CoI was acknowledged, this is

noted, as we assume that CoI may possibly have led to biased conclusions. CoI may for example pertain to research funding by a commercial actor or researchers' own financial interests in dissemination of a prevention program. Information about possible CoI is mainly obtained from the referenced publications and is therefore incomplete.

Finally, in its 1st edition, ISDUP rates the level of efficacy for interventions found to yield positive results in preventing underage substance use in five categories: 'Limited' (one star), 'Adequate' (two stars), 'Good' (three stars), 'Very good' (four stars) and 'Excellent' (five stars). We will also refer to this rating in our assessment, although these ratings were not provided for the literature added in the updated 2nd edition.

The European Prevention Curriculum (EUPC) is based on the ISDUP but also offers substantial additional guidance to policymakers beyond scientific evidence for efficacy or effectiveness of prevention strategies or intervention measures. The EUPC provides an overview of evidence-based programs and interventions in two data bases: a. the Best practice portal – evidence database, and b. the Xchange Registry.

In the Best practice portal, each included program or prevention strategy is given a rating of the evidence (of efficacy or effectiveness), in one of the five following categories: 'Beneficial', 'Likely to be beneficial', 'Trade-off between benefits and harms', 'Evidence of ineffectiveness' and 'Unknown effectiveness'. In the Xchange prevention registry, which includes only programs/prevention measures evaluated in at least one European country, the programs/interventions are rated in one of the following six categories: 'Beneficial', 'Likely to be beneficial', 'Possibly beneficial', 'Additional studies recommended', 'Unlikely to be beneficial' and 'Possibly harmful'. These ratings will also be referred to in our assessments of the literature.

1. Parenting Skills Programs (Middle childhood/Early adolescence)

Evidence from the International Standards on Drug Use Prevention (ISDUP), 2nd edition

Both editions of the ISDUP highlight the role of *parenting skills* as a key factor in healthy child development, including their protective role against use of alcohol, tobacco, and other drugs in their children. Both editions use similar language to describe the type of intervention aiming to reduce substance use among young people through improving skills of their parents (*italics* added):

> "Parenting skills programmes help parents become better parents, in very simple ways. A warm childrearing style, where parents set rules for acceptable behaviours, closely monitor free time and friendship patterns, help to acquire skills to make informed decisions, and are role models *has been shown to be one of the most powerful protective factors against substance abuse and other risky behaviours*."[3]

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A total of five reviews ostensibly addressing *parenting skills programs* was noted in the ISDUP 2nd edition; one already reviewed in the 1st edition (cited as Mejia, 2012) and four newly added reviews in the 2nd edition (incompletely cited in footnotes only as Thomas et al., 2016; Foxcroft and Tsertsvadze, 2012, Allen et al., 2016, and Kuntsche, 2016). In comparison, the 1st edition entails a considerably longer list of relevant studies on family/parenting skills interventions ("Nine good reviews and four acceptable reviews reported findings with regard to this intervention"[3], *p*. 14), but only Mejia et al. 2012 was carried over to the 2nd edition.

The reason for this shortened evidence list is unclear, especially considering the 4-star ratings (i.e., "very good" effects in preventing substance abuse[a], Table 1, *p*. 8) and strong conclusions (i.e., "There is also strong evidence that these kinds of programmes can prevent self-reported drug use at a follow up of 12 months or more.", *p*. 14) in the 1st edition. It is possible that less relevant studies were excluded in the 2nd update, as the 1st edition listed multiple reports (often rated as "good") without any primary alcohol/drug use outcomes assessed in offspring[5-9].

As stated in the ISDUP 2nd edition, *p*.5:

> "Five reviews reported findings with regard to this intervention, of which four are from the new overview of systematic reviews.
>
> With regard to primary outcomes, these studies report that family-based universal programmes can[b] prevent tobacco, alcohol, drug and substance use in young people, the effect size generally being persistent into the medium and long term (longer than 12 months). More intensive programmes delivered by a trained facilitator appear to be more consistently effective compared with single sessions or computer-based programmes.

[a] It is unclear whether this reference to "substance abuse" in Table 1 was a typo, or whether this table summarized evidence concerning substance abuse only (and if so, why).

[b] **This non-descript phrasing was defined only in the 1st edition, *p*. 6: "There are cases for which "good" systematic reviews concluded that the studies available to them were few or with mixed results. This is indicated in the text by formulations such as "the intervention *might* or *can* prevent substance abuse".**

Also, particular gender-specific interventions targeting mothers and daughters were reported to be effective. The evidence summarized above is from studies on family-based prevention interventions implemented in Africa, Asia, the Middle East, Europe, Australia and North America."

ISDUP literature overview

Given that the appropriate scientific citations were not provided for the ISDUP 2nd edition and there was no document corresponding to the 1st edition's Appendix II, Annex V (Summary results of "good" and "acceptable" studies), the summary of these five reviews is as follows:

1. Mejia (2012)

Refers to: **Mejia, A., Calam, R., & Sanders, M. R. (2012).** A review of parenting programs in developing countries: opportunities and challenges for preventing emotional and behavioral difficulties in children. *Clinical child and family psychology review*, *15*(2), 163–175.

This report[6] utilized a multi-step review to review evidence concerning the effectiveness of parenting programs – "interventions designed to enhance or change parental role performance through training, support or education, and their main goal is to influence the well-being of the children of these parents" -- administered in developing countries to families with children under 12 years of age.

A total of 44 studies published between 1990-2011 targeting children's physical and cognitive development were identified and reviewed; of these, 8 studies -- conducted in South Africa, Pakistan, China, Ethiopia, Chile, Iran, Brazil, and Lebanon -- specifically focused on programs aimed to prevent emotional and behavioral difficulties in children which could have conceivably included substance use. None of those studies appear to have examined any primary outcomes -- that is, the use of alcohol and/or drugs. The studies were rated as overall of poor quality, as according to the authors, "Only one study had a strong methodology among those designed to prevent emotional and behavioral outcomes."

As the conclusions from both ISDUP editions for the Parenting Skills section specifically state that "*With regard to primary outcomes, these studies report that family-based universal programmes can prevent tobacco, alcohol, drug and substance use in young people"*, the citation of this review as supporting evidence of such statements appears misleading.

For this reason, this review was not further considered.

2.* Thomas et al. (2016), *citation not provided.

Assumed to refer to the 2015 Cochrane review, based on the previous publications from the first author: **Thomas, R. E., Baker, P. R., Thomas, B. C., & Lorenzetti, D. L. (2015)**. Family-based programmes for preventing smoking by children and adolescents. The Cochrane database of systematic reviews, 2015 (2), CD004493.

OR the corresponding publication evaluating family- and family+school based interventions:

Thomas, R. E., Baker, P. R., & Thomas, B. C. (2016). Family-based interventions in preventing children and adolescents from using tobacco: a systematic review and meta-analysis. Academic Pediatrics, 16(5), 419-429,

If this is the correct source, it was excluded from this evaluation given its focus on the prevention of smoking. However, it should be noted (in relation to the ISDUP summary and conclusions) that this review also focused solely on family-based programs (study aims from the 2015 Cochrane review: "To assess the effectiveness of interventions to help families stop children starting smoking", or from the 2016 Academic Pediatrics review: "To assess effectiveness of family-based interventions alone and combined with school-based interventions to prevent children and adolescents from initiating tobacco use.") and 23 of the summarized interventions were tested in the USA, 2 in Europe, 1 in Australia, and 1 in India.

Many of the programs were included in the Allen et al. (2016) review[10], as evaluated interventions seldom focused on the prevention of smoking alone.

3. Foxcroft and Tsertsvadze (2012); *citation not provided*

Assumed to refer to: **Foxcroft, D. R., & Tsertsvadze, A. (2012).** Universal alcohol misuse prevention programmes for children and adolescents: Cochrane systematic reviews. Perspectives in public health, 132(3), 128–134.

This summary[11] provides an overview of the three Cochrane reviews (including the one below), evaluating the effectiveness of universal school-based (53 trials), family-based (12 trials), and multi-component (20 trials) universal prevention programs for alcohol misuse in children and adolescents. While concluding that "some school, family or multi-component prevention programmes were shown to be effective in reducing alcohol misuse in youths", they also warn that:

> "these results warrant a cautious interpretation, since bias and/or contextual factors may have affected the trial results. Further research should replicate the most promising studies identified in these reviews and pay particular attention to content and context factors through rigorous evaluation."

Or possibly? (if so, then it is not the new review for ISDUP2 as stated in the summary, but an older report already cited in the 1st ISDUP edition)
Foxcroft, D. R., & Tsertsvadze, A. (2011). Universal family-based prevention programs for alcohol misuse in young people. *The Cochrane database of systematic reviews*, (9), CD009308.

From article[12]: This Cochrane systematic review evaluated universal family-based prevention programs in preventing alcohol misuse in school-aged children under the age of 18. Search terms across relevant databases prioritized universal prevention and clinical trial terms, not family- or parent-based interventions. A total of 12 parallel-group trials were included, 11 from the USA and one from the Netherlands. Two trials had very short follow-up times (under 6 months). Due to extensive heterogeneity across interventions, populations, and outcomes, the results were summarized only qualitatively. While the authors note that… "in family settings, universal prevention typically takes the form of supporting the development of parenting skills…"[12], *p*. 3, many of the reviewed programs by design intervened on families as a unit and could not always be parsed by the recipient (i.e., parents vs. children), thus departing from ISDUP definitions.

According to authors, 9 of the 12 trials showed some evidence of effectiveness compared to a control or other intervention group, with observed effects persisting over the medium and longer-term periods. Four of these effective interventions included only girls. No intervention

appears to have been administered solely through schools, although schools often served as recruitment platforms. Delivery modes involved mailing of printed or video instructional material, computer-assisted training, or meetings with trained facilitators or pediatricians.

Half (i.e., six) of the evaluated trials compared at least two different programs, including both the individual components and combinations of family- and school-based interventions in one trial. The review also summarized family-based programs such as the Families Matter; Strengthening Families; or The Strong African American Families Program, which often recruited and intervened on entire families (i.e., both parents and children) or at least mother-child dyads, and which frequently had an explicit focus on building parenting skills relevant to offspring's putative alcohol use rather than the improvement of general/generic parenting skills. Follow-up times ranged from 2 to 120 months across interventions.

The review also concludes that the reporting quality of trials was poor, with only 20% reporting adequate method of randomization and program allocation concealment. Only half of the evaluated trials adequately addressed incomplete data, while the attrition rates were evaluated as unacceptable for two trials. About 60% of the trials were free from other biases.

4. Allen et al. (2016), *citation not provided*.
Assumed to refer to: **Allen, M. L., Garcia-Huidobro, D., Porta, C., Curran, D., Patel, R., Miller, J., & Borowsky, I. (2016).** Effective Parenting Interventions to Reduce Youth Substance Use: A Systematic Review. *Pediatrics*, *138*(2), e20154425.

From article[10]: This review aimed to describe the effectiveness of parent-focused interventions in reducing or preventing tobacco, alcohol, and illicit substance use among adolescents (defined as youth 10-19 years of age), and to identify optimal intervention targeted participants, dosage, settings, and delivery methods. In this respect, this review provided greater and more relevant details above and beyond the basic effectiveness assessments. However, this review also reflected the greatest heterogeneity of outcomes both in terms of substances (alcohol, tobacco, and other drugs, as well as their use patterns) -- often including non-behavioral outcomes such as "use intentions" -- thus again precluding meta-analytical approaches and limiting the summary results to graphic synthesis. Search strategy across all databases included both "family-" and "parent-" based interventions as the leading search terms, thus extending ISDUP's parameters to include families, not only parents, as intervention recipients.

A total of 42 RCT studies represented by 66 articles met the inclusion criteria. Many of the reviewed interventions were included in the Foxcroft & Tsertsvadze Cochrane review[12]; for example, a set of Spoth et al. studies evaluating the Strengthening Families Program (SFP) and its effects. Of the 42 reviewed studies, 39 targeted and intervened on both the parents and offspring in some manner, and as such may be more appropriately described as family-based (instead of solely parenting) interventions. Several included interventions (e.g., Project Northland implemented and assessed in the US and Croatia) could hardly be described as a parenting intervention given their multifaceted nature or multi-component nature noted clearly in the article title and/or program description. All but 2 studies (one from Croatia and one from the Netherlands) were conducted in the United States. Follow-up times ranged from 2 months to 6 years across the examined interventions.

The authors conclude that these "parenting interventions were effective at preventing and decreasing adolescent tobacco, alcohol, and illicit substance use over the short and long term". The size of this effect was not described or quantified in a traditional manner. Similarly, traditional

meta-analysis was again not conducted due to the heterogeneity of assessed studies/interventions, but harvest plots were used to graphically synthesize the findings.

The majority of interventions rated as effective could be described as medium to low intensity as they required ≤12 contact hours, and were implemented through in-person sessions often including both parents and offspring (again, not necessarily designed or implemented chiefly as parent- interventions). Majority of interventions were delivered in school or home settings, with computer delivery method and home delivery settings having the best evidence for alcohol use, and professional delivery method and combined delivery setting scoring best for use of illicit drugs. Thirteen out of the 42 reviewed studies focused on alcohol use outcomes only; another 31 included alcohol outcomes, broadly defined. There was no study focusing on use of other drugs only, but such outcomes were part of 21 studies (e.g. polysubstance use, illicit substance use, etc.).

Of note is that many non-behavioral outcomes (e.g., "intention to use") were synthesized together with behavioral outcomes (i.e., initiation and use) across all examined substances in the main analyses. The summary results referring to "use" of tobacco, alcohol, or other drugs were presented without differentiation of use patterns, including prevalence, frequency, hazardous use, intoxication, etc., outcomes.

Finally, only 7 of the 42 reviewed studies were rated as having low risk of bias based on the Cochrane Low Risk of Bias Criteria where the scores can range from 0 (high risk of bias) to the maximum score of 5 (low risk of bias). Fifteen of the 42 reviewed studies received the Low Risk Bias score of 1, and one study received the score of 0, therefore making the rationale for their inclusion questionable. The authors conclude that "the overall risk of bias of this systematic review is high, suggesting results must be interpreted with caution"[10], *p*. 12. Sensitivity analysis where these studies with the high risk of bias were excluded would have been helpful (even though the risk of bias was somewhat accounted for in the main visual synthesis), especially as several such studies reported positive effects.

5. Kuntsche (2016), *citation not provided*.

Assumed to refer to **Kuntsche, S., & Kuntsche, E. (2016).** Parent-based interventions for preventing or reducing adolescent substance use - A systematic literature review. *Clinical psychology review*, *45*, 89–101.

From article[13]: This systematic review provides an overview of the effectiveness of parent-based programs in preventing, curbing or reducing substance use (i.e., alcohol, tobacco and cannabis) among 10 to 18-year-olds (however, several studies and at least one program reported on college student samples who barely met these criteria at baseline).

This is the only review that attempted to conceptually and methodologically differentiate family- vs. parent-based programs in their search strategy[c], as studies were included only if they reflected: "*(e) implementation of a prevention/intervention program focusing exclusively on parents (excluding school or community programs which include parents as additional program targets, programs targeting the entire family, etc.), i.e. adolescents were only surveyed to provide evidence of the program's effectiveness and the school setting was only used for participant*

[c] This was also to some extent true for the Thomas et. al (2016) review, which noted the common combination of "family" and "school" interventions.

recruitment)",[13] p. 96. In this respect, only this systematic review provided evidence for the effectiveness of interventions as described/defined in ISDUP. This is also the only included review that summarized evaluated programs by name (e.g., Örebro Prevention Program, Smoke Free Kids, etc.), thus providing highly relevant information to policy-makers and practitioners in a user-friendly manner. The main focus was on randomized trials, but the review included several quasi-experimental designs as well. As in the above reviews, the results were tabulated as the meta-analysis could not be performed due to the heterogeneity of both the assessed programs and outcomes.

Of the 653 identified in the first screening, 39 publications dealing with 13 programs were included, all published in the period between 2005-2014. Save from the "follow up time longer than 6 month" classification, the exact follow-up times for individual studies don't seem to have been provided either in the main text or in the supplemental tables. More than half (24 out of 39) studies examined solely alcohol use outcomes; two studies (one intervention) focused solely on tobacco use. Information on each program's delivery settings were included in supplemental material and indicated that with the exception of one program (the Örebro Prevention Program), majority were delivered outside of schools, via home-delivered materials, parent-group sessions, etc. Interventions from the USA, Sweden, Netherlands, Australia, and Italy were included.

The results summary reveals that most of the examined trials tested one of the two specific programs: 1) the Örebro Prevention Program (ÖPP; mostly involving administration of instructional power-point presentations focusing primarily on adolescent alcohol use during regular parent-teacher meetings) or 2) the Parent-Based Intervention program (PBI; involving instructional material focusing on reduction of alcohol use during college years delivered to parents of incoming college freshmen, where all outcomes and putative intervention effects appear to have been assessed during college years). Both programs appeared to have effects primarily in the context of repeated administration and booster sessions.

Noted limitations reflect studies' quality similar to previous reviews, as not even 1/3 (only 11 of 39) studies received a good quality ranking and four studies had a poor quality ranking based on the 7-point COSMIN criteria (COnsensus-based Standards for the selection of health status Measurement Instruments; scores ranging from 1 = poor, to 7 = good quality).

The authors conclude: "The results presented reveal some support for the effectiveness of parent-based programs". The most robust effects were observed for up to 12 months post-intervention, but these were not described in sufficient detail. In fact, despite the title and the main aims purporting to examine programs "preventing, curbing or reducing substance use (i.e. alcohol, tobacco and cannabis) among 10 to 18-year-olds", there is only cursory description of these diverse effects in the main text. More details are provided in the supplemental materials, but again, not systematically evaluated.

ISDUP literature summary

The three relevant reviews[d] -- summarized in **Table 1** -- ostensibly examined interventions aiming to prevent or reduce the use of alcohol and other drugs among young people by improving

[d] The three reports are: Foxcroft & Tsertsvadze (2011), Allen et. al (2016), and Kuntsche & Kuntsche (2016).
Mejia et. al (2012) was not included in the current evaluation. The reasons for repeated inclusion of the Mejia review in both editions of the *Standards* remain unclear, as discussed above.
One review for which no proper reference was provided (Thomas, 2016) was assumed to focus on the prevention of tobacco use based on previous publications by this author, and was as such excluded from this narrative focusing primarily on use of

their parents' parenting skills, broadly speaking. Yet in practice, instead of general parenting skills, these programs often involved alcohol- or drug-specific parenting practices such as zero-tolerance towards substance use, rule-setting, substance-use communication, encouraging children to resist peer pressure to use drugs, etc. Further, these programs and relevant sections were framed in terms of the "Parenting skills", but the corresponding summary conclusions were framed in terms of the "family-based universal programmes" in both ISDUP editions.

No meaningful discussion of universal- vs. selective programs based on the contributing studies/interventions was provided in this section; however, the 1st ISDUP edition summarizes the evidence from both of these of interventions (Table 1, p. 8)[3] as "very good" in relation to substance abuse and assigns it a 4/5 stars rating. The 2nd edition, however, summarizes this evidence in a rather non-descript phrase, noting that "family-based universal programmes can prevent tobacco, alcohol, drug and substance use in young people", *p*. 15. This statement cannot be easily interpreted without clarification provided only in the 1st edition: "There are cases for which "good" systematic reviews concluded that the studies available to them were few or with mixed results. This is indicated in the text by formulations such as "the intervention *might* or *can* prevent substance abuse", *p*. 6.

Excluding the aforementioned Thomas et al. review on smoking prevention programs, only one review[11,12] has specifically evaluated *family-based universal programs* as stated in the ISDUP summary conclusions; only one[13] has specifically evaluated *parenting (skills) programs* (by attempting to exclude interventions where parents were not the sole program recipients) as stated in the ISDUP section header; and one[10] appears to have evaluated programs with any type/degree of parental involvement as a parent-focused or parenting (skills) intervention. Whether these related but distinct constructs (family vs. parent) are assumed to be indistinguishable and interchangeable in the ISDUP text remains unclear.

Relatedly, the current language across ISDUP definitions, classifications, and conclusions of the *Parenting skills programs* section implicitly assumes that the unique contribution of intervening on *parental skills* can be parsed easily, or that a *parenting skills* attributable fraction can be obtained from the intervention's overall effects (if any). In practice, children were often included in the intervention together with their parents, as part of family-based or more comprehensive programs aiming to address adolescents' substance use or other problem behaviors/areas. For example, the Strengthening Families Program (SFP) program includes a series of weekly sessions for parent AND the child[10,12], and even programs claiming to be fundamentally parent-centered (such as the Familias Unidas for instance)[10,13] include several family visits necessitating participation of both the parents and adolescents.

In addition, studies such as the Dutch variation of the Örebro Prevention Program which included complex designs and control conditions (parent-only, child-only, and parent + child combined), often demonstrated the poorest effects of the parent-only arm and the strongest effects of the most comprehensive parent + child arm. In short, underscoring "parental skills" as the key component appears unsupported by the prevalent design or family-focus of evaluated interventions, especially as the Introduction to the 2nd edition specifically warns that:

alcohol and other drugs among young people. Nevertheless, it was understood that at least some of the conclusions in 2nd edition might have been based on findings from this review.

> "Another challenge is the indication that the number of studies is too low to be able to conclusively identify the "active ingredients", that is, the component or components that are really necessary for the intervention or policy to be efficacious or effective….", p. 4.

As noted above, a single review[13] evaluated the unique contribution of "parenting skills" programs specifically defined as such, concluding that while such programs may have positive effects on parent-child relationships, discipline practices, communication, etc., there is only "…*some evidence* in terms of preventing, curbing or reducing adolescent substance use.", *p*. 89, *p*. 100 (italics added). Further, evidence for the effectiveness of one of the two main programs (Parent-Based Intervention program, PBI) included in this review comes primarily from studies examining college-aged samples and is thus largely incongruent with the ISDUP's "Middle childhood" or even "Early adolescence" designation.

The two remaining reviews[10,12] also used cautious language and made tentative conclusions. The reviews (including the omitted Thomas et al., 2016 review on smoking prevention) did not phrase their conclusions in terms of the effect sizes, but rather in terms of evidence for the programs' effectiveness or lack thereof. Indeed, the nature of evaluated programs precluded meta-analyses or more complex synthesis of the considered literature, and the results were often not quantified.

There were considerable variations across evaluated programs ranging from the intervention type/focus, duration, or delivery, to the developmental age of targeted children. Only one review examined the effects of delivery method and setting[10], while the remaining two provided this information in supplemental material without deeper narrative summaries[12,13]. These omissions were reflected in the ISDUP summary as well, which does not outline evidence-based delivery settings (e.g., school, home, etc.) but does somewhat address delivery methods: "More intensive programmes delivered by a trained facilitator appear to be more consistently effective compared with single sessions or computer-based programmes.", *p*. 15.

Further, there were also considerable variations not only across substances (although the majority of programs focused solely or predominantly on alcohol use) but also across the specific substance use outcomes or use patterns. Multiple studies included complex outcomes (i.e., individual growth trajectories of alcohol use for example), and several included non-behavioral outcomes (i.e., intentions to use alcohol or illicit drugs) that were actually integrated in one review[10] together with behavioral outcomes. Such variations make it challenging not only to evaluate the efficacy/effectiveness of these interventions, but also to meaningfully summarize and connect them to the main aims of the ISDUP document[e] in a systematic fashion.

In addition, it should be noted that several interventions were mentioned by name in the ISDUP introduction[f], however, with the exception of SFP, it is unclear if the remaining programs were in fact evaluated as part of the three main systematic reviews concerning their effects on substance use among offspring. Passing examination revealed that neither the Incredible Years nor the Triple P (Positive Parenting Program) featured prominently in these reviews, if at all.

[e] "This document focuses on prevention of the initiation of drug use and the prevention of transition to drug use disorders.", 1st edition, p. 2. "Primary outcomes of prevention were defined as "initiation of substance use", "continuation of substance use" and "progression to substance use disorders", 2nd edition, p. 6.

[f] "For example, there are many programmes aiming at preventing drug use through the improvement of parenting skills (e.g., the Strengthening Families Program, the Triple P—Positive Parenting Program and the Incredible Years programme). These are different programmes delivering the same intervention (parenting skills/family skills training).", *p*.5.

Also, the ISDUP conclusions fail to mention the presence of biases and caveats explicitly stated in all three reviews[g] and preponderance of evidence from high-income countries and westernized socio-cultural contexts.

Finally, the addition of only four systematic reviews summarizing evidence concerning parenting/family-based interventions appears incomplete. Even a cursory library search identified a number of highly relevant reports (both meta-analyses and systematic reviews) published between 2015-2018; whether these reports were considered at all for the 2nd edition is unknown given the absence of pertinent documentation:

Vermeulen-Smit, E., Verdurmen, J. E., & Engels, R. C. (2015). The effectiveness of family interventions in preventing adolescent illicit drug use: A systematic review and meta-analysis of Randomized Controlled Trials. *Clinical Child and Family Psychology Review*, *18*(3), 218–239.

Van Ryzin, M. J., Roseth, C. J., Fosco, G. M., Lee, Y. K., & Chen, I. C. (2016). A component-centered meta-analysis of family-based prevention programs for adolescent substance use. *Clinical Psychology Review*, *45*, 72–80.

Bo, A., Hai, A. H., & Jaccard, J. (2018). Parent-based interventions on adolescent alcohol use outcomes: A systematic review and meta-analysis. *Drug and Alcohol Dependence*, *191*, 98–109.

Valero de Vicente, M., Ballester Brage, L., Orte Socías, M. C., & Amer Fernández, J. A. (2017). Meta-analysis of family-based selective prevention programs for drug consumption in adolescence. *Psicothema*, *29*(3), 299–305.

Emmers E, Bekkering GE, Hannes K. (2015). Prevention of alcohol and drug misuse in adolescents: An overview of systematic reviews. *Nordic Studies on Alcohol and Drugs*, 32(2):183-198.

Evidence from The European Prevention Curriculum (EUPC)

In EUPC, family-based programs are addressed as part of Chapter 5. In contrast to the corresponding ISDUP section, a useful overview of relevant definitions and descriptions of family-based interventions (e.g., universal, selective, or indicated, or parenting-, family-skills, or family-therapy interventions) is provided. In addition, parenting interventions were defined for the reader, and the fact that they may or may not involve children's participation was clarified. In addition, a general summary of family factors influencing child health and development was provided. However, similar to the ISDUP introductory remarks, it is not clear if these statements were based on the reviewed evidence from the prevention literature or other cohort/observational studies for example.

One study was referenced (but not cited) as documenting core features of successful interventions, including the focus on positive parent-child interactions, emotion literacy and communication, and effective and consistent discipline. These features to some extent mirror those outlined in the ISDUP, especially family bonding and appropriate disciplinary practices. Descriptions of parent- and child-aimed content of successful interventions again placed emotional development and emotional competence at the top. However, no parenting/family interventions with such emotion-specific content, either in the EUPC or in the ISDUP, were highlighted as examples.

In fact, the three examples of interventions with promising results that were noted in this chapter – EFFEKT, Functional Family Therapy, and Triple P (Positive Parenting Program) – barely

[g] "Overall risk of bias is high.", *p*. 1, (Allen et al., 2016)
"Furthermore, only 11 of 39 studies received a good quality ranking and four studies had a poor quality ranking" *p*. 98 (Kuntsche & Kuntsche, 2016).

meet the above criteria and descriptions, and none focus exclusively on emotional competence or on improving parent-child interactions. The EFFEKT program has already been identified and indirectly included in the ISDUP summary (i.e., the Swedish Örebro Prevention Program). This program primarily focuses on reducing permissiveness and favorable attitudes towards alcohol use among parents (and ultimately alcohol use among offspring), and not on improving parenting skills broadly defined, on the quality of parent-child interactions, or on emotion communication. Even though explicitly named in the EUPC text, this program was not retrieved in the Xchange Prevention Registry search of programs rated as *beneficial* or *potentially beneficial* in reducing substance use outcomes among youth (see the next section). This program was rated only as "Possibly beneficial". The accompanying web summary[h] describes limited evidence at best for program's effectiveness while also noting serious methodological and analytical issues in some EFFEKT studies.

The second mentioned program, Functional Family Therapy (FFT), was rated more highly as "Likely to be beneficial" in the Xchange Prevention registry but the accompanying web summary[i] does not include descriptions of its effects on any substance use outcomes. This intervention targeting at-risk youth (e.g., "delinquent young people at risk of institutionalisation") through individually-tailored family counseling was implemented in the Netherlands, Ireland, and Sweden. Given its clinical nature and multiple targeted problem behaviors, the features of this program again do not match the EUPC key points and take-home messages in relation to prevention of alcohol, tobacco, and other drug use among youth.

The Triple P (Positive Parenting Program) was the third program listed in the "Evidence-based programmes" section, even though the EUPC notes that it is not (yet) included in the Xchange Prevention Registry. A cursory search of the Xchange Prevention registry reveals that the Triple P is, in fact, included in the registry as of late 2024 and rated as "Possibly beneficial" following German, Swiss, and the UK trials. Again, similar to the FFT, the accompanying summary[j] does not include descriptions of Triple P's effects on any of the primary substance use outcomes in offspring. Overall, the Xchange Registry summaries of these programs note a range of other outcomes, but no use of alcohol and other drugs among youth as one may conclude based on their prominence in the EUPC document.

Finally, even though the Strengthening Families Programme (SFP) was also included in multiple international reviews summarized as part of the ISDUP, the EUPC critically acknowledges the apparent absence of evidence for its effective implementation in European context. In fact, the Xchange Prevention Registry search for this program by name[k] returns the classification of "Unlikely to be beneficial" based on the consistent null findings from Germany, Poland, Sweden, and the UK.

Additional evidence from the EUDA Best practice portal/Xchange Prevention Registry

Additional literature search aiming to identify interventions was performed using the EUDA Best practice portal, Xchange Prevention Registry -- "...an online registry of thoroughly evaluated prevention interventions".

[h] https://www.euda.europa.eu/best-practice/xchange/effekt%C3%B6rebro_en
[i] https://www.euda.europa.eu/best-practice/xchange/functional-family-therapy-fft_en
[j] https://www.euda.europa.eu/best-practice/xchange/triple-p-positive-parenting-program-level-4_en
[k] https://www.euda.europa.eu/best-practice/xchange/strengthening-families-10-14_en

The search was performed without any restrictions on the age group, risk factors, or country.

The first search selected only programs administered in "family" settings rated as "Beneficial" in relation to outcomes specified as "substance use", "alcohol use", and "use of illicit drugs". This search returned 0 hits and identified no programs meeting these criteria.

The second search expanded the initial criteria to include such programs rated as "Likely to be beneficial". This search returned only one hit[l] and only one possibly beneficial program (for "alcohol use" and "use of illicit drugs") reflecting the already mentioned Functional Family Therapy (FFT). This program was deemed not relevant to the current review given its clinical nature, focus on young people involved in delinquency, and lack of studies examining substance use outcomes.

Additional evidence from the EUDA Best practice portal/Evidence Database

Additional literature search aiming to identify interventions was performed using the EUDA Best practice portal, Evidence Database – "This database gives you access to the latest evidence on drug-related interventions. The information is based on systematic searches is updated regularly".

The search was performed without any restrictions on the search terms, area, or substance. The first search selected only programs administered in "family" settings or targeting "families" rated as "beneficial" in relation to the desired outcomes specified as "reduction in substance use". This search returned 4 hits[m], two of which concerned treatment programs such as multidimensional family therapy[14,15] and two of which focused solely on the prevention of smoking. As such, these programs were not considered further.

The second search expanded the initial criteria to include programs rated as "likely to be beneficial". This search identified 4 hits[n] meeting these criteria: one concerning different therapeutic approaches to reducing cannabis use[16,17], one concerning multi-component prevention programs for alcohol misuse in young people[18], one concerning comprehensive family-oriented prevention of drug use[19], and one concerning interventions to reduce harm associated with adolescent substance use[20].

Of these four hits, only one 20-year old Cochrane review[19] was considered relevant to this summary. The "likely to be beneficial" rating was apparently based on the results from one program included in this systematic review of 17 studies[19] where reductions were observed in adolescents' lifetime and past year cannabis use six years after the comprehensive family-oriented program – the Iowa Strengthening Families Program (ISFP)[21,22]. Methodological and analytical caveats concerning this program were also noted, similar to those in the main EUPC text. Given that this program was extensively evaluated as part of the main ISDUP literature review, no further assessments were performed.

[l] https://www.euda.europa.eu/best-practice/xchange_en

[m] https://www.euda.europa.eu/best-practice/evidence-summaries_en?title=&field_evidence_rating_target_id=1181&field_bpfs_outcome_target_id=1331&field_bpfs_area_target_id=All&field_bpfs_substance_target_id=All&field_bpfs_target_target_id=1069

[n] https://www.euda.europa.eu/best-practice/evidence-summaries_en?title=&field_evidence_rating_target_id=1182&field_bpfs_outcome_target_id=1331&field_bpfs_area_target_id=All&field_bpfs_substance_target_id=All&field_bpfs_target_target_id=1069

Summary conclusions

The summary of evidence concerning the effectiveness and efficacy of the "Parenting skills" interventions and "Family-based prevention" as presented in the 2nd ISDUP edition and EUPC poses several challenges to those seeking to better understand and/or potentially implement such interventions. These challenges are largely resulting from the lack of clarity concerning 1) the actual nature of interventions described under the "parenting skills" section in ISDUP, 2) their content and targeted domains/skills, and 3) the actual nature and/or size of the observed effects, combined with the inconsistencies between the evaluated literature and corresponding conclusions and recommendations in ISDUP and EUPC.

First, clearer conceptualization and alignment of the terminology used interchangeably throughout the ISDUP text -- *parenting (skills)* programs vs. *universal family-based* programs -- would have been helpful in understanding the exact nature of evaluated interventions. This conflation of the two related, but substantively different types of programs -- especially in terms of implementation -- is apparent throughout the main ISDUP text. Only one review actually examined interventions as they were defined and described in ISDUP[13]; that is, programs involving only parents as intervention recipients and programs aiming to improve only their (parenting) skills. This distinction was more appropriately addressed in the EUPC "Family-based prevention" Chapter 5, which also provided a useful theoretical framework and relevant definitions to the reader. Accordingly, perhaps the ISDUP section entitled "Family-based programs" (vs. the current "Parenting skills programs") would not only have aligned better with the EUPC chapter, but would also have provided both more accurate reflection of the summarized literature and more accurate conclusions[o].

Second, the current ISDUP summary[p] appears to de-emphasize the fact that many programs aimed to improve parenting skills/practices of direct relevance to substance use and/or other related problem behaviors in children. Similarly, the ISDUP notes enhancement of family bonding and attachment as the foremost characteristic of effective/efficacious programs, but it is unclear which program was based on these elements or which literature review provided foundation for such conclusions. Similar issues are apparent in the EUPC summary, which for example underscores that the "effective interventions teach parents to be responsive and how to respond appropriately to their children's needs and requests" or that "parents should be taught to display affection and empathy for each other, their children and other people", *p*. 93. Such conclusions can hardly be based on the interventions showcased in the EUPC document. For example, the EFFEKT/Örebro Prevention Program primarily aims to affect parents' attitudes towards drinking and it evidently contains no major emotional competence training.

Overall, the reviewed ISDUP literature seems to suggest that family-based programs -- which may or may not have been a part of larger multi-component interventions, and which may or may not have included independent and evaluable parenting skills components -- largely built

[o] Some differentiation of these programs was evident in the 1st ISDUP edition: "Finally, *parent and family focused interventions* also produce significant and long-term improvements with regard to family functioning (…).", *p*. 14.

[p] *Characteristics of parenting skills programmes deemed to be associated with efficacy and/or effectiveness based on expert consultation:*

✓✓ They enhance family bonding, i.e., the attachment between parents and children.

✓✓ They support parents by showing them how to take a more active role in their children's lives, e.g., monitoring their activities and friendships, and being involved in their learning and education.

✓✓ They show parents how to provide positive and developmentally appropriate discipline.

✓✓ They show parents how to be a role model for their children.

upon specific skills relevant to substance use might have some positive effects in curbing various substance use behaviors among offspring. Neither the ISDUP nor the EUPC appear to appropriately outline the content of these interventions often targeting parental attitudes towards substance use or substance-specific rules, discipline, and communication – instead, highlighted are the content and elements (i.e., attachment, etc.) that hardly seem central to these programs[q]. Information concerning evidence-based delivery methods and delivery settings in particular, is not adequately presented in ISDUP.

Finally, and perhaps most importantly, while characteristics of the effective parenting/family interventions were summarized both in the 2nd edition ISDUP (*pp*. 15-16) and EUPC (*pp*. 93-94), neither document meaningfully summarizes the actual effects observed across these interventions. Neither the strength of these purported effects, nor their type, nature, or scope were stated in a concrete or pragmatic manner that would be relevant to non-academic audiences. While acknowledging that systematizing heterogeneous body of literature is challenging, the reader is nevertheless left wondering if these stated effects reflect reduced prevalence rates of substance use, reduced prevalence rates of (again variously defined) risky use patterns, reduced quantities or frequencies of consumption, delayed initiation of use, etc. – and if so, for what substances, in what socio-demographic and age groups, and by how much. None of these indicators are provided or directly reviewed in the current ISDUP edition or in the EUPC chapter[r], thus calling into question both their practical relevance and utility.

Nevertheless, these programs were introduced in rather strong terms in both 1st and 2nd edition of ISDUP. Yet, the generic phrasing of the 2nd edition's weak conclusion that these "*programmes <u>can</u> prevent tobacco, alcohol, drug and substance use in young people"* stands in sharp contrast to the 4/5 star rating of the Parenting Skills interventions in preventing substance <u>abuse</u> from the 1st edition. This non-descript language of the 2nd edition is additionally puzzling considering that among 13 reviews presented in the 1st ISDUP edition, only one review -- of only adequate quality and with no primary outcomes assessed -- 87was included again in the 2nd edition. Finally, while the conclusions from the ISDUP 1st edition somewhat differentiate between these programs' effects on alcohol and drug use outcomes, no such distinction was made in the 2nd edition's evidence summaries.

Still, the ISDUP conclusion that "*More intensive programmes delivered by a trained facilitator appear to be more consistently effective compared with single sessions or computer-based programmes"* seems consistent with evidence from the three reviews, which often noted the need for multiple or booster sessions[13], or examined program intensity[10]. However, a more systematic summary of the successful programs' delivery methods and settings might have been of greater relevance to practitioners. Similarly, the ISDUP conclusion that *"particular gender-specific interventions targeting mothers and daughters were reported to be effective"* seems consistent with evidence from the two reviews[10,12], which provided sample characteristics (i.e., gender) in their summaries, or evaluated interventions targeting mother-daughter dyads only.

The ISDUP claim that "*The evidence summarized above is from studies on family-based prevention interventions implemented in Africa, Asia, the Middle East, Europe, Australia and North*

[q] For example, the heavily featured SFP describes its content like this: "Parents learn to increase desired behaviors in children by using attention and rewards, clear communication, effective discipline, substance use education, problem solving and limit setting. Children learn effective communication, understanding feelings, social skills, problem solving, resisting peer pressure, consequences of substance use, and compliance with parental rules."
(https://strengtheningfamiliesprogram.org/about/detailed-info/).

[r] Such details seem to be provided in a more meaningful manner in the Xchange Prevention registry online tool.

America" appears misleading and presumably based on the Mejia et. al (2012) review which did not include any primary substance use outcomes in offspring from targeted families. In this regard, the EUPC chapter provides more nuance and consideration of geographic and cultural variations in program implementation, especially when combined with detailed summaries included in the Xchange Registry.

In sum, the generic conclusions that parent/family-focused interventions can prevent substance use in youth from such families are not meaningfully connected either to public health frameworks or to the prevention practice in the ISDUP document. While the corresponding EUPC chapter provides more comprehensive theoretical framing and critical views (e.g., consideration of barriers and challenges in prevention work with families), it too lacks specificity and thus utility. Practitioners and other actors interested in such interventions are not provided with clear definitions of their form (parent- vs. family-based, universal vs. targeted, etc.) in the ISDUP document, or with clear and accurate descriptions of their content in either the ISDUP or EUPC document. In addition, delivery methods and settings were sparsely described in two of the three contributing reviews and consequently in the ISDUP summary, although such details would be of great relevance to the prevention practice.

Most importantly, readers are not provided with summaries reflecting any quantifiable output of such interventions beyond the *"tobacco, alcohol, drug and substance use"*. In this regard, the 2nd ISDUP edition offers but a simplified version of its earlier conclusions, and no more relevant or meaningful information than would have been provided by the abstracts of the three relevant reviews (summarized here in **Table 1**) -- especially as the reviews themselves were neither properly cited nor summarized in appendices. EUDA does appear to provide more details and more relevant info but mainly through its Xchange prevention registry database and not in the EUPC stand-alone and largely conceptual chapter.

Table 1: Summary of evidence presented in relation to *Parenting skills programs*

Article	Type	# of primary studies	Results summary	Conclusions
1. Foxcroft, D. R., & Tsertsvadze, A. (2012). Universal alcohol misuse prevention programmes for children and adolescents: Cochrane systematic reviews. Perspectives in public health, 132(3), 128–134. https://doi.org/10.1177/1757913912443487 OR? **Foxcroft, D. R., & Tsertsvadze, A. (2011).** Universal family-based prevention programs for alcohol misuse in young people. *The Cochrane database of systematic reviews*, (9), CD009308. https://doi.org/10.1002/14651858.CD009308	Systematic review	12 trials /publications All studies reflected family-based or multi-component programs, not parenting skills only programs	"**9 of the 12 trials showed some evidence of effectiveness compared to a control or other intervention group, with persistence of effects over the medium and longer-term. Four of these effective interventions were gender-specific, focusing on young females.** One study with a small sample size showed positive effects that were not statistically significant, and two studies with larger sample sizes reported no significant effects of the family-based intervention for reducing alcohol misuse." "The reporting quality of trials was poor, only 20% of them reporting adequate method of randomisation and program allocation concealment. Incomplete data was adequately addressed in about half of the trials and this information was unclear for about 30% of the trials."	"In conclusion, in this Cochrane systematic review we found that that **the effects of family-based prevention interventions are small but generally consistent and also persistent into the medium- to longer-term**."
2. Allen, M. L., Garcia-Huidobro, D., Porta, C., Curran, D., Patel, R., Miller, J., & Borowsky, I. (2016). Effective Parenting Interventions to Reduce Youth Substance Use: A Systematic Review. *Pediatrics*, *138*(2), e20154425. https://doi.org/10.1542/peds.2015-4425	Systematic review, including harvest plots to graphically synthesize the main findings	66 publications covering 42 studies Of 42 studies, 39 were family-based or multi-component programs, not parenting-only programs	"**Results indicate that parenting interventions are effective at preventing and decreasing adolescent tobacco, alcohol, and illicit substance use over the short and long term.** The majority of effective interventions required ≤12 contact hours and were implemented through in-person sessions including parents and youth. **Evidence for computer-based delivery was strong only for alcohol use prevention**. Few interventions were delivered outside of school or home settings. LIMITATIONS**:** Overall risk of bias is high."	"**This review suggests that relatively low-intensity group parenting interventions are effective at reducing or preventing adolescent substance use and that protection may persist for multiple years.** There is a need for additional evidence in clinical and other community settings using an expanded set of delivery methods."

3. Kuntsche, S., & Kuntsche, E. (2016). Parent-based interventions for preventing or reducing adolescent substance use - A systematic literature review. Clinical psychology review, 45, 89–101. https://doi.org/10.1016/j.cpr.2016.02.004	Systematic review, **Specific focus on parent (not family) based programs**	39 publications, covering 13 programs/ interventions	"**Results reveal desirable effects of parenting measures such as rule-setting, monitoring and parent–child communication. There was also some evidence in terms of preventing, curbing or reducing adolescent substance use.** However, this appears to depend particularly on the age group of the adolescents in question, the kind of parents included and the intensity of the program."	"To conclude, the results of this systematic review underline the importance of including parents in programs aiming to impede initiation of substance use or curb or reduce already existing substance use in adolescence."

ISDUP definitions:

"Parenting skills programmes support parents in being better parents, in very simple ways. A warm child-rearing style, whereby parents set rules for acceptable behaviours, closely monitor free time and friendship patterns, help to acquire personal and social skills and are role models, *is one of the most powerful protective factors against substance use and other risky behaviours*."

ISDUP conclusions:

"**With regard to primary outcomes, these studies report that family-based universal programmes can prevent tobacco, alcohol, drug and substance use in young people, the effect size generally being persistent into the medium and long term (longer than 12 months).**

More intensive programmes delivered by a trained facilitator appear to be more consistently effective compared with single sessions or computer-based programmes. **Also, particular gender-specific interventions targeting mothers and daughters were reported to be effective.**

The evidence summarized above is from studies on family-based prevention interventions implemented in Africa, Asia, the Middle East, Europe, Australia and North America."

2. *Personal and Social Skills Education (Middle Childhood) and Prevention Education Based on Social Competence and Influence (Early Adolescence)*

Evidence from the International Standards on Drug Use Prevention (ISDUP), 2nd edition

Both ISDUP editions describe these programs as primarily universal interventions targeting youth in educational settings, and aiming to improve their social competence broadly defined -- with the ultimate goal of reducing underage substance use:

> (Middle Childhood): "In programmes on personal and social skills, trained teachers engage children in interactive activities to give them the opportunity to learn and practice a range of personal and social skills. These programmes are typically delivered to all children via a series of structured sessions (i.e., this is a universal intervention). The programmes provide opportunities to learn skills to be able to cope with difficult situations in daily life in a safe and healthy way. They support the development of general social competencies, including mental and emotional well-being. These programmes comprise mostly developmental components. That is, they do not typically include content with regard to specific substances, as in most communities children at this young age have not initiated use. This is not the case everywhere, and programmes targeting children who have been exposed to substances (e.g., inhalants) at this very young age could, if wished, refer to the substance-specific guidance included for "Prevention education based on social competence and influence" in the section on "Early adolescence", below."
>
> (Early Adolescence): "During skills-based prevention programmes, trained teachers engage students in interactive activities to give them the opportunity to learn and practise a range of personal and social skills (social competence). These programmes focus on fostering substance and peer refusal abilities that allow young people to counter social pressures to use substances and in general cope with challenging life situations in a healthy way.
> In addition, they provide the opportunity to discuss, in an age-appropriate way, the different social norms, attitudes and positive and negative expectations associated with substance use, including the consequences of substance use. They also aim to change normative beliefs on substance use addressing the typical prevalence and social acceptability of substance use among peers (social influence)."

The main ISDUP text thus aimed to summarize universal interventions aiming to improve personal and social skills (during middle childhood, before ethe onset of substance use) and social competence and influence (during early adolescence) through school-based activities led by trained teachers. The ultimate goal of such programs is to reduce substance use through improved socio-emotional skills broadly defined and understanding of relevant social influence domains (i.e., education, conformity, compliance, etc.). With developmental maturation, the focus may gradually move towards substance use, such as the discussion of norms and expectations associated with use of alcohol and other drugs, resistance of peer pressure, understanding of media messages, etc.

The 2nd ISDUP edition notes a total of seven relevant reviews addressing substance use among young people through personal and social skills education in middle childhood, cited as Hodder et al. (2017), Salvo et al. (2012), McLellan and Perera (2013), McLellan and Perera (2015), Schröer-Günther (2011) and Skara (2003). However, the relevant footnote lists six, not seven reviews, and not three but only two reviews (Skara, 2003, and Schröer-Günther, 2011) were identified in the 1st ISDUP edition as claimed.

The 2nd ISDUP edition notes a total of 22 relevant reviews addressing substance use among young people through social competence/influence programs in early adolescence: "Twenty-two reviews reported results for this kind of intervention, 15 of which from the new

overview", but only twenty and not twenty-two references were cited in the document as follows: Ashton et al. (2015), Champion (2013), de Kleijn et al. (2015), Espada et al. (2015), Faggiano et al. (2014), Foxcroft and Tsertsvadze (2012), Hale et al. (2014), Hodder et al. (2017), Jackson (2012), Jones (2006), Kezelman and Howe (2013), Lee et al. (2016), McArthur et al. (2015), McLellan and Perera (2013), McLellan and Perera (2015), Pan (2009), Roe (2005), Salvo et al. (2012), Schröer-Günther (2011) and West (2004).

Conclusions regarding the effects of these interventions were almost identical across the two ISDUP publications, with stronger language used to describe the programs' effects ("prevent" vs. "can prevent") during adolescence:

> "Seven reviews reported findings with regard to this intervention, four of which from the new overview. *With regard to primary outcomes, according to these studies, supporting the development of personal and social skills in a classroom setting can prevent tobacco, alcohol and drug use, particularly in a longer follow-up period (longer than one year)*. Strategies focusing only on resilience were found to be effective only in relation to drug use." (Middle Childhood, 2nd ISDUP edition, *p*. 17)
>
> "Twenty-two reviews reported results for this kind of intervention, 15 of which from the new overview. *With regard to primary outcomes, according to these studies, certain programmes based on a combination of a social competence and social influence prevent tobacco use, alcohol use and drug use* (preventive effects are small but consistent across studies, also in the long term (longer than 12 months).
>
> Programmes targeting individual and environmental resilience-related protective factors in school settings were reported to be effective in preventing the use of drugs, but not use of tobacco or alcohol.
>
> Programmes based on the provision of information only, as well as the Drug Abuse Resistance Education (DARE) programme, were reported not to be effective.
>
> It was reported that using peers to deliver programmes, relating to all substances, was effective, with the caveat that care should be taken not to use this method for high-risk groups, as there is a danger of adverse effects (e.g., an increase of substance use). Computer-based delivery methods were generally reported to have a small effect size, for all substances. (Middle Childhood, 2nd ISDUP edition, *p*. 21)

These programs were described as both universal and selective in the 1st ISDUP edition and given a 3/5 starts rating (i.e., "good" effects in preventing substance abuse, Table 1, *p*. 8).

ISDUP literature overview

Given the substantial theoretical overlap between these programs as administered during middle childhood and early adolescence -- also evidenced in multiple overlapping citations -- these developmental stages were pooled for ease of description. After excluding the reviews exclusively focusing on tobacco use prevention[23-26], commissioned government reports[27], and those with incompatible scope and/or populations (i.e., youth with mental health disorders, young adult men)[28,29], we considered a total of 14 reviews as relevant. It should be noted that a handful of reviews were included even though they did not meet ISDUP's own parameters of teacher-delivered programs, as they were facilitated by peers, computers, or police officers in the case of DARE[30-33].

Given that complete scientific citations were not provided for ISDUP2, the summary of these studies is as follows (also summarized in **Table 2**), in chronological order:

1. **Skara (2003), included in both 1st and 2nd edition of ISDUP**
   Refers to: **Skara, S., & Sussman, S. (2003).** A review of 25 long-term adolescent tobacco and other drug use prevention program evaluations. *Preventive medicine*, *37*(5), 451–474.

   This 2003 review[34] evaluated long-term success of strategies aiming to prevent tobacco and other drug use among adolescents. Long-term was defined as up to a 15-year follow up time after the program's completion. This review also specifically noted its focus on "psychosocial strategies programming" in preventing adolescent substance use, likely reflecting predominance of such theoretical underpinnings at that time. This review was entirely aligned with ISDUP's conceptualizations, as all of the evaluated interventions were characterized by (comprehensive) social influences content.

   A total of 25 studies reflecting data collected between 1976 and 1999 were evaluated. The primary focus of this review was on tobacco use, and only 9 studies out of these 25 provided long-term follow up data on outcomes reflecting the use of alcohol and other drugs (mostly marijuana). Of these 9 relevant studies/programs, 6 reported positive program effects in relation to alcohol and marijuana use incidence and/or prevalence. These effects were calculated for some of the studies, and were calculated by the authors to range from 6.9% - 11.7% reduction in prevalence of weekly alcohol use, and 5.7% reduction in prevalence of past-month marijuana use.

   Program contents, modality, and teacher-in-service features were reported in a useful manner as part of Table 4 summarizing "Programming characteristics". All of the 6 programs with the reported long-term success were primarily based on the (comprehensive) social influence model and in that respect are well-aligned with ISDUP's classification; however, many involved additional content such as the Life Skills training or information concerning short- and long-term consequences of early substance use. Many programs involved departures in terms of facilitators and were not delivered by teachers alone, if at all (i.e. peers, computers, audio or video materials were reported) and settings (i.e., community-wide). Five of the 6 relevant studies reporting beneficial effects were USA-based and one (Healthy School and Drugs Project) was from the Netherlands.

   Finally, while the individual studies were not assessed for quality in this report, the authors' note that while their review "provides long-term empirical evidence of the effectiveness of social influences programs in preventing or reducing substance use for up to 15 years after completion of programming", nevertheless, "this conclusion is still somewhat tenuous given the lack of significant program effects reported in several studies and the great variability that existed in the level of internal and external validity across all studies."

   This article was also reference in other ISDUP sections, namely *Community-based multi-component initiatives*.

2. **West (2004), included in both 1st and 2nd edition of ISDUP**
   Refers to: **West, S. L. and O'Neal, K. K. (2004).** Project D.A.R.E. outcome effectiveness revisited. *American Journal of Public Health*, 94(6):1027-9.

This meta-analysis generated overall effect sizes for the effectiveness of the American Drug Abuse Resistance Education (D.A.R.E) program in preventing adolescent substance use based on 11 reports published between 1991-2002 that included at least one indicator of alcohol, tobacco, or illicit drug use. The overall effect size was small and non-significant, indicating that the Project D.A.R.E. is ineffective. The contributing studies were not evaluated for quality, but the authors claim that the selection only of peer-reviewed published reports ensured "inclusion of only those studies with rigorous methodology"., p. 1027. That this meta-analysis pooled only the reports based on "old", unrevised version of D.A.R.E was also noted.

It is also not clear to what extent this program fits ISDUP's theoretical framings, as it builds on social learning theories to reduce substance use among youth, but it also aims to improve psychosocial outcomes such as drug resistance skills, self-esteem, and family bonding. Although it is a school-based program, it was originally developed and taught by the police (officers).

3. **Roe (2005), included in both 1st and 2nd edition of ISDUP**
   Roe, S., & Becker, J. (2005). Drug prevention with vulnerable young people: A review. Drugs: Education, Prevention and Policy, 12(2), 85–99.

This review summarized the results from 16 studies published between 1994-2003 focusing solely on the prevention of illicit drug use among vulnerable young people. These vulnerable populations were variously defined, and included "subsample of youth at high risk due to exposure to substance using peers and poor academic performance", "inner city minority neighborhoods where youth are subjected to multiple risk conditions", to "runaway/homeless youths" and "children of substance abusers".

Many programmes (9) were school-based and appeared to mainly target youth defined as "high risk" due to poverty, academic, and/or behavioral problems, including substance use. Multiple non-school settings such as methadone clinics, residential institutions, and community centers were also noted as the targeted population was high risk youth.

This review tabulated relevant characteristics (including sites, sample sizes, intervention content, drug-related outcomes, methodology, and quality ratings), but no quantitative results from primary studies. The authors conclude that school-based programs based on life skills training showed positive results in reducing drug use among vulnerable youth. Of the nine school-based interventions, 4 involved parenting- or family-visit components as well.

Given considerable departures from the core ISDUP definitions, as well as its limited systematization of primary studies, this basic review is considered only as supporting evidence. However, all contributing studies were rated as at or often above average (scores 3 or greater) on the Maryland Scale of Scientific Methods.

This article was also reference in other ISDUP sections, namely *Community-based multi-component initiatives*.

4. **Pan (2009), included in both 1st and 2nd edition of ISDUP**
   Refers to: **Pan, W., & Bai, H. (2009)**. A multivariate approach to a meta-analytic review of the effectiveness of the D.A.R.E. program. *International journal of environmental research and public health*, *6*(1), 267–277.

This meta-analysis updates the results reported in 2004 for the effectiveness of the Drug Abuse Resistance Education (D.A.R.E) program. Overall effect sizes for both drug use and psychosocial outcomes were computed based on a total of 20 D.A.R.E. reports published on the US adolescent samples between 1987-2003. The overall effect sizes were again "less than small". The quality of the contributing studies was not commented upon.

As noted above, D.A.R.E is not entirely aligned with the ISDUP's theoretical framing, and although it is a school-based program, it is (mainly) delivered by police officers.

5. **Jackson (2012), included in both 1st and 2nd edition of ISDUP**
Refers to: **Jackson, C., Geddes, R., Haw, S., & Frank, J. (2012).** Interventions to prevent substance use and risky sexual behaviour in young people: a systematic review. *Addiction (Abingdon, England)*, *107*(4), 733–747.

According to authors, this "systematic review was performed to identify experimental studies of interventions to reduce risk behaviour in adolescents or young adults and that reported on both any substance (alcohol, tobacco and illicit drug) use and sexual risk behaviour outcomes". This restricted inclusion criteria and the possibility of associated biases was not properly acknowledged in ISDUP.

A total of 18 candidate studies were identified, and 13 with moderate-strong quality ratings were selected. Of these 13 RCTs and CTs, 4 were community or family-based, while 9 interventions involved some form of school-based delivery. Of these 9, only four reflected sole "school-based curriculum-focused interventions", while one reflected "school-based curriculum-focused interventions with additional components" and another four reflected "whole-school or multi-setting programmes". Thus, only a small fraction of the included studies was aligned with the ISDUP framing in at least in one respect. Of these four "school-based curriculum-focused interventions", two showed some evidence for substance use effects and were implemented in African nations (South Africa and Namibia); one had no effect on substance use and was implemented in South Africa as well, and the fourth one was Project ALERT implemented in the American state of South Dakota, showing short term but no long-term reductions in alcohol, tobacco, and cannabis use.

The overall results in relation to substance use outcomes across all 13 studies indicated that the effects on alcohol and drug use were weak, with "just 2 of 11 studies (that reported alcohol use outcomes) demonstrating significant effects on at least one alcohol measure", and "only three of 11 interventions reporting on illicit drug use demonstrated significant positive effects on at least one drug use outcome", p. 744. The authors also identified multiple limitations, including high attrition rates in follow-ups, self-selection, and the facts that successful interventions all appeared to be "complex interventions that targeted more than one risk/protective factor", p. 745.

This article was also referenced in other ISDUP sections, namely *Community-based multi-component initiatives*.

6. **Foxcroft and Tsertsvadze (2012), citation not provided, referenced only in 2nd edition**
Assumed to refer to: **Foxcroft, D.R. and Tsertsvadze, A. (2012),** Cochrane Review: Universal school-based prevention programs for alcohol misuse in young people. Evid.-Based Child Health, 7: 450-575.

This Cochrane review evaluated effectiveness of universal school-based programs on adolescent (youth 18 or younger) alcohol use. The review included 27 trials included in a previous Cochrane review of primary prevention[35], and an additional 27 trials (represented by 40 publications) since 2002. Overall, included were 53 studies (mostly cluster-randomized) published between 1984-2010 (but also one from 1968). Overall poor reporting quality of the contributing studies was noted.

The review differentiated conceptually between generic (39 trials where "the target of the intervention programs was of generic nature, focusing on prevention of multiple factors (i.e., alcohol, tobacco, drugs, anti-social behavior") and alcohol-specific interventions (11 trials where the focus was solely on the prevention of alcohol misuse). The remaining 3 trials targeted co-use of alcohol and cannabis, of alcohol and other drugs, and of tobacco use only. The review included any universal school-based psychosocial or educational prevention program; the latter included for instance drug education programs, healthy school or community initiatives, or screening for alcohol consumption. Thus, it was almost impossible to extricate studies entirely aligned with the ISDUP's framing.

Most interventions (85%) were compared to standard curriculum. Meta-analysis was not possible because the estimates could not be pooled across diverse study designs, populations, and outcomes. Majority of trials were conducted in English-speaking countries; 41 from North America (USA and Canada) and 6 from Australia. Two trials (including Unplugged) were implemented in multiple countries.

In 15 of the 39 trials evaluating generic interventions, the program interventions demonstrated significantly greater reductions in (variously measured) alcohol use. The same results were observed in 6 of the 11 trials that evaluated alcohol-specific interventions.

The authors also provided a summary of successful programs, p. 465:

> "Amongst the generic prevention programs, those based on psychosocial or developmental approaches (e.g., life skills through the LST program in the United States; social skills and norms through the Unplugged program in Europe; development of behaviour norms and peer affiliation through the GBG in the United States and in Europe) were more likely to report statistically significant effects over several years (up to 12 years with the GBG) when compared to standard school curriculum or other types of interventions, with effect sizes that are often small but potentially important based on economic models.
>
> Generic programs offer the additional advantage of potentially impacting on a broader set of problem behaviours, for example cannabis, tobacco, harder drugs, antisocial behaviour.
>
> Overall, we conclude that the evidence supports certain generic prevention programs over alcohol-specific prevention programs."

7. Champion (2013), citation not provided, referenced only in 2nd edition

Refers to: **Champion, K. E., Newton, N. C., Barrett, E. L., & Teesson, M. (2013).** A systematic review of school-based alcohol and other drug prevention programs facilitated by computers or the internet. *Drug and alcohol review*, *32*(2), 115–123.

Because ISDUP specifically underscores teacher-delivered programs, this review will not be evaluated in depth. This systematic review Internet- or computer-based prevention programs for alcohol or other drugs delivered in schools. Included were 10 internet- or computer administered programs implemented in 12 trials published between 2000-2011.

All but one Dutch trial were from English-speaking countries, USA (5), Australia (4), Canada (1) and the UK (1).

Quality of the included trials was noted as rather low, with the highest quality rating assigned to the Australian Climate Schools program and with some trials even receiving the score of "0". Study designs were not reported, and these studies were referred to as "trials", but whether they were randomized (and if so, how) is not known.

Of the 12 included trials, 3 examined only tobacco use and one included no behavioral outcomes but reported only substance use knowledge, attitudes, and intentions. Only 4 studies were based on the social learning principles alone while the rest reflected other orientations, such as harm-minimization or Transtheoretical Model of Change (TTM), or combinations with social learning approaches, and thus were additionally departing from ISDUP's framings.

The overall effects of these interventions on alcohol and drug use, according to the article conclusions, were modest, p. 120:

> "All four trials that measured alcohol consumption were associated with some reduction in alcohol use at postintervention and/or follow up. Effect size (ES) was small at post intervention (ES 0.09) and similarly modest at follow up (ES 0.16–0.38 and odds ratio0.36–0.71). Two trials were associated with positive outcomes relating to the frequency of binge drinking. Of the seven programs, only one targeted cannabis. This program was associated with a significant reduction in the frequency of cannabis use at 6-month follow up with a small effect size (0.19)."

8. **Kezelman and Howe (2013), citation not provided, referenced only in 2nd edition**
Assumed to refer to the systematic review concerning prevention of cannabis use, the first author's name was not included, and the last author's name was misspelled -- the citation was therefore misleading: **Norberg, M. M., Kezelman, S., & Lim-Howe, N. (2013).** Primary prevention of cannabis use: a systematic review of randomized controlled trials. *PloS one*, *8*(1), e53187.

This review systematically summarized 28 articles representing 25 unique RCT studies focusing on prevention of cannabis use in youth and young adults. The authors also attempted to address program content and theoretical foundations of these interventions. This proved extremely challenging, as: "The vast majority (84%, *n*=21) of the 25 included studies reported some form of psychoeducation. Other typical content included social skills training (64%, *n*=16), risk resiliency/refusal skills training (60%, *n*=15), and decision making skills training (40%, *n*=10)." Thus, several studies covered multiple content areas, and were thus challenging to fit into program characteristics as outlined in ISDUP.

The review also differentiated meaningfully between universal vs. targeted and unimodal (i.e., single modality such as school) and multimodal programs. Cross-tabulation of these characteristics shown in Table 1, *p*.5 suggests that a total of 5 programs (9 publications) utilized universal unimodal design: Life Skills Training, Towards No Drug Abuse, Climate Schools Model (CSM), ALERT, and SPORT. Although the review synthesized data by program design and individual program components, no synthesis was presented for school-based AND teacher led programs as defined in ISDUP.

The highest quality ratings were assigned to the Australian CSM and American SPORT projects – both health-oriented interventions associated with statistically significant but

small effects reducing frequency of cannabis use past 90 days (CSM) and small effects in reducing prevalence of past month use and delaying initiation (SPORT).

The overall quality of the studies included was noted as poor, as was the fact that many programs did not include cannabis-specific content, but were of generic nature and focused on substance use broadly defined.

9. Faggiano et al. (2014), citation not provided, referenced only in 2nd edition
Assumed to refer to: **Faggiano, F., Minozzi, S., Versino, E., & Buscemi, D. (2014)**. Universal school-based prevention for illicit drug use. *The Cochrane database of systematic reviews*, *2014*(12), CD003020.

This strong review "reviewed the evidence about the effect of school-based prevention interventions on reducing the use and intention to use drugs and increasing knowledge about the harms of drugs in primary or secondary school pupils". A total of 51 studies (either RCTs or CCTs) published between 1984-2012 were reviewed, with Conflict of Interest declared for the first author in relation to his role in the *Unplugged* trials which were included in this Cochrane review. The majority of trials 41/51 were conducted in the US and in grades 6-7 in middle school. For multiple studies, there was an "unclear risk of bias" reported for multiple domains. Full meta-analysis was not possible, but the effects were reported in relation to dichotomous measures (that is, prevalence) and continuous measures of marijuana and hard drug use. Short-term (less than a year follow up) and long-term (12+ months follow up) effects were also summarized.

While the quantitative summaries were provided as part of Table 2 abstract, the authors summarize the classification of evaluated programs according to their theoretical foundation, p. 10:

"A more recent classification proposes dividing the interventions as follows (Thomas 2006):

• Knowledge-focused curricula present participants with information about smoking including health risks of tobacco use, and the prevalence and incidence of smoking assuming that information alone will lead to changes in behaviour.

• Social competence curricula use enhancement interventions (also called affective education), based on Bandura's social learning theory (Bandura 1977). This model hypothesises that children learn drug use by modelling, imitation and reinforcement, influenced by the child's pro-drug cognitions, attitudes and skills. Susceptibility is increased by poor personal and social skills and a poor personal self-concept (Botvin 2000). These programmes use cognitive-behavioural skills (instruction, demonstration, rehearsal, feedback, reinforcement, and out-of-class practice in homework and assignments). They teach generic self-management, personal and social skills, such as goal-setting, problem-solving and decision-making, and also teach cognitive skills to resist media and interpersonal influences, to enhance self esteem, to cope with stress and anxiety, to increase assertiveness and to interact with others.

• Social norms approaches, based on McGuire's persuasive communications theory (McGuire 1968), and Evans's theory of psychological inoculation (Evans 1976), use normative education methods and anti-drugs resistance skills training. These include correcting adolescents' overestimates of the drug use rates of adults and adolescents, recognising high-risk situations, increasing awareness of media, peer and family influences, and teaching and practising refusal skills. They often apply the techniques of generic competence enhancement to specific anti-drug goals.

• Combined methods draw on knowledge-focused, social competence and social influence approaches.

Thus, the strength and relevance of this review is reflected in its evaluation of the school-based interventions in relation to the programs' conceptualization and theoretical foundations, which is greatly aligned with those stated in ISDUP's. They were all school-

based and most programs were based on social competence/influence models and could easily be extracted as such. As for teacher led interventions: A third of social competence programs and half of social influence programs utilized only teacher-based delivery. In addition, combinations of teacher and other program facilitators (e.g. police officers, social workers, or research staff) were utilized in several of the trials included.

10. Hale et al. (2014), citation not provided, referenced only in 2nd edition

Assumed to refer to: **Hale, D. R., Fitzgerald-Yau, N., & Viner, R. M. (2014).** A systematic review of effective interventions for reducing multiple health risk behaviors in adolescence. *American Journal of Public Health*, *104*(5), e19–e41.

The inclusion criteria for this article were extremely questionable. The authors presumably aimed to identify interventions that reported significant effects in reducing multiple health risk behaviors. Specifically, studies were included if they "reported statistically significant effects on 2 or more of the following: tobacco use, alcohol, illicit drug use, sexual risk behavior, and aggressive behavior (e.g., delinquency, truancy) as either primary or secondary outcomes.", *p*. e20. In essence, in addition to considering joint outcomes only, the reports of null findings were effectively excluded from this review. In addition, examination of "Intervention description" summaries revealed that majority of interventions utilized multiple theoretical models and varied content, for example, Adolescents Transition Program was described as "multilevel program incorporating Family Check-Up intervention and SHAPe curriculum, modeled after Life Skills Program. The 6 SHAPe sessions focused on school success, health decisions, building positive peer groups, the cycle of respect, coping with stress and anger, and solving problems peacefully"., p. e22. For these reasons, this review was not considered further as highly biased and outside ISDUP's parameters in terms of the theory and content of examined programs.

Still, evaluated were 55 RCTs published between 1980-2012 reflecting 44 interventions aiming to prevent multiple health risk behaviors in adolescence. Of these, 44 studies reflected 32 school-based programs, but only 24 of these were administered only in school-settings. Nine interventions reported positive effects for all three substances (alcohol, tobacco, and illicit drugs) and all nine were "multicomponent interventions and aimed to increase resilience by enhancing adolescents' refusal skills", *p*. e30.

Despite these stringent inclusion criteria, the reported effects sizes were small according to the authors, and multiple limitations of the contributing RCTs were noted.

11. Espada et al. (2015), citation not provided, referenced only in 2nd edition

Assumed to refer to: **Espada, J. P., Gonzálvez, M. T., Orgilés, M., Lloret, D., & Guillén-Riquelme, A. (2015).** Meta-analysis of the effectiveness of school substance abuse prevention programs in Spain. *Psicothema*, *27*(1), 5–12.

This report meta-analyzed findings from 21 studies published between 2002-2013 (3 theses and 18 publications) that evaluated school-based substance use prevention programs in Spanish schools. The review differentiated between the programs' theoretical orientation (Social learning, Reasoned action, Social influence model, and Health education or other). However, most of the studies were in the latter category, and hence the review study did not align well with the ISDUP framings. While indeed meta-analyses were conducted for

interventions by specific theoretical orientation, the pooled estimates reflected a composite indicator which also included a number of non-behavioral (i.e., non-substance use) outcomes.

For these reasons, this review is not considered further.

12. McArthur et al. (2015), citation not provided, referenced only in 2nd edition

Assumed to refer to: **MacArthur, G. J., Harrison, S., Caldwell, D. M., Hickman, M., and Campbell, R. (2016).** Peer-led interventions to prevent tobacco, alcohol and/or drug use among young people aged 11–21 years: a systematic review and meta-analysis. *Addiction*, 111: 391–407.

Because ISDUP specifically underscores teacher-delivered programs, this review of peer-led interventions will not be evaluated in depth. Most studies were conducted in the school setting, and peer-led meant that "programmes needed to include a substantial component in which peers were involved in the delivery of the intervention; for instance, via the direct delivery of curriculum components, or by acting as a mentor or 'buddy' to study participants." Thus, this review did not align well with the ISDUP framings.

This review aimed to "investigate and quantify the effect of peer-led interventions that sought to prevent tobacco, alcohol and/or drug use among young people aged 11–21 years". Even though the title suggests that the samples of young adults were included, the summary of contributing studies (all RCTs) indicate that the age range was 9-19.

The review identified 17 eligible interventions (labeled studies) what were included in quantitative synthesis, but three studies were excluded from meta-analyses due to various limitations. Most studies were USA-based. Of the 17 considered interventions, 9 targeted tobacco use only. Of the remaining 8 studies, 4 targeted alcohol use only, and 4 targeted the use of alcohol, tobacco, and other drugs.

Underlying theoretical foundations for these 8 non-tobacco studies ranged -- according to the authors -- from cognitive-behavioral approaches (Life Skills Training) to the intervention that "builds on the social influence model and draws on the health belief model and self-efficacy theory of behaviors change" (as was described Project ALERT), p. 397.

Pooled analyses of all studies reporting alcohol use outcomes and cannabis use outcomes showed weak but statistically significant effects.

Studies were not evaluated for quality of evidence, but this was noted under limitations, p.404:

> "Secondly, all included studies were subject to bias, and the quality of evidence for each outcome [under, for example, a classification system such as GRADE (Grading of Recommendations Assessment, Development and Evaluation)] would be considered to be low, owing primarily to the poor quality of data reporting in the included studies. In many cases, methods of randomization and allocation concealment were not provided, the extent of blinding was unclear and attrition was relatively high in some studies."

13. Lee et al. (2016), citation not provided, referenced only in 2nd edition

Assumed to refer to**: Lee, N. K., Cameron, J., Battams, S., & Roche, A. (2016).** What works in school-based alcohol education: A systematic review. *Health Education Journal*, *75*(7), 780-798.

This review included 70 studies of altogether 40 school-based programs. Each program was evaluated with regard to quality of evidence and consistency and magnitude of effects. The three programs that were assessed as having good evidence of effect on alcohol outcomes, were School Climate, Project ALERT, and All Stars.

Among these, Project Alert seems closest to the ISDUP framing, although this program includes also parent activities. Programs assessed as having some evidence of effect on alcohol outcomes were Life Skills /Life Skills Training, Unplugged and SHARPH (School Health and Harm Alcohol Harm Reduction Project). With the exception of the latter, these programs also seem to align well with the ISDUP framing. Notably, the remaining programs evaluated, were assessed as having little or no evidence of effect on alcohol outcomes (1 program; DARE), or as programs with inconclusive evidence on alcohol outcomes (30 programs), or programs with evidence of negative effect on alcohol outcomes (2 programs: Peer Acceleration Social Network, Take Charge of Your Life).

14. Hodder et al. (2017), citation not provided, referenced only in 2nd edition

Assumed to refer to: **Hodder, R. K., Freund, M., Wolfenden, L., Bowman, J., Nepal, S., Dray, J., Kingsland, M., Yoong, S. L., & Wiggers, J. (2017).** Systematic review of universal school-based 'resilience' interventions targeting adolescent tobacco, alcohol or illicit substance use: A meta-analysis. *Preventive medicine*, *100*, 248–268

This meta-analysis included 19 RCTs summarized in 41 articles that evaluated universal school-based interventions that addressed "resilience". That is, the intervention was required to address at least one individual and at least one environmental (family, school, or community) resilience protective factor. These factors were defined in the Supplemental material to this review as:

> "- included individual resilience protective factors: academic achievement, autonomy, cooperation and communication, coping, empathy, goals and aspirations, moral competence, problem solving/decision making, religiosity, self-control, self-efficacy, self-esteem, self-regulation, self-awareness, social and emotional competence, social and emotional skills.
> - included environmental resilience protective factors: community adult high expectations, community caring relationships, community meaningful participation, community support, home adult high expectations, home caring relationships, home meaningful participation, home support, peer caring relationships, pro-social peers, school adult high expectations, school caring relationships, school meaningful participation, school support."

and appear to have been extracted from already implemented, often well-known, interventions such as, for example, multiple implementations of Project Northland or D.A.R.E. programs.

The programs' characteristics, including theoretical foundations and delivery modes, were summarized as part of Appendix D in this meta-analysis. Theoretical underpinning were diverse and ranged from Social influence model (for Healthy for Life (HFL) Program and Linking Lives Health Education Program), Social Cognitive Theory (for Going Place Program), Triadic influence and Perry's planning model for adolescent health promotion programs (Project Northland), and even Coercion theory (Linking the Interests of Families and Teachers

(LIFT). Delivery modes were equally diverse, and in multiple programs schools were just one arm in a more complex multi-component program often involving parents and families.

Given these features, it is not clear in what ways this meta-analysis reflected ISDUP's theoretical framings and definitions and is thus not considered in depth.

ISDUP literature summary

A set of 14 reviews (see **Table 2** summary) included in the 2nd ISDUP edition purportedly examined universal interventions designed to prevent or reduce substance use among young people through teacher-delivered programs aiming to improve students' social competence/influence, broadly speaking. Why this specific set of parameters was underscored in ISDUP is not clear, but it appears to be based upon conceptualization used in two Cochrane reviews[36,37] included in 1st and 2nd edition (also on other Cocrane reviews not included here focusing on prevention of tobacco use) and on predominance of social competence and influence models in the pre-2000's prevention programs[34].

As shown in the above brief assessment of the 14 reviews, only two[34,36] were coherently aligned with the ISDUP's theoretical framing of universal school-based prevention. The reviews were also heterogenous in other respects. Five of these 14 considered articles focused solely on the prevention of illicit drug use[30,31,36,38,39], including one review considering solely cannabis use[38], two meta-analyses considering solely the American D.A.R.E. program[30,31], and one review considering only drug use in high-risk populations[39] variously defined for example as children of parents with substance use disorders, youth residing in American inner cities, or students evaluated as aggressive by teachers. Two reviews focused solely on the prevention of alcohol use[40,41], and the remaining reviews and meta-analyses considered prevention of substance use more broadly to include alcohol, tobacco, and use of other drugs, often together with other risky or unhealthy behaviors[33,34,42-45]. Of these, one review examined school-based interventions implemented in Spain[43]. The majority of primary studies were American and Australian, but there were trials from several African states (e.g., South Africa, Namibia) in particular in systematic reviews also considering sexual health outcomes[44]. Several programs were evaluated across repeated implementations or follow-ups, for example ALERT 1990, ALERT 2003, ALERT 2005, ALERT 2009, and such.

Overall, the reviewed literature seems outdated. For example, even though one key review reported long-term (up to 15 years post intervention) effects of several American interventions[34], the last follow-up in all those studies was conducted pre-2000s and multiple trials implemented baseline in the 1970's. While one can argue that such findings demonstrate robust effects, an alternative claim can be made that such findings cannot be considered meaningful after half a century. Another recent review from 2016 reported that only 3 (out of 40 evaluated) school-based programs targeting alcohol use among adolescent students had good evidence of a positive effect[40]. If there was a pattern observed across this evaluated literature, it may be summarized as an inverse relationship between the strength of evidence and its recency. That is, the more recent reviews evaluating more recent implementations appear to be progressively generating weaker evidence of these programs' efficacy in preventing or reducing alcohol and drug use among youth.

ISDUP's specific focus on only one level (universal), one theoretical framing (social competence/influence models), one delivery mode (teachers), and one delivery setting (schools)

could have in practice provided succinct info of great relevance to a range of actors interested in such programs. But not one hereby referenced review focused specifically on all of these facets as described in ISDUP. Two reviews (one from 2003 and one from 2014)[34,36] summarize trials closest to these ISDUP-defined characteristics, although a substantial proportion of included interventions were not teacher led. Similar to the issues raised in Section 1 addressing parenting skills vs. family-based programs, the current language across ISDUP definitions, classifications, and conclusions of this section also implicitly assumes that the unique contribution of teachers' intervention upon *social competence/influence* factors can be parsed easily, or that a *social competence/influence* attributable fraction can be obtained from the intervention's overall effects (if any). This persistent conflation of delivery settings (i.e., schools), program facilitators (i.e., teachers), and program content and theoretical orientations (i.e., social competence and social influence models) throughout the ISDUP text was indeed challenging.

As noted above, the reviewed evidence does not fully reflect these ISDUP parameters. In the evaluated systematic reviews, considered were both universal and selective interventions; multiple theoretical models (i.e., health education, harm reduction, TTM, resilience-based models, etc.) seldom explicitly stated either in the systematic reviews or in the contributing studies; multiple target populations (i.e., vulnerable youth such as those with mental health disorders, behavioral problems, HIV positive youth, or youth living on the streets) and multiple delivery modes (with two reviews/meta-analyses even specifically excluding teachers as programs' primary facilitators[32,33]).

While many interventions were delivered in schools, this was not always the case as one review included interventions delivered to children of substance-using parents in methadone clinics[39] and at least two reviews[38,42] attempted to address the issues of school vs. additional delivery setting. Indeed, many interventions generally classified as school-based actually included additional arms (such as parental involvement), or were themselves parts of larger, community-wide or multi-component interventions. For example, multiple systematic reviews -- including the flagship 2003 review on psychosocial interventions[34] -- from ISDUP's section on *Personal and social skills education (Middle childhood)* were also included in its section on *Community-based multi-component initiatives*.

Further, considered were also multiple problem behaviors in addition to substance use (e.g., risky sexual behaviors, other problem behaviors such as delinquency or truancy). For example, one review (questionably) included and synthesized only those studies where universal or selective interventions showed statistically significant improvement in two or more of such behaviors[45] and another review considered and evaluated only those interventions jointly targeting adolescent substance use and sexual health[44]. In what ways such inclusion criteria might have biased the results is not adequately addressed in ISDUP. Such reviews were mentioned here primarily to highlight the disconnect between ISDUP's conceptualizations, presented evidence, and ultimate conclusions.

Finally, there were also considerable variations not only across substances, but also across the specific substance use outcomes or use patterns. For example, just one Cochrane review focusing on school-based prevention of alcohol use[41] noted that

> "the outcomes varied with respect to their definition (e.g., alcohol use, frequency of use, mean number of drinks, proportion of alcohol non-users, weekly drinking, hard liquor use, frequency of drunkenness, drunkenness in the last month, incidence of drinking and driving, binge drinking), scales of measurement (means, percentages, odds ratios, risk ratios), and the period to which they pertained (e.g., past month, past 2 months, current, past year, ever)", *p*. 461.

In addition, because many interventions include these measures, several reviews also reported on non-behavioral outcomes (i.e., drug-related knowledge) that appear to be integrated in one meta-analysis[43] together with behavioral use outcomes.

For these reasons, it was not possible to evaluate the efficacy/effectiveness of school-based interventions based on social competence/social influence models as they were defined in the ISDUP section. The following examples may illustrate the challenges: one systematic review[44] evaluated effectiveness of 13 interventions jointly targeting substance use and risky sexual behaviors among youth. Of these 13 interventions, 9 were school-based, but 4 were *only* school-based student interventions, while the remaining 5 involved additional components or were parts of whole-school/multi-setting programs. As such, this report was also included in ISDUP's section on *Community-based multi-component initiatives*. Additional careful review of these 9 primary studies would be required to extract the unique contribution of the school-based delivery of an intervention built upon social competence/influence theoretical foundation on students' substance use. And this is in addition to the challenges posed by the inclusion criteria, and a dual target (substance use and sexual health) of evaluated programs. Another systematic review of cannabis-prevention programs[38] noted that the majority of evaluated interventions could not be easily classified, as they integrated multiple theoretical models and corresponding training: psychoeducation, social skills training, risk resiliency/refusal skills training, and decision making skills training. In short, a separate evaluation with proper classification of interventions according to their level (e.g., universal, etc.), theoretical underpinnings/content (e.g., harm minimization, health education, etc.), delivery mode (e.g., teacher, but also peer and increasingly common web- and computerized deliveries), and settings (e.g., school vs. after-school programs, or multi-component programs of which schools may be only one of several components) might provide answers in alignment with ISDUP definitions of these interventions, but such a task would require an independent systematic review or meta-analysis.

As noted above, one Cochrane review[36] that focused specifically on the prevention of drug use seems to have followed ISDUP's conceptualizations for the most part; this review compared the effects on illicit drug use across social competence, social influence, and combined curricula, but it too evaluated school programs (such as D.A.R.E.) not always delivered by teachers. The oldest referenced review[34] also examined prevention programs based primarily on psychosocial models -- and social influence model in particular -- but it too included programs not always delivered by trained teachers, as well as programs that were part of larger community-wide initiatives.

It appears that ISDUP's conclusions that "*certain programmes based on a combination of a social competence and social influence prevent tobacco use, alcohol use and drug use (preventive effects are small but consistent across studies, also in the long term (longer than 12 months)*" and that "*programmes based on the provision of information only were reported not to be effective"* were primarily based on the conclusions from these two reviews[34,36] alone, *p*. 3:

> "Programmes based on social competence were mostly represented and showed a similar tendency to reduce the use of substances and the intention to use, and to improve knowledge about drugs, compared to usual curricula, but the effects were seldom statistically significant.
>
> Programmes based on social influence showed weak effects that were rarely significant.

> *Programmes based on a combination of social competence and social influence approaches seemed to have better results than the other categories, with effective results in preventing marijuana use at longer follow-up, and in preventing any drug use*.
>
> Knowledge-based interventions showed no differences in outcomes, apart from knowledge, which was improved among participants involved in the programme."

This is also the case for the remaining ISDUP conclusions, which appear to be based on a single selected review, not on evidence synthesis. Specifically, the ISDUP conclusion that "*Programmes targeting individual and environmental resilience-related protective factors in school settings were reported to be effective in preventing the use of drugs, but not use of tobacco or alcohol*" not only somewhat contradicts its previous statement that "*certain programmes based on a combination of a social competence and social influence prevent tobacco use, alcohol use and drug use"*, but it also appears to be based on a single review[42] of (for the reader rather undefined) individual- and school-level resilience factors extracted from established trials. Similarly, ISDUP conclusions on peer- and computer-delivered programs correspond to the respective focused reviews[32,33], although none of these delivery features falls within ISDUP's own parameters of teacher delivery, and even though these delivery modes were considered in several other reviews[38,45] and definitely present in multiple primary studies across almost all considered systematic reviews.

While acknowledging that some programs such as D.A.R.E. were ineffective, other critical views were missing. For example, that programs based on other theoretical models were often positively rated in recent reviews, while ISDUP's preferred model (social influence) was actually identified as very weak in two key reviews[36,40] was not properly acknowledged. For example, a 2016 review of 40 school-based alcohol prevention programs[40] identified only one program with an A-grade rating: a harm-minimization, universal drug prevention program facilitated by the internet. As such, this program does not reflect at all interventions based on social competence and/or social influence models as described in ISDUP. The key Cochrane review[36] summarizes evidence for interventions based on this model as such:

> "Programmes based on social influence, which are focused on reducing the influence of society in general on the onset of use of substances, by normative education, for example, were assessed in eight studies. In general, the results appeared weak and were rarely significant."

Finally, the list of systematic reviews summarizing evidence concerning these school-based interventions appears incomplete. Even a cursory library search identified a number of highly relevant reports (both meta-analyses and systematic reviews) published between 2015-2018; whether these reports were considered at all for the 2nd edition is unknown given the absence of pertinent documentation:

Strøm, H. K., Adolfsen, F., Fossum, S., Kaiser, S., & Martinussen, M. (2014). Effectiveness of school-based preventive interventions on adolescent alcohol use: a meta-analysis of randomized controlled trials. *Substance abuse treatment, prevention, and policy*, *9*, 48.

Agabio, R.; Trincas, G.; Floris, F.; Mura, G.; Sancassiani, F.; Angermeyer, M.C. (2015). A systematic review of school-based alcohol and other drug prevention programs. *Clin. Pract. Epidemiol. Ment. Health*, *11*, 102–112.

Onrust, S. A., Otten, R., Lammers, J., & Smit, F. (2016). School-based programmes to reduce and prevent substance use in different age groups: What works for whom? Systematic review and meta-regression analysis. *Clinical Psychology Review*, *44*, 45–59.

Teeson, M., Newton, N. C. and Barret, E. L. (2012). Australian school-based prevention programs for alcohol and other drugs: A systematic review. *Drug and Alcohol Review, 31*: 731-736.

Lize, S. E., Iachini, A. L., Tang, W., Tucker, J., Seay, K. D., Clone, S., DeHart, D., & Browne, T. (2017). A Meta-analysis of the effectiveness of interactive middle school cannabis prevention programs. *Prevention Science, 18*(1), 50–60.

Evidence from The European Prevention Curriculum (EUPC)

In EUPC, these programs are addressed as part of Chapter 6, under a more general overview of School-based and Workplace-based prevention. The type of intervention prioritized in ISDUP (i.e., Prevention education based on personal and social skills and social influence) was simply mentioned as one possible theoretical orientation underlying various interventions delivered in school settings. This chapter also includes a table summary of "What works and does not work in school-based prevention" (the original Table 13, p. 106), differentiating the programs' content, delivery, and structure in a more user-friendly manner than the corresponding ISDUP text. However, no references were provided for this summary table in EUPC.

Further, three specific programs are mentioned under the heading 'Evidence-based programmes': *Unplugged*, *The Good Behaviour Game (GBG)*, and *KiVa*, as the interventions that "are found to have promising results according to several evaluations in different European countries." (p. 106). These programs were also heavily featured in several of the ISDUP reviews, especially Unplugged and GBG[46].

While Unplugged is often described as a comprehensive social influence program, the other programs appear to only vaguely reflect the ISDUP's key elements of social competence and social influence -- but they could nevertheless be understood as generic psychosocial/developmental programs. Indeed, theoretical orientation is seldom explicitly stated in programs' description, as they seem to incorporate multiple approaches and elements. This is especially evident in the case of GBG (which primarily targets academic performance) and KiVa (which primarily targets bullying and victimization). These programs are described in this manner in the EUPC and in the Xchange Registry database:

> *Unplugged:* "Unplugged is a school-based programme that incorporates components focusing on critical thinking, decision making, problem-solving, creative thinking, effective communication, interpersonal relationship skills, self-awareness, empathy, coping with emotions and stress, normative beliefs and knowledge about the harmful health effects of substances. The curriculum consists of 12 one-hour units taught once a week by class teachers who previously attended a 2.5-day training course. The Xchange registry rates Unplugged as 'beneficial', meaning that it is likely to be effective across different contexts." (as described in EUPC, p. 107).

The Xchange registry search of this program by name[s] revealed that it is rated as "Beneficial" after the trials conducted in Austria, Belgium, Germany, Greece, Italy, Spain and Sweden (also in the Czech republic but with a different age group and in Slovakia in a poorly randomized trial). The program showed positive effects on students' alcohol, tobacco, and cannabis use, often in quantifiable terms of relevance to public health (e.g., the proportion of persistent cannabis non-users was higher in the intervention vs. control condition).

> The Good Behaviour Game (GBG): "The GBG is a classroom-based behaviour management strategy for primary schools that teachers use along with a school's standard instructional

[s] https://www.euda.europa.eu/best-practice/xchange/unplugged_en

curricula. The GBG is rated as 'likely to be beneficial' in Xchange, meaning that, although research has found it to be effective, more work needs to be undertaken in Europe to be sure. The GBG uses a classroom-wide game format with teams and rewards to socialise children to the role of student and reduce aggressive, disruptive classroom behaviour, which is a risk factor for adolescent and adult substance use, antisocial personality disorder, and violent and criminal behaviour. In GBG classrooms, the teacher assigns all children to teams, which are balanced with regard to gender, aggressive, disruptive behaviour and shy, socially isolated behaviour. Basic classroom rules of student behaviour are posted and reviewed. When the GBG is played, each team is rewarded if team members commit a total of four or fewer infractions of the classroom rules during game periods.

During the first weeks of the intervention, the GBG is played three times a week, for 10 minutes each time, during periods of the day when the classroom environment is less structured and the students work independently of the teacher. Game periods are increased in length and frequency at regular intervals; by mid-year the game may be played every day. Initially, the teacher announces the start of a game period and gives rewards at the conclusion of the game. Later, the teacher defers rewards until the end of the school day or week. Over time, GBG is played at different times of the day, during different activities and in different locations, so the game evolves from being highly predictable in timing and occurrence, with immediate reinforcement, to being unpredictable, with delayed reinforcement, so that children learn that good behaviour is expected at all times and in all places." (as described in EUPC, p. 107)

The Xchange registry search of this program by name[t] revealed that it is rated as "Beneficial" after the trials conducted in Belgium, Netherlands, Ireland, United Kingdom, and Estonia. Notably, studies evaluating GBG evaluated outcomes ranging from reading attainment to disruptive classroom behavior, but seldom reported on substance use outcomes. The one Dutch 2009 study[47] that did examine substance use (alcohol and tobacco) reported mixed findings, including some in favor of the intervention and some null-findings.

KiVa: "KiVa is an anti-bullying programme, which has had promising reviews in Finland and has been adopted in Estonia as well. This programme targets school children between the ages of 5 and 11 and uses universal and indicated strategies. It tries to enhance prosocial behaviour and emotional well-being. KiVa is not yet in the Xchange registry, but it is rated as 'promising' in the Blueprints registry, meaning that high-quality research has found it to be effective". (as described in EUPC, p. 107).

The Xchange registry search of this program by name[u] revealed that it is in fact included in the database as of late 2024, and it was rated as "Likely to be beneficial" after the trials conducted in Finland, Italy, Netherlands. None of the studies evaluating KiVA reported on substance use outcomes, and alcohol, tobacco, or drug use were not even listed under "outcomes targeted" section in the program description.

Additional evidence from the EUDA Best practice portal/Xchange Prevention Registry

Additional literature search aiming to identify interventions was performed using the EUDA Best practice portal, Xchange Prevention Registry -- "...an online registry of thoroughly evaluated prevention interventions".

The search was performed without any restrictions on the age group, risk factors, or country.

[t] https://www.euda.europa.eu/best-practice/xchange/good-behaviour-game_en
[u] https://www.euda.europa.eu/best-practice/xchange/kiva-anti-bullying-programme-combined-universal-and-indicated-type-anti-bullying-programme-school-children_en

The first search selected only programs administered in "school" settings rated as "beneficial" in relation to outcomes specified as "substance use", "alcohol use", and "use of illicit drugs". This search returned no programs in relation to "substance use" and 2 hits (Unplugged and GBG) in relation to "alcohol use" and "use of illicit drugs".

The second search expanded the initial criteria to include such programs rated as "Likely to be beneficial". This search returned no programs in relation to "substance use" and two hits (School Health and Alcohol Harm Reduction Project (SHAHRP)/Steps Towards Alcohol Misuse Prevention Programme (STAMPP) - life skills training to reduce alcohol use and harms, and IPSY - life skills training with discussions on school context and learning climate) in relation to "alcohol use" and "use of illicit drugs". Both of these programs were evaluated as part of the hereby considered ISDUP literature. For example, IPSY (together with Unplugged and GBG) was mentioned as an example of generic psychosocial and developmental prevention programs that can be effective and could be considered as policy and practice options in one Cochrane review focusing on alcohol use outcomes[46], while SHAHRP was noted as a program with some evidence of effect on alcohol outcomes among students in another review[40].

Additional evidence from the EUDA Best practice portal/Evidence Database

Additional literature search aiming to identify interventions was performed using the EUDA Best practice portal, Evidence Database – "This database gives you access to the latest evidence on drug-related interventions. The information is based on systematic searches is updated regularly".

The search was performed without any restrictions on the search terms, area, or substance. The first search selected only programs administered in "school" settings or targeting "families" rated as "beneficial" in relation to the desired outcomes specified as "reduction in substance use".

This search returned 5 hits[v], one of which focused on comprehensive community-based programs targeting high-risk youth based on previously excluded government report[27], one on the prevention tobacco use only[48], and three on life-skills and social influence based interventions aiming to reduce alcohol, cannabis, and any drug use. These three relevant programs were based on the two reviews, one from a 2010 evaluation of the Unplugged program[49] and one from the 2014 Cochrane review on drug prevention [36] already included in this evaluation.

The second search expanded the initial criteria to include programs rated as "likely to be beneficial". This search returned 5 hits[w], one on culturally sensitive prevention programs for substance use among adolescents of color most of which were not school-based but family-based[50], one on interactive programmes vs. non interactive ones for problematic students use of licit and illicit drugs (cited reference could not be identified), one on multi-component prevention programs for alcohol misuse in young people[18] thus considering more than school-based interventions, one on peer-led approaches based on governmental report excluded from this evaluation[51] (but possibly miscited in the Xchange portal as McGrath at al., 2006, but actually referring to the MacArthur et al., 2015 publication on peer-led interventions already evaluated

[v] https://www.euda.europa.eu/best-practice/evidence-summaries_en?title=&field_evidence_rating_target_id=1181&field_bpfs_outcome_target_id=1331&field_bpfs_area_target_id=All&field_bpfs_substance_target_id=All&field_bpfs_target_target_id=1326

[w] https://www.euda.europa.eu/best-practice/evidence-summaries_en?title=&field_evidence_rating_target_id=1182&field_bpfs_outcome_target_id=1331&field_bpfs_area_target_id=All&field_bpfs_substance_target_id=All&field_bpfs_target_target_id=1326

here), one on school-based alcohol-specific prevention programs in preventing alcohol misuse in school-aged children up to 18 years of age already considered in this evaluation[46], and one on standalone life skill-based interventions to reduce cannabis use also already considered in this evaluation[36].

The final search without any restrictions but specifying "Unplugged", "Good Behaviour Game", and "KiVa" programs by name in the first search field returned 0 hits.

Summary conclusions

The summary of evidence concerning the effectiveness and efficacy of the "teacher-delivered universal school-based social competence/social influence" interventions for children and adolescents as presented in the 2nd ISDUP edition and EUPC poses several challenges to those seeking to better understand and/or potentially implement such interventions. These are largely resulting from the discrepancy between ISDUP's specificity in definition of these school-based programs and generalization in conclusions concerning their efficacy. While such a focus on universal school based, teacher-delivered programs of a specific theoretical model might have served to simplify the decision making process by relevant actors, the enclosed evidence and corresponding conclusions in ISDUP do not accurately reflect these specific programs and in fact, may generate confusion due to the confusing terminology.

In short, similar conceptualization issues occurred in ISDUP's summary of these programs as did in the summary of *Parenting skills* vs. *Family-based programs*; that is, there was a persistent conflation of delivery settings (i.e., schools), program facilitators (i.e., teachers), and program content and theoretical orientations (i.e., social competence and social influence models) throughout the ISDUP text, summaries, and conclusions. As in the case of ISDUP's Parenting skills programs which were more appropriately described as Family-based programs, this ISDUP section is more appropriately described simply as *School-based interventions*, irrespective of their theoretical model, content, or delivery mode – which were numerous and diverse, and require a separate coverage.

This more appropriate and more relevant "school-based" framing was used in EUPC, including a useful summary table (Table 13, p. 106 in EUPC) broadly outlining structure, content, and delivery characteristics of the school-based programs associated with both positive and null effects. However, while ISDUP in its conclusions notes that "It was reported that using peers to deliver programmes, relating to all substances, was effective", this summary table for example notes that "Evidence for peer-led versus adult-led prevention programming is weak". Similarly, while ISDUP in its description of successful interventions notes that "They are delivered through a series of structured sessions (typically 10–15 sessions), taking place once a week, often providing booster sessions over multiple years." *p*. 22, this EUPC summary table in contrast notes that "Evidence for the value of 'booster' sessions in successive years is weak". Whether these discrepancies stem from the different literature (international vs. European), different coverage periods (with EUPC being more recent), or other factors, and how they are to be reconciled is unclear.

Indeed, meaningful evaluation of the ISDUP literature was challenging due to heterogeneity of programs, and similar issues were noted in the several key systematic reviews (e.g., "There was no easily discernible pattern in characteristics that would distinguish trials with positive results from those with no effects.", *p*. 3)[46] or ("The substantial heterogeneity between studies precluded the pooling of results to give summary estimates. Intervention effects were

mixed, with most programmes having a significant effect on some outcomes, but not others", *p*. 107)[44]. Complex evidence from more recent reviews appears underrepresented in ISDUP's overall conclusions, which seem to favor a couple of key reviews (from 2003 and 2013).

ISDUP's generic conclusions that these programs "can" prevent substance use during middle childhood and rather overstated conclusions that "certain programs … prevent tobacco use, alcohol use and drug use" in adolescence are again not meaningfully connected either to public health frameworks or to the prevention practice. As noted previously, conflation of basic concepts (intervention type, mode, underlying theory) throughout ISDUP text may lead to the conclusions that all school-based programs are indeed universal, teacher-delivered programs grounded on social competence/social influence models of social development. This is simply not the case, especially in more recent reviews of more recent implementations.

More importantly and similarly to the summaries of other interventions summarized in this document, readers are not provided with any quantifiable output of such interventions beyond the *"tobacco, alcohol, drug and substance use"*. The purported effects ("certain programs … prevent tobacco use, alcohol use and drug use") were not clearly described in relation to the commonly used public health indicators such as incidence, prevalence, etc., and appear to be based on selected older reviews instead of (indeed challenging) synthesis of more recent evidence. In this regard, the 2nd ISDUP edition offers no more relevant or meaningful information than would have been provided by the abstracts of the 14 relevant systematic reviews and meta-analyses (summarized here in **Table 2**) -- especially as these sources themselves were neither properly cited nor summarized in ISDUP appendices.

The question remains to what extent is such a generic summary of relevance or use to prevention practice.

Table 2: Summary of evidence presented in relation to *Personal and social skills* (middle childhood) and *Social competence and influence* (early adolescence) *programs*

Article	Type	# of primary studies	Results summary	Conclusions
1. Skara, S., & Sussman, S. (2003). A review of 25 long-term adolescent tobacco and other drug use prevention program evaluations. Preventive medicine, 37(5), 451–474. https://doi.org/10.1016/s0091-7435(03)00166-x	Review	25 long-term studies, none of which has FUP beyond 1999; multiple studies with baseline in 1970's	"The majority of these studies reported significant program effects for long-term smoking, alcohol, and marijuana outcomes, while indicating a fairly consistent magnitude of program effects."	"This review provides long-term empirical evidence of the effectiveness of social influences programs in preventing or reducing substance use for up to 15 years after completion of programming. However, this conclusion is still somewhat tenuous given the lack of significant program effects reported in several studies and the great variability that existed in the level of internal and external validity across all studies."
2. Roe, S., & Becker, J. (2005). Drug prevention with vulnerable young people: A review. Drugs: Education, Prevention and Policy, 12(2), 85–99. https://doi.org/10.1080/09687630420003226639	Systematic review	16 studies, Only 9 in schools	"Sixteen relevant studies were found that used a suitable quality of research design, involving at least a comparison group. **The most common setting for these evaluations was in schools, where life-skills training interventions showed positive results in reducing drug use (at least in the short term).** In the community an intensive multi-component intervention (the Children at Risk program) was the most effective. "	
3. West, S. L., & O'Neal, K. K. (2004). Project D.A.R.E. outcome effectiveness revisited. American journal of public health, *94*(6), 1027–1029. https://doi.org/10.2105/ajph.94.6.1027	Meta-analysis	11 studies appearing in the literature from 1991 to 2002	"The overall weighted effect size for the included D.A.R.E. studies **was extremely small** (correlation coefficient = 0.011; Cohen d = 0.023; 95% confidence interval = −0.04, 0.08) and **nonsignificant** (z = 0.73, NS)."	"Our study supports previous findings indicating that D.A.R.E. is ineffective."
4. Pan, W., & Bai, H. (2009). A multivariate approach to a meta-analytic review of the effectiveness of the D.A.R.E. program. Intl. J. of environmental research and public health, 6(1), 267–277. https://doi.org/10.3390/ijerph6010267	Meta-analysis	20 studies that assessed the effectiveness of the D.A.R.E. program in the United States	"The results showed that the **effects of the D.A.R.E. program on drug use did not vary across the studies with a less than small overall effect** while the effects on psychosocial behavior varied with still a less than small overall effect. "	

5. Jackson, C., Geddes, R., Haw, S., & Frank, J. (2012). Interventions to prevent substance use and risky sexual behaviour in young people: a systematic review. Addiction (Abingdon, England), 107(4), 733–747. https://doi.org/10.1111/j.1360-0443.2011.03751.x	Systematic review	18 experimental studies, 13 of which with strong or moderate quality rating	"**Intervention effects were mixed, with most programmes having a significant effect on some outcomes, but not others.** The most promising interventions addressed multiple domains (individual and peer, family, school and community) of risk and protective factors for risk behaviour. Programmes that addressed just one domain were generally less effective in preventing multiple risk behaviour."	"There is some, albeit limited, evidence that programmes to reduce multiple risk behaviours in school children can be effective, the most promising programmes being those that address multiple domains of influence on risk behaviour. Intervening in the mid-childhood school years may have an impact on later risk behaviour, but further research is needed to determine the effectiveness of this approach."
6. Foxcroft, D.R. and Tsertsvadze, A. (2012). Cochrane Review: Universal school-based prevention programs for alcohol misuse in young people. Evid.-Based Child Health, 7: 450-575. https://doi.org/10.1002/ebch.1829	Systematic review	53 RCT,	"53 trials were included, most of which were cluster-randomised. The reporting quality of trials was poor, only 3.8% of them reporting adequate method of randomisation and program allocation concealment. Incomplete data was adequately addressed in 23% of the trials. Due to extensive heterogeneity across interventions, populations, and outcomes, the results were summarized only qualitatively. **Six of the 11 trials evaluating alcohol-specific interventions showed some evidence of effectiveness compared to a standard curriculum. In 14 of the 39 trials evaluating generic interventions, the program interventions demonstrated significantly greater reductions in alcohol use either through a main or subgroup effect**. Gender, baseline alcohol use, and ethnicity modified the effects of interventions. Results from the remaining 3 trials with interventions targeting cannabis, alcohol, and/or tobacco were inconsistent."	"This review identified studies that showed no effects of preventive interventions, as well as studies that demonstrated statistically significant effects. **There was no easily discernible pattern in characteristics that would distinguish trials with positive results from those with no effects. Most commonly observed positive effects across programs were for drunkenness and binge drinking. Current evidence suggests that certain generic psychosocial and developmental prevention programs can be effective and could be considered as policy and practice options. These include the Life Skills Training Program, the Unplugged program, and the Good Behaviour Game**. A stronger focus of future research on intervention program content and delivery context is warranted."
7. Norberg, M. M., Kezelman, S., & Lim-Howe, N. (2013). Primary prevention of cannabis use: a systematic review of randomized	Systematic review	Twenty-eight articles, representing 25 unique studies	"Results indicated that primary prevention programs can be effective in reducing cannabis use in youth populations, with statistically significant effect sizes ranging from trivial (0.07)	"While there were studies in these areas that contradicted these results, the results highlight the importance of assessing the interdependent relationship

controlled trials. PloS one, 8(1), e53187. https://doi.org/10.1371/journal.pone.0053187			to extremely large (5.26), **with the majority of significant effect sizes being trivial to small**. **Given that the preponderance of significant effect sizes were trivial to small and that percentages of statistically significant and non-statistically significant findings were often equivalent across program type and individual components, the effectiveness of primary prevention for cannabis use should be interpreted with caution**. Universal multi-modal programs appeared to outperform other program types (i.e, universal uni-modal, targeted multi-modal, targeted unimodal). **Specifically, universal multi-modal programs that targeted early adolescents (10–13 year olds), utilised non-teacher or multiple facilitators, were short in duration (10 sessions or less), and implemented boosters sessions were associated with large median effect sizes**."	of program components and program types. **Finally, results indicated that the overall quality of included studies was poor, with an average quality rating of 4.64 out of 9.** Thus, further quality research and reporting and the development of new innovative programs are required."
8. Champion, K. E., Newton, N. C., Barrett, E. L., & Teesson, M. (2013). A systematic review of school-based alcohol and other drug prevention programs facilitated by computers or the internet. Drug and alcohol review, 32(2), 115–123. https://doi.org/10.1111/j.1465-3362.2012.00517.x	Systematic review	12 trials reflecting 10 programs	"Seven trials evaluated Internet-based programs and five delivered an intervention via CD-ROM. The interventions targeted alcohol, cannabis and tobacco. Data to calculate effect size and odds ratios were unavailable for three programs. **Of the seven programs with available data, six achieved reductions in alcohol, cannabis or tobacco use at post intervention and/or follow up. Two interventions were associated with decreased intentions to use tobacco, and two significantly increased alcohol and drug-related knowledge."**	"**Findings indicate that existing computer- and Internet-based prevention programs in schools have the potential to reduce alcohol and other drug use as well as intentions to use substances in the future.** These findings, together with the implementation advantages and high fidelity associated with new technology, suggest that programs facilitated by computers and the Internet offer a promising delivery method for school-based prevention."
9. Hale, D. R., Fitzgerald-Yau, N., & Viner, R. M. (2014). A systematic review of effective interventions for reducing multiple health risk behaviors in adolescence.	Systematic review	55 RCT of 44 interventions reporting significant reductions in 2 or more health risk behaviors (tobacco,	"We identified 44 randomized controlled trials of universal or selective interventions and were effective for multiple health risk behaviors. Most were school based, conducted in the United States, and effective for multiple forms of	

American Journal of Public Health, 104(5), e19–e41. https://doi.org/10.2105/AJPH.2014.301874		alcohol, illicit drug use, risky sexual behavior, aggression).	substance use. **Effects were small, in line with findings for other universal prevention programs.** In some studies, effects for more than 1 health risk behavior only emerged at long-term follow-up."	
10. Faggiano, F., Minozzi, S., Versino, E., & Buscemi, D. (2014). Universal school-based prevention for illicit drug use. The Cochrane database of systematic reviews, 2014(12), CD003020. https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD003020.pub3/full		51 RCT Twenty-seven studies compared 28 programmes adopting a social competence approach versus usual curricula, eight studies compared a social influence approach versus usual curricula, seven studies compared a combined approach versus usual curricula, two studies compared a programme based on knowledge only versus usual curricula, four studies compared other approaches versus usual curricula, seven studies assessed 11 different comparisons.	Following this classification, the main results of this review are as follows. • Programmes based on social competence, which aim to improve personal and interpersonal skills, are in the large majority (28 out of 51 studies). They showed a similar tendency to reduce the use of substances and the intention to use, and to improve knowledge about drugs, compared to usual curricula, but the effects were seldom statistically significant. • Programmes based on social influence, which are focused on reducing the influence of society in general on the onset of use of substances, by normative education, for example, were assessed in eight studies. In general, the results appeared weak and were rarely significant. • Programmes based on a combination of social competence and social influence approaches were assessed in seven out of 51 studies. They seemed to show, for some outcomes, better results than the other categories, with effective results in preventing marijuana use at longer-term follow-up, and in preventing any drug use. • Only two studies assessed knowledge focused interventions and they showed no differences in outcomes among intervention and controls, apart from knowledge, which appeared to be improved among participants involved in the programme.	"**School programmes based on a combination of social competence and social influence approaches showed, on average, small but consistent protective effects in preventing drug use, even if some outcomes did not show statistical significance**. Some programmes based on the social competence approach also showed protective effects for some outcomes. Since the effects of school-based programmes are small, they should form part of more comprehensive strategies for drug use prevention in order to achieve a population-level impact."

			• The other programme category is the combination of different programmes and approaches, however the differences were so great that it was not possible to consider them as an (sic.) homogeneous class."	
11. Espada, J. P., Gonzálvez, M. T., Orgilés, M., Lloret, D., & Guillén-Riquelme, A. (2015). Meta-analysis of the effectiveness of school substance abuse prevention programs in Spain. Psicothema, 27(1), 5–12. https://doi.org/10.7334/psicothema2014.106	Meta-analysis	Twenty-one studies, published on Spanish prevention programs between 2002 and 2013	"Preventive program effectiveness was low (*d*= 0.16), although it was higher at the follow-up (*d*= 0.30). The programs were most effective in changing attitudes (*d*= 0.44) towards drugs. **The models of health education (*d*= 0.48) and social learning (*d*= 0.20) were also very effective, especially in combination with oral, written, and audiovisual support material (*d*= 0.21) and the implementation of joint programs by health education professionals and faculty members (*d*= 0.25).**"	
12. Lee, N. K., Cameron, J., Battams, S., & Roche, A. (2016). What works in school-based alcohol education: A systematic review. Health Education Journal, 75(7), 780-798. https://doi.org/10.1177/0017896915612227	Systematic review	70 studies, evaluating 40 individual programs	"**Of the 40 programmes, 3 had good evidence of a positive effect. They included CLIMATE Schools (Australia), Project ALERT (USA) and All Stars (USA).** Of the others, 4 showed some evidence of positive effect, 1 had no evidence of effect, 29 were inconclusive and 2 showed negative outcomes, such as increases in alcohol use. Although many programmes were evaluated, very few had sufficient evidence to be able to endorse their widespread implementation in schools."	"**Three programmes included in the review had sufficient positive outcomes to be recommended for implementation, and four showed good outcomes in some areas.** Schools should consider these results when deciding on introducing alcohol education. Overall, **the evidence base is broad but relatively weak and further research is required,** focusing on programmes identified as having good or potentially good outcomes."
13. MacArthur, G.J., Harrison, S., Caldwell, D. M., Hickman, M., & Campbell, R. (2016). Peer-led interventions to prevent tobacco, alcohol and/or drug use among young people aged 11–21 years: a systematic review and meta-analysis. *Addiction*, 111: 391–407. doi: 10.1111/add.13224.	Systematic review and meta-analysis	17 studies, 10 of which targeted tobacco use only, 6 alcohol use, and 3 cannabis use	"Pooling of six studies representing 1699 individuals in 66 schools demonstrated that **peer-led interventions were also associated with benefit in relation to alcohol use (OR = 0.80, 95% CI = 0.65-0.99, P = 0.036), while three studies (n = 976 students in 38 schools) suggested an association with lower odds of cannabis use (OR = 0.70, 0.50-0.97, P = 0.034).**"	"**Peer interventions may be effective in preventing tobacco, alcohol and possibly cannabis use among adolescents, although the evidence base is limited overall, and is characterized mainly by small studies of low quality**."

14. Hodder, R. K., Freund, M., Wolfenden, L., Bowman, J., Nepal, S., Dray, J., Kingsland, M., Yoong, S. L., & Wiggers, J. (2017). Systematic review of universal school-based 'resilience' interventions targeting adolescent tobacco, alcohol or illicit substance use: A meta-analysis. Preventive medicine, 100, 248–268. https://doi.org/10.1016/j.ypmed.2017.04.003	Meta-analysis	Nineteen eligible studies (tobacco: n = 15, alcohol: n = 17, illicit: n = 11)	"**An overall intervention effect was found for binary measures of illicit substance use (n = 10; OR: 0.78, 95%CI: 0.6–0.93, p = 0.007,Tau^2 = 0.0, I^2 = 0%), but not tobacco or alcohol use**. A similar result was found when studies assessed as high risk of bias were excluded. "	"Overall intervention effects were evident for illicit substance use within multiple intervention characteristic subgroups, but not tobacco and alcohol. **Such results support the implementation of universal school-based interventions that address 'resilience' protective factors to reduce adolescent illicit substance use**, however suggest alternate approaches are required for tobacco and alcohol use."

ISDUP definitions:

Middle Childhood:

"**In programmes on personal and social skills, trained teachers engage children in interactive activities to give them the opportunity to learn and practice a range of personal and social skills**. These programmes are typically delivered to all children via a series of structured sessions (i.e., this is a **universal intervention**). The programmes provide opportunities to learn skills to be able to cope with difficult situations in daily life in a safe and healthy way. They support the development of general social competencies, including mental and emotional well-being. These programmes comprise mostly developmental components

Early Adolescence:

"During skills-based prevention programmes, **trained teachers engage students in interactive activities to give them the opportunity to learn and practise a range of personal and social skills (social competence).** These programmes focus on fostering substance and peer refusal abilities that allow young people to counter social pressures to use substances and in general cope with challenging life situations in a healthy way.

ISDUP conclusions:

Middle childhood:

"With regard to primary outcomes, according to these studies, **supporting the development of personal and social skills in a classroom setting can prevent tobacco, alcohol and drug use, particularly in a longer follow-up period (longer than one year). Strategies focusing only on resilience were found to be effective only in relation to drug use.**"

Early adolescence:

"With regard to primary outcomes, according to these studies, **certain programmes based on a combination of a social competence and social influence prevent tobacco use, alcohol use and drug use (preventive effects are small but consistent across studies, also in the long term (longer than 12 months).**

Programmes **targeting individual and environmental resilience-related protective factors in school settings were reported to be effective in preventing the use of drugs, but not use of tobacco or alcohol**.

Programmes based on the provision of information only, as well as the Drug Abuse Resistance Education (DARE) programme, **were reported not to be effective**.

It was reported that **using peers to deliver programmes, relating to all substances, was effective**, with the caveat that care should be taken not to use this method for high-risk groups, as there is a danger of adverse effects (e.g., an increase of substance use).

Computer-based delivery methods were generally reported to have a small effect size, for all substances."

1. Programs Addressing Individual Psychological Vulnerabilities

Evidence from the International Standards on Drug Use Prevention (ISDUP), 2nd edition

This ISDUP section summarizes indicated school-based programs that target youth with personality traits that are known precursors of substance use and substance use problems. The ultimate aim of these programs is to prevent and reduce substance use in this high-risk youth population, as defined and described in ISDUP:

> "Some personality traits, such as sensation-seeking, impulsiveness, anxiety sensitivity or feelings of hopelessness, are associated with increased risk of substance use. These indicated prevention programmes help those adolescents who are particularly at risk to deal constructively with emotions arising from their personalities instead of using negative coping strategies including hazardous and harmful alcohol use. Therefore, they consist mostly of developmental components."

A total of 5 articles addressed this type of intervention. All of them were carried over from the 1st ISDUP edition, and they reflect two closely related randomized trials[52-55] and one systematic review[56] which addressed no primary substance use outcomes. Studies addressing primary vs. secondary outcomes were appropriately differentiated in this section. No additional literature summarizing either RCT or systematic reviews addressing this type of program were identified in the 2nd edition, even though they were available by the date of publication.

Conclusions regarding the effects of these interventions were almost identical across the two ISDUP publications; however, the 1st edition offered both concrete examples of obtained effects and corresponding time frames (*italics* added), and is thus more user friendly than the non-descript summary of the 2nd edition:

> "Four acceptable randomized control trials reported findings with regard to this intervention in early adolescence and adolescence. *According to these studies, programmes addressing individual psychological vulnerabilities can lower the rates of drinking (reducing the odds by 29 per cent compared to high risk students in control schools) and binge-drinking (reducing the odds by 43 per cent) at a two-year follow-up*.
>
> One good review reported findings with regard to this intervention in middle childhood. According to this study, this type of intervention can impact the individual mediating factors affecting substance abuse later in life, such as self-control." 1st edition, *p*. 22:
>
> "No new reviews were identified in the new overview of systematic reviews. In the first edition of the *International Standards,* two randomized control trials had reported effect with regard to this intervention in early adolescence and adolescence, and one review had reported evidence with regard to this intervention in middle childhood.
>
> With regard to primary outcomes, according to these studies, programmes addressing individual psychological vulnerabilities can lower the rates of drinking and binge drinking in a two-year follow-up period. With regard to secondary outcomes, this type of intervention can impact individual mediating factors affecting substance use later in life, such as self-control.", 2nd edition, *p*. 25.

ISDUP literature overview and summary

The summary of relevant literature is as follows:

1. **Piquero (2010).**
   Refers to: **Piquero, A.R., Jennings, W.G. and Farrington, D.P. (2010)**, Self-control interventions for children under age 10 for improving self-control and delinquency and problem behaviors. Campbell Systematic Reviews, 6: 1-117. DOI: https://doi.org/10.4073/csr.2010.2

This Campbell Systematic Review performed a review and meta-analysis of 34 randomized controlled trials addressing various aspects of self-control (i.e., personal vulnerabilities) and associated behavioral problems, especially delinquency. Multiple trials were published in the 1970s and 1980s. The authors conclude that:

> "...self-control improvement programs are an effective intervention for improving self-control and reducing delinquency and problem behaviors, and that the effect of these programs appears to be rather robust across various weighting procedures, and across context, outcome source, and based on both published and unpublished data."

Because none of the evaluated studies evaluated primary substance use outcomes, this review was not considered further. However, that this review included only secondary outcomes and potentially mediators was properly acknowledged in both ISDUP editions: "With regard to secondary outcomes, this type of intervention can impact individual mediating factors affecting substance use later in life, such as self-control.", ISDUP 2nd edition, p. 25.

The remaining four reports reflect evidence from two related interventions targeting four high-risk personality profiles based on sensation seeking, impulsivity, hopelessness, and anxiety sensitivity among adolescents. All reports tested essentially identical intervention (Adventure and current PreVenture) devised by Dr. Patricia Conrod, which aimed not to alter basic personality but to provide the participants with alternative tools and skills helping them manage such trait vulnerabilities. To what extent this program reflects developmental components underscored in ISDUP definitions is not entirely clear. All trials were administered in schools either by trained facilitators, including clinicians, research staff, or trained teachers. All cited publications referred to interventions which were registered as Clinical Trials.

These articles are thus summarized together here (also in **Table 3**), in chronological order:

2. **Conrod (2008).**
   Conrod, P.J., Castellanos, N. and Mackie, C. (2008). Personality-targeted interventions delay the growth of adolescent drinking and binge drinking. Journal of Child Psychology and Psychiatry, 49: 181-190.

   Conrod (2010).
   Conrod, P. J., Castellanos-Ryan, N., & Strang, J. (2010). Brief, personality-targeted coping skills interventions and survival as a non-drug user over a 2-year period during adolescence. Archives of general psychiatry, 67(1), 85–93.

   O'Leary-Barrett, M., Mackie, C. J., Castellanos-Ryan, N., Al-Khudhairy, N., & Conrod, P. J. (2010). Personality-targeted interventions delay uptake of drinking and

decrease risk of alcohol-related problems when delivered by teachers. *Journal of the American Academy of Child and Adolescent Psychiatry*, *49*(9), 954–963.e1.

Conrod, P. J., O'Leary-Barrett, M., Newton, N., Topper, L., Castellanos-Ryan, N., Mackie, C., & Girard, A. (2013). Effectiveness of a selective, personality-targeted prevention program for adolescent alcohol use and misuse: a cluster randomized controlled trial. *JAMA psychiatry*, *70*(3), 334–342.

As noted before, all of the included RCT's reflect the same program (either Adventure or Preventure) tested in the UK secondary schools among students (13-16 olds) with at least one high-risk personality trait: sensation seeking, impulsivity, hopelessness, and anxiety sensitivity assessed via the Substance Use Risk Profile Scale (SURPS). Students with these elevated SURPS dimensions were randomly assigned into control or intervention conditions, which involved two 90-min group sessions. All sessions were administered during school hours by trained facilitators (sometimes trained teachers), with students often called from class to attend the session[52].

Three reports evaluated various alcohol use outcomes, and one evaluated drug (marijuana, cocaine, and other drugs) outcomes. The evidence from these trials showed significantly lower odds of binge drinking among students with high sensation seeking traits 6 and 12 months post intervention[54], lower drinking and binge drinking rates or lower odds of illicit drug use for high risk youth 24 months post intervention for example[52,55]. All trials appear to have been masked, but putative iatrogenic effects of high-risk youth group sessions were not addressed.

Despite the strong RCT evidence from all cited trial (all of them referenced in both editions of Standards), this type of intervention received only 2/5 starts ("adequate") rating in the 1st edition summary (Table 1, *p*. 9) and generic summary statements (i.e., "can lower the rates…") in both editions.

Evidence from The European Prevention Curriculum (EUPC)

In EUPC, prevention programs based on individual psychological vulnerabilities do not have a designated chapter in the same manner they have a designated section in ISDUP; instead, these programs were briefly mentioned as part of Chapter 6 on School-based prevention. The evidence for their efficacy was noted as "adequate" in the EUPC Table 12 summary, *p*. 101.

Additional evidence from the EUDA Best practice portal/Xchange Prevention Registry

Additional literature search aiming to identify interventions was performed using the EUDA Best practice portal, Xchange Prevention Registry -- "…an online registry of thoroughly evaluated prevention interventions".

The search was carried out without any restrictions on the age group or country, but these Individual-level risk factors were considered based on the RCT's evaluated as part of ISDUP: Sensation seeking; Hyperactivity, and Impulsiveness.

Sensation seeking: The first search selected only programs rated as "beneficial" in relation to outcomes specified as "substance use", "alcohol use", and "use of illicit drugs" by Risk factor search field set to Individual Risk factors: Sensation Seeking. This search returned 0 hits and identified no programs meeting these criteria. The second search expanded the initial criteria to include such programs rated as "possibly beneficial" in relation to outcomes specified as "substance use", "alcohol use", and "use of illicit drugs" by Risk factor search field set to Individual Risk factors: Sensation Seeking. This search also returned 0 hits and identified no programs meeting these criteria.

Hyperactivity: The first search selected only programs rated as "beneficial" in relation to outcomes specified as "substance use", "alcohol use", and "use of illicit drugs" by Risk factor search field set to Individual Risk factors: Hyperactivity. This search returned 0 hits and identified no programs meeting these criteria. The second search expanded the initial criteria to include such programs rated as "possibly beneficial" in relation to outcomes specified as "substance use", "alcohol use", and "use of illicit drugs" by Risk factor search field set to Individual Risk factors: Hyperactivity. This search returned 1 hit for "alcohol use" and "use of illicit drugs" (Functional Family Therapy, not considered further) and no hits for "substance use".

Impulsiveness: The first search selected only programs rated as "beneficial" in relation to outcomes specified as "substance use", "alcohol use", and "use of illicit drugs" by Risk factor search field set to Individual Risk factors: Impulsiveness. This search returned 0 hits and identified no programs meeting these criteria. The second search expanded the initial criteria to include such programs rated as "possibly beneficial" in relation to outcomes specified as "substance use", "alcohol use", and "use of illicit drugs" by Risk factor search field set to Individual Risk factors: Impulsiveness. This search also returned 0 hits and identified no programs meeting these criteria.

The final search without any restrictions but specifying "Preventure" in the first search field returned the link to the Preventure program[x], which was rated only as "Possibly beneficial". In contrast to only 4 publications cited in ISDUP, the Xchange registry includes 11 Preventure publications, including the two publications from a Dutch trial which was largely not successful but showed some positive effects in relation to binge drinking only. Nevertheless, is unclear why this program received such a mediocre rating, as the accompanying summaries from these 11 publications appear to meet the criteria possibly even for the highest ("Beneficial") rating in the Xchange Registry (Beneficial**:** Interventions for which convincing, consistent and sustained effects for relevant outcomes are in favour of the intervention as found in two or more studies of excellent quality in Europe.)

Additional evidence from the EUDA Best practice portal/Evidence Database

Additional literature search aiming to identify interventions was performed using the EUDA Best practice portal, Evidence Database – "This database gives you access to the latest evidence on drug-related interventions. The information is based on systematic searches is updated regularly".

The search was performed without any restrictions on the search terms, area, or substance. The first search selected only "Prevention" area programs rated as "Beneficial" targeting "young people" in relation to the desired outcomes specified as "reduction in substance use". This search returned 4 hits[y], none of which reflected personality-based interventions: one 20-years old commissioned review on comprehensive community-based programmes targeting high-risk youth[27]; one 15-years old Cochrane review of mentoring programs[57], and one more recent Cochrane review cited twice (in relation to both alcohol and tobacco use prevention)[58]. As such, these programs were not considered further.

[x] https://www.euda.europa.eu/best-practice/xchange/personality-targeted-substance-misuse-intervention-preventure_en

[y] https://www.euda.europa.eu/best-practice/evidence-summaries_en?title=&field_evidence_rating_target_id=1181&field_bpfs_outcome_target_id=1331&field_bpfs_area_target_id=1025&field_bpfs_substance_target_id=All&field_bpfs_target_target_id=1035

The second search extended these criteria to select programs rated as "Likely to be beneficial": this search returned 6 hits[z], none of which again appeared to reflect personality-based interventions[12,18,19,59-61]. High-risk or vulnerable youth were mentioned in one cited report (Interactive programmes targeting vulnerable youth, representing evaluation of 46 programs aiming to reduce substance use among the high risk American youth, and it is thus unclear why it was included in the European-based evidence document)[61], but these high-risk profiles again do not seem to have been based on the participants' personality traits.

The final search without any restrictions but specifying "Preventure" program by name in the first search field returned 0 hits.

Summary conclusions

This ISDUP section entirely focuses on RCT evidence from one program (Adventure/Preventure), and there is no corresponding EUPC section outlining these personality-based interventions.

Additional evidence from the Preventure trials predating the 2nd ISDUP edition were available, but for some reason not included; in addition to the reports from the original UK trials[62,63], there were also two RCTs conducted in the Netherlands and Australia[64,65]. Even though the 2019 review[66] of these interventions (of the Preventure trial in particular) was published subsequent to the ISDUP 2nd edition, it could have been included in the EUDA registries which are presumably regularly updated.

Although based on the same set of publications, the 1st ISDUP edition offers a more detailed summary conclusion than the 2nd one, including the specific timelines and intervention effects. Still, both editions describe only alcohol-specific findings even though there were additional effects observed for delayed initiation of marijuana, cocaine, and other drug use at the 2-year follow-up (report referenced in both ISDUP editions[55]) and more complex effects on cannabis use initiation and frequency of use (report available at the time of publication, but not referenced in ISDUP[63]).

This program received below average ratings in the 1st edition of Standards (2/5 stars, Table 1, p. 9); in the 2nd edition "programmes addressing individual psychological vulnerabilities can lower the rates of drinking and binge drinking in a two-year follow-up period", *p*. 25; and in the Xchange Registry ("Possibly beneficial"). The EUPC briefly mentions this type of program as an example of indicated school-based prevention, rating it as "adequate", *p*. 101. These ratings do not seem aligned with the quality of the presented RCT evidence.

The ISDUP summary of characteristics associated with positive outcomes of this intervention appears entirely aligned with its characteristics as described in primary sources.

Finally, personality-targeting interventions outside of Preventure were not included, for example, a set of randomized control trials[67-69] where high sensation seekers were targeted indirectly through marketing/advertisement campaigns specifically designed to capture their cognitive styles in order to reduce their drug use. These studies and their mixed effects were implicitly described in ISDUP's Media Campaigns section as part of a Campbel Review[70]. Whether such approaches would be appropriate today remains an open questions.

[z] https://www.euda.europa.eu/best-practice/evidence-summaries_en?title=&field_evidence_rating_target_id=1182&field_bpfs_outcome_target_id=1331&field_bpfs_area_target_id=1025&field_bpfs_substance_target_id=All&field_bpfs_target_target_id=1035

Table 3: Summary of evidence presented in relation to programs addressing *Individual psychological vulnerabilities*

Article	Type	Results summary	Conclusions
1. Conrod, P.J., Castellanos, N. and Mackie, C. (2008). Personality-targeted interventions delay the growth of adolescent drinking and binge drinking. Journal of Child Psychology and Psychiatry, 49: 181-190. https://doi.org/10.1111/j.1469-7610.2007.01826.x	RCT	"Multi-group analysis of a latent growth curve model showed a group difference in the growth of alcohol use between baseline and 6-months follow-up, with the control group showing a greater increase in drinking than the intervention group for this period. Interventions were particularly effective in preventing the growth of binge drinking in those students with a sensation seeking (SS) personality. SS drinkers in the intervention group were 45% and 50% less likely to binge drink at 6 (OR = .45) and 12 months (OR = .50) respectively, than SS drinkers in the control group, p = .001, phi = .49, Number Needed to Treat = 2.0."	"Considering the robust, inverse relationship between age of onset of alcohol use and later alcohol dependence, this intervention strategy may prove effective in preventing the onset of adult alcohol use disorders, by helping high-risk youth delay the growth of their drinking to a later developmental stage."
2. Conrod, P. J., Castellanos-Ryan, N., & Strang, J. (2010). Brief, personality-targeted coping skills interventions and survival as a non-drug user over a 2-year period during adolescence. Archives of general psychiatry, 67(1), 85–93. https://doi.org/10.1001/archgenpsychiatry.2009.173	RCT	"Intent-to-treat repeated-measures analyses on continuous measures of drug use revealed time × intervention effects on the number of drugs used ($P < .01$) and drug use frequency ($P < .05$), whereby the control group showed significant growth in the number of drugs used as well as more frequent drug use over the 2-year period relative to the intervention group. Survival analysis using logistic regression revealed that the intervention was associated with reduced odds of taking up the use of marijuana (β = −0.3; robust SE = 0.2; $P = .09$; odds ratio = 0.7; 95% confidence interval, 0.5-1.0), cocaine (β = −1.4; robust SE = 0.4; $P < .001$; odds ratio = 0.2; 95% confidence interval, 0.1-0.5), and other drugs (β = −0.7; robust SE = 0.3; $P = .03$; odds ratio = 0.5; 95% confidence interval, 0.3-0.9) over the 24-month period."	"This study extends the evidence that brief, personality-targeted interventions can prevent the onset and escalation of substance misuse in high-risk adolescents."
3. O'Leary-Barrett, M., Mackie, C. J., Castellanos-Ryan, N., Al-Khudhairy, N., & Conrod, P. J. (2010). Personality-targeted interventions delay uptake of drinking and decrease risk of alcohol-related problems when delivered by teachers. *Journal of the American Academy of Child and Adolescent Psychiatry*, *49*(9), 954–963.e1. https://doi.org/10.1016/j.jaac.2010.04.011	RCT	"School delivery of the personality-targeted intervention program was associated with significantly lower drinking rates in high-risk students at 6-month follow-up (odds ratio, 0.6), indicating a 40% decreased risk of alcohol consumption in the intervention group. Receiving an intervention also predicted significantly lower binge-drinking rates in students who reported alcohol use at baseline (odds ratio, 0.45), indicating a 55% decreased risk of binge-drinking in this group compared with controls. In addition, high-risk intervention-school students reported lower quantity by frequency of alcohol use (β = −.18) and drinking-related problems (β = −.15) compared with the nontreatment group at follow-up."	"This trial replicates previous studies reporting the efficacy of personality-targeted interventions and demonstrates that targeted interventions can be successfully delivered by teachers, suggesting potential for this approach as a sustainable school-based prevention model."

4. Conrod, P. J., O'Leary-Barrett, M., Newton, N., Topper, L., Castellanos-Ryan, N., Mackie, C., & Girard, A. (2013). Effectiveness of a selective, personality-targeted prevention program for adolescent alcohol use and misuse: a cluster randomized controlled trial. *JAMA psychiatry*, *70*(3), 334–342. https://doi.org/10.1001/jamapsychiatry.2013.651	RCT	"Two-part latent growth models indicated long-term effects of the intervention on drinking rates (β = −0.320, SE = 0.145, *P* = .03) and binge drinking rates (β = −0.400, SE = 0.179, *P* = .03) and growth in binge drinking (β = −0.716, SE = 0.274, *P* = .009) and problem drinking (β = −0.452, SE = 0.193, *P* = .02) for High Risk (HR) youth. The HR youth were also found to benefit from the interventions during the 24-month follow-up on drinking quantity (β = −0.098, SE = 0.047, *P* = .04), growth in drinking quantity (β = −0.176, SE = 0.073, *P* = .02), and growth in binge drinking frequency (β = −0.183, SE = 0.092, *P* = .047). Some herd effects in LR youth were observed, specifically on drinking rates (β = −0.259, SE = 0.132, *P* = .049) and growth of binge drinking (β = −0.244, SE = 0.073, *P* = .001), during the 24-month follow-up."	"Findings further support the personality-targeted approach to alcohol prevention and its effectiveness when provided by trained school staff. Particularly novel are the findings of some mild herd effects that result from this selective prevention program."

ISDUP definitions:

"Some personality traits, **such as sensation-seeking, impulsiveness, anxiety sensitivity or feelings of hopelessness, are associated with increased risk of substance use**. **These indicated prevention programmes help those adolescents who are particularly at risk to deal constructively with emotions arising from their personalities** instead of using negative coping strategies including hazardous and harmful alcohol use. Therefore, they consist mostly of developmental components."

ISDUP conclusions:

"In the first edition of the *International Standards,* two randomized control trials had reported effect with regard to this intervention in early adolescence and adolescence, and one review had reported evidence with regard to this intervention in middle childhood.

With regard to primary outcomes, according to these studies, programmes addressing individual psychological vulnerabilities can lower the rates of drinking and binge drinking in a two-year follow up period.

With regard to secondary outcomes, this type of intervention can impact individual mediating factors affecting substance use later in life, such as self-control."

3. Other Programs

Classroom environment improvement programs

Only one relevant systematic review identified in the 1st ISDUP edition; as the study did not directly address any primary outcomes (alcohol and drug use), it was not included in the current summary.

Policies to retain children in school

Only two relevant systematic reviews identified in the 1st ISDUP edition; as these studies did not directly address any primary outcomes (alcohol and drug use), they were not included in the current summary.

Addressing mental health disorders

No relevant studies were identified in either the new overview of systematic reviews or the first ISDUP edition.

School-wide programs to enhance school attachment

These programs were described as such in the 2nd ISDUP edition, *p*. 24:

"School-wide programmes to enhance school attachment support student participation, positive bonding and commitment to school. These interventions and policies are universal. They are often implemented jointly with other prevention interventions, such as skills-based education, school policies on substance use and/or supporting parenting skills and parental involvement."

Two reviews evaluated and reported findings for this intervention, but only one was new to the 2nd edition. This report was cited as Hodder et. (2017) and it was assumed to refer to:

Hodder, R. K., Freund, M., Wolfenden, L., Bowman, J., Nepal, S., Dray, J., Kingsland, M., Yoong, S. L., & Wiggers, J. (2017). Systematic review of universal school-based 'resilience' interventions targeting adolescent tobacco, alcohol or illicit substance use: A meta-analysis. Preventive medicine, 100, 248–268.

This report was included in Section 2 (Personal and Social Skills Education (Middle Childhood) and Prevention Education Based on Social Competence and Influence (Early Adolescence) of this document and will therefore not be discussed separately here.

Mentoring

These programs were described as such in the 2nd ISDUP edition, *p*. 24:

""Natural" mentoring refers to the relationships and interactions between children/ adolescents and non-family-related adults such as teachers, coaches and community leaders, and it has been found to be linked to reduced rates of substance use and violence. Mentoring programmes match young people, especially young people from marginalized situations (selective prevention), with adults, who commit to arranging activities and spending some of their free time with the young person on a regular basis."

Only one report was carried over to the 2nd edition, a 2011 Cochrane review:

Thomas, R. E., Lorenzetti, D., & Spragins, W. (2011). Mentoring adolescents to prevent drug and alcohol use. *The Cochrane database of systematic reviews*, (11), CD007381. https://doi.org/10.1002/14651858.CD007381.pub2

This report based on 4 RCTs was not further considered as it, according to the authors: “All four RCTs were in the US, and included "deprived" and mostly minority adolescents” and “No RCT reported enough detail to assess whether a strong randomisation method was used or allocation was concealed.”

General Comments and Identified Concerns

ISDUP, 2nd edition

The 2018 2nd ISDUP edition updates the 2013 1st edition, and it "describes the interventions and policies shown by scientific evidence to be efficacious or effective in preventing substance use and which could serve as the foundation of an effective health-centered national substance use prevention system", *p*. 5. This updating process is described in the 2nd edition's introductory section, yet multiple issues and questions remain:

a. The 2nd ISDUP edition, which was the primary focus of this evaluation, appears to be incomplete in terms of documentation of primary sources. All relevant appendices appear to refer only to the original 1st edition, with no edits reflecting the procedures and/or the literature added as part of the 2018 update.

The lack of relevant documentation resulted in substantial challenges in this evaluation process. This also poses significant barriers-to-access to other relevant parties, including the intended target groups of policy makers and/or practitioners.

Even though these appendices with key information -- such as the search procedures, inclusion/exclusion criteria, complete scientific citations, summaries of relevant findings, and quality/bias ratings -- were referred to throughout the Introductory section of the 2nd edition, corresponding documents were neither located on the UNODC main ISDUP sites[æ] nor provided to the research team upon request.

This caused multiple issues in this evaluation, as annotated below.

b. Both ISDUP editions appear to heavily rely on the input, recommendations, and advice from the Group of Experts.

First, the evidence included in both ISDUP editions appears to be largely based on the scientific literature nominated by the Group of Experts and on "consultations with other sources of quality scientific literature" such as the Cochrane Database or the EMCDDA Best Practice Portal. While introductory text of the 2nd edition refers to the additional "overviews" aiming to identify relevant scientific literature in the form of systematic reviews, what these procedures entailed remains unclear given the absence of relevant documentation as described above.

The main ISDUP text does not document any independent or comprehensive literature search for example, nor does it critically engage this methodology predicated upon expert-nominated sources.

How this expert-based methodology could have biased the main findings and recommendations is also not adequately addressed. For example, reliance on expert-nominated literature (vs. conducting a proper literature search) could explain the absence of some highly relevant systematic reviews and meta-analyses from the 2nd edition given their publication date, to list just a handful of selected ones:

[æ] https://www.unodc.org/unodc/en/prevention/prevention-standards-first.html
https://www.unodc.org/unodc/en/prevention/prevention-standards.html

Stockings E, Hall WD, Lynskey M, Morley KI, Reavley N, Strang J, Patton G, Degenhardt L. (2016). Prevention, early intervention, harm reduction, and treatment of substance use in young people. *Lancet Psychiatry*. 3(3):280-96. DOI: 10.1016/S2215-0366(16)00002-X

Vermeulen-Smit, E., Verdurmen, J. E., & Engels, R. C. (2015). The effectiveness of family interventions in preventing adolescent illicit drug use: A systematic review and meta-analysis of Randomized Controlled Trials. *Clinical child and family psychology review*, *18*(3), 218–239. DOI: 10.1007/s10567-015-0185-7

Das, J. K., Salam, R. A., Arshad, A., Finkelstein, Y., & Bhutta, Z. A. (2016). Interventions for adolescent substance abuse: An overview of systematic reviews. *The Journal of Adolescent Health*, *59*(4S), S61–S75. https://www.jahonline.org/article/S1054-139X(16)30167-7/fulltext

Strøm, H. K., Adolfsen, F., Fossum, S., Kaiser, S., & Martinussen, M. (2014). Effectiveness of school-based preventive interventions on adolescent alcohol use: a meta-analysis of randomized controlled trials. *Substance abuse treatment, prevention, and policy*, *9*, 48. https://doi.org/10.1186/1747-597X-9-48

Agabio, R., Trincas, G., Floris, F., Mura, G., Sancassiani, F., & Angermeyer, M. C. (2015). A systematic review of school-based alcohol and other drug prevention programs. *Clinical Practice and Epidemiology in Mental Health: CP & EMH*, *11* (Suppl 1 M6), 102–112. https://doi.org/10.2174/1745017901511010102

Van Ryzin, M. J., Roseth, C. J., Fosco, G. M., Lee, Y. K., & Chen, I. C. (2016). A component-centered meta-analysis of family-based prevention programs for adolescent substance use. *Clinical Psychology Review*, *45*, 72–80. https://doi.org/10.1016/j.cpr.2016.03.007

Emmers E, Bekkering GE, Hannes K. (2015). Prevention of alcohol and drug misuse in adolescents: An overview of systematic reviews. *Nordic Studies on Alcohol and Drugs*, 32(2):183-198. https://doi.org/10.1515/nsad-2015-0019

Onrust, S. A., Otten, R., Lammers, J., & Smit, F. (2016). School-based programmes to reduce and prevent substance use in different age groups: What works for whom? Systematic review and meta-regression analysis. *Clinical Psychology Review*, *44*, 45–59. https://doi.org/10.1016/j.cpr.2015.11.002

Teeson, M., Newton, N. C. and Barret, E. L. (2012). Australian school-based prevention programs for alcohol and other drugs: A systematic review. *Drug and Alcohol Review, 31*: 731-736. https://doi.org/10.1111/j.1465-3362.2012.00420.x

Newton, N.C., Champion, K.E., Slade, T., Chapman, C., Stapinski, L., Koning, I., Tonks, Z., and Teesson, M. (2017). A systematic review of combined student- and parent-based programs to prevent alcohol and other drug use among adolescents. *Drug and Alcohol Review*, 36: 337–351. https://doi.org/10.1111/dar.12497

Lize, S. E., Iachini, A. L., Tang, W., Tucker, J., Seay, K. D., Clone, S., DeHart, D., & Browne, T. (2017). A Meta-analysis of the effectiveness of interactive middle school cannabis prevention programs. *Prevention Science, 18*(1), 50–60. https://doi.org/10.1007/s11121-016-0723-7

MacArthur, G., Caldwell, D. M., Redmore, J., Watkins, S. H., Kipping, R., White, J., Chittleborough, C., Langford, R., Er, V., Lingam, R., Pasch, K., Gunnell, D., Hickman, M., & Campbell, R. (2018). Individual-, family-, and school-level interventions targeting multiple risk behaviours in young people. *The Cochrane database of systematic reviews*, *10*(10), CD009927. https://doi.org/10.1002/14651858.CD009927.pub2

Whether these and other potential studies were identified/considered but not included in the 2nd edition for some reason remains unknown given the aforementioned absence of relevant documentation/appendices.

Second, both ISDUP editions summarize additional intervention characteristics:

> "Under each strategy, the *International Standards* list to the extent possible the characteristics of the strategies that are associated with efficacy and/or effectiveness, or the lack thereof. These characteristics were largely identified through expert advice during the development of the first edition of the *International Standards* and have been only minimally revised, pursuant to comments by the group of experts on the first draft of this second updated edition", *p*. 7.

Again, no adequate clarifications concerning these procedures and the expert advice appear to be provided, but various WHO reports were cited in relation to these sections.

c. All primary sources included in both ISDUP editions were inadequately cited (as footnotes to the main text) only by the first/second author's name and publication year, and without full article title or (journal) source. While the 1st edition provided this information to a certain extent as part of the Appendix II Annex V, no corresponding document was identified for the 2nd edition despite its numerous mentions in the main text.

This issue markedly obstructed independent insights into evaluated literature and resulted in an arduous task of manual identification of the (presumably correct) primary sources.

Specifically, often provided were only one author's name and publication year, making the identification of primary sources literature challenging, and especially so in cases of commonly occurring last names (e.g., Allen, Lee, etc.) or multiple publications from the cited author in a given year. For example, the work cited only as Lee et al. (2016) was assumed to refer to: Lee, N. K., Cameron, J., Battams, S., & Roche, A. (2016). What works in school-based alcohol education: A systematic review. Health Education Journal, 75(7), 780-798. https://doi.org/10.1177/0017896915612227 only after a lengthy library search and deduction/elimination process.

In addition, it appears that many primary sources were cited incorrectly. For example, the work cited as Kezelman and Howe (2013) could not be identified, and it was assumed to refer to the systematic review concerning prevention of cannabis use: Norberg, M. M., Kezelman, S., & Lim-Howe, N. (2013). Primary prevention of cannabis use: a systematic review of randomized controlled trials. *PloS one*, *8*(1), e53187. https://doi.org/10.1371/journal.pone.0053187. The first author's name was not included, and the last author's name was misspelled in the ISDUP's version of citation.

These were not isolated occurrences; similar issues were rampant throughout the main document. This evaluation was based on the best guesses of such inadequate citations.

d. All systematic reviews and primary RCT studies included in the 1st ISDUP edition were summarized and rated as either good or acceptable in terms of evidence of program's efficacy/effectiveness. While the 1st edition provided this information as part of the Appendix II Annex V, no corresponding document was identified for the 2nd edition despite its mentions in the main text.

The main text of the 2nd edition notes that only studies rated to have a low risk of bias (71 studies in total, out of 392 candidate studies) were included. It was assumed that this equals to the 1st editions' "good" rating. As noted before, the document listing the studies nominated and then selected was not identified although it is described as Appendix I in the 2nd edition.

e. The updated 2nd edition presented newly added studies, as well as some studies previously included in the 1st edition. The rationale underlying the carry-over of the selected studies into the 2nd edition remains unclear and inconsistent.

For example, a total of five reviews addressing *Parenting skills programs* was noted in the ISDUP 2nd edition; the four newly added ones and one already included in the 1st edition (cited as Mejia, 2012). In comparison, the 1st edition entailed a considerably longer list of relevant studies: "Nine good reviews and four acceptable reviews reported findings with regard to this intervention"[3], *p*. 14), yet only Mejia et al. 2012 was carried over to the 2nd edition even though it did not assess any primary outcomes (i.e., substance use) in offspring and even though it received only an "acceptable" rating. In contrast, neither a 2006 Cochrane review of non-school interventions aiming to prevent drug use among young people[19], nor a 2013 systematic review of interventions aiming to improve parenting skills in low and middle-income countries[5] that was rated as "good" were carried over into the 2nd ISDUP edition.

In addition, the number of sources noted in main text often did not match the number of articles cited, possibly leading to knowledge gaps. For example, the 2nd ISDUP edition notes that "Seven reviews reported findings with regard to this intervention, four of which from the new overview". However, the relevant footnote lists six, not seven reviews (cited as Hodder et al. (2017), Salvo et al. (2012), McLellan and Perera (2013), McLellan and Perera (2015), Schröer-Günther (2011) and Skara (2003), and not three but only two reviews (Skara, 2003, and Schröer-Günther, 2011) were identified in the 1st ISDUP edition.

Such inconsistencies were not isolated incidents, but could not be meaningfully addressed due to the lack of documentation.

f. Differing inclusion criteria across the two ISDUP editions.

The 2nd edition specifically excluded:

> "…epidemiological studies discussing prevalence, incidence, vulnerabilities and resilience linked to substance use; studies regarding treatment strategies or focusing only on the prevention of the health and social consequences of drug use and drug use disorders; primary studies; reviews of reviews; and studies on the general delivery of prevention and/or prevention systems", *p*. 6.

The rationale for these exclusion criteria was not adequately addressed, especially concerning the potentially impactful reports such as the review of reviews. For example, the 1st edition included various reviews of other systematic reviews[27,51,71] but the reviews-of-reviews were specifically excluded in the 2nd edition (see above). Such criteria effectively eliminated potentially informative reports such as the reviews-of-reviews or reviews-of-meta analyses[72-76].

The 1st edition also appears to contain non-peer reviewed literature, such as commissioned/government reports[27]. Such reports were not considered as evidence in this review even when they were included in the 2nd edition.

ISDUP/EUPC

a. Lack of differentiation by the type of substance (alcohol, tobacco, other drugs).

The main ISDUP text is organized according to developmental stages, and the program/intervention type available at each stage. The summary conclusions reflecting the evidence for interventions aiming to prevent, delay, or reduce the use of legal yet controlled substances (alcohol, tobacco) and illegal substances (most often cannabis) were often lumped together, thus providing little specificity and utility to practitioners. The 1st edition often attempted to differentiate relevant evidence by substance ("The text describes what evidence is available and the findings reported in it, by substance."), *p*. 7., and it this regard was somewhat better structured.

Similar lack of differentiation is present in EUPC, despite its considerably stronger theoretical and practical framing.

b. Inconsistent reporting and rating of interventions/programs

Both the 2nd edition of Standards and the EUPC mention by name a handful of family/parenting interventions. The Strengthening Families Program (SFP), Triple P (Positive Parenting Program), and the Incredible Years were mentioned as some examples of programs addressing parenting skills in the Introductory chapter of the Standards, even though the cited literature/evidence (with the exception of SFP) hardly refers to these specific programs in relation to prevention of substance use among offspring.

Similarly, the EFFEKT, Functional Family Therapy (FFT), and Triple P (Positive Parenting Program) programs were noted as examples of promising interventions in the EUPC even though the evidence concerning their efficacy/effectiveness in preventing substance use among offspring was either rather limited (EFFEKT: https://www.euda.europa.eu/best-practice/xchange/effekt%C3%B6rebro_en; rated only as "Possibly Beneficial"[ø] with two higher rankings possible) or not reported/assessed at all according to the summaries retrieved from the Xchange Prevention Registry (FFT: https://www.euda.europa.eu/best-

[ø] **Xchange ratings**
Beneficial: Interventions for which convincing, consistent and sustained effects for relevant outcomes are in favour of the intervention as found in two or more studies of excellent quality in Europe.
Likely to be beneficial: Interventions for which convincing and consistent effects for relevant outcomes are in favour of the intervention as found in at least one evaluation study of excellent quality in Europe.
Possibly beneficial: Interventions for which some effects for relevant outcomes are in favour of the intervention as found in at least one evaluation study of acceptable quality in Europe. An intervention ranked as 'possibly beneficial' is suitable for application in the context of more rigorous evaluations.
Additional studies recommended: Interventions for which concerns about evaluation quality or consistency of outcomes in Europe make it difficult to assess if they are effective or not, even if outcomes seem to be in favour of the intervention.
Unlikely to be beneficial: Interventions for which at least one evaluation of excellent quality in Europe shows convincing evidence of no effects on relevant outcomes.
Possibly harmful: Interventions for which some effects for relevant outcomes of the intervention are considered harmful, as found in at least one evaluation study of acceptable quality in Europe. An intervention ranked as 'possibly harmful' is unsuitable for application except within a framework of other priorities and with rigorous and strictly supervised evaluations.

practice/xchange/functional-family-therapy-fft_en, Triple P: https://www.euda.europa.eu/best-practice/xchange/triple-p-positive-parenting-program-level-4_en). Similar issues occur in relation to the School-based programs highlighted as examples of evidence-based interventions in EUPC. While Unplugged's "beneficial" rating in preventing substance use is to some extent supported by the Xchange Registry evidence (https://www.euda.europa.eu/best-practice/xchange/unplugged_en), the other two programs (GBG and KiVa) do not seem to address or report substance use outcomes in any meaningful capacity in the Xchange (GBG: https://www.euda.europa.eu/best-practice/xchange/good-behaviour-game_en; KiVa: https://www.euda.europa.eu/best-practice/xchange/kiva-anti-bullying-programme-combined-universal-and-indicated-type-anti-bullying-programme-school-children_en) .

Such inconsistencies were not isolated. For example, a practitioner may be interested in using the Xchange Registry to learn what may be the best-rated program for the prevention of alcohol use (e.g., conduct the search with basic filters reflecting targeted outcome: "Alcohol use", Xchange rating: "Beneficial"). These search criteria returned the "Good Behavior Game" program as the first hit on the list, even though alcohol use outcomes were evaluated in only one (out of 11 reported studies) and with limited evidence only according to the accompanying summary: https://www.euda.europa.eu/best-practice/xchange/good-behaviour-game_en.

The EUPC document also mentions the SFP as an example of family-based interventions, while simultaneously noting the lack of evidence for its positive effects across multiple European studies. In fact, the program received "Unlikely to be Beneficial" rating (better only than the "Possibly Harmful" rating) based on the German, Swedish, Polish, and United Kingdom implementation trials: https://www.euda.europa.eu/best-practice/xchange/strengthening-families-10-14_en.

Finally and perhaps most importantly, the EUDA Best Practice Portal and its associated databases appear inconsistent in their ratings of programs' effectiveness. For example, both the Preventure and EFFEKT (a.k.a., the Örebro Prevention Program) programs received identical mediocre ("Possibly Beneficial") ratings in the Xchange Prevention registry, even though multiple Preventure trials reported statistically significant effects in relation to delaying or reducing multiple facets of substance use among adolescents (https://www.euda.europa.eu/best-practice/xchange/personality-targeted-substance-misuse-intervention-preventure_en) thus meeting the Xchange criteria even for the highest ("Beneficial") rating [c]. In contrast, the same "Possibly beneficial" rating was assigned to another program (Aktion Glasklar) based only one RCT from Germany, even though the provided summary reveals extremely limited, and possibly questionable evidence of its effectiveness[å] (https://www.euda.europa.eu/best-practice/xchange/aktion-glasklar_en).

In conclusion, the Xchange Registry ratings appear to consider only evidence supporting the intervention's effectiveness (e.g., "Beneficial" rating is assigned to "interventions for which convincing, consistent and sustained effects for relevant outcomes are in favour of the intervention as found in two or more studies of excellent quality in Europe") without weighing the number of studies with null findings.

[å] "There was a statistically significant effect favouring the intervention on alcohol-related knowledge at post-test and one-year follow-up, and self-reported life-time binge drinking at follow-up (but not at post-test). There was no effect on self-reported alcohol-related intentions, past-month alcohol use, life-time alcohol use or drunkenness at post-test or follow-up. The intervention condition had significantly more favourable attitudes towards alcohol consumption at post-test than the control condition, although this difference was not statistically significant at the follow-up (one year after pre-test)."

c. Limitations, omitted literature, critical views missing

While both documents, and especially EUPC, acknowledge various challenges, limitations, and possible biases, greater critical engagement would have been helpful. This is especially true in case of the main ISDUP methodology, largely based upon the expert-nominated literature and undefined searches of the Cochrane and Campbell databases, and unacknowledged multiple biases originally reported in primary sources/systematic reviews.

Interpretation of key evidence and conclusions in the 2nd edition could not be meaningfully interpreted without the 1st edition. For example, only in the 1st edition there appears to be a clarification: "There are cases for which "good" systematic reviews concluded that the studies available to them were few or with mixed results. This is indicated in the text by formulations such as "the intervention *might* or *can* prevent substance abuse", *p*. 6.

Multiple reports published by 2018 appear to have not been considered, and have definitely not been included in the 2nd ISDUP edition. Overall, critical views and more streamlined evaluation approaches seem lacking[2,77].

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