



# Students with and Without Relatives with Problematic Substance Use: Do They Differ in Health, Substance Use and Study Success?

Dorine M. van Namen<sup>1,2</sup> · Sander R. Hilberink<sup>1</sup> · Hein de Vries<sup>2</sup> · AnneLoes van Staa<sup>1</sup> · Gera E. Nagelhout<sup>2,3</sup>

Accepted: 9 July 2022  
© The Author(s) 2022

## Abstract

The aim of this cross-sectional study is (1) to describe the socio-demographic characteristics of students with relatives with problematic substance use and to examine differences between students with and without relatives with problematic substance use in (2) health, (3) substance use and (4) study success. We analyzed these differences in bivariate analyses between 881 (15.6%) students in a Dutch university population with relatives with problematic substance use (referred to as Affected Family Members (AFMs)) and 4,781 students without such relatives. AFMs reported poorer health and used more substances, especially cannabis, than did non-AFM students and drank more often alone than did their peers. AFMs had more frequently study delay and missed class more often because of drug use. AFMs with more than one relative with problematic substance use had poorer health than AFMs with only one relative. Effect sizes were small to moderate. Health and educational professionals should provide support to deal with difficult life circumstances, for example, trauma-informed care programs.

**Keywords** Academic Achievement · Affected Family Members; Alcohol · Drugs · Education · Problematic Substance Use

Problematic substance use impacts not only the user, but also family members such as (adult) children, siblings and partners (referred to as affected family members (AFMs)). In general, AFMs experience much stress because of their relative's problematic substance use, and domestic violence is common (Choenni et al., 2017; Cleaver et al., 2007; Orford et al., 2013). These experiences are often referred to as traumatic (Van der Kolk, 2022).

---

✉ Dorine M. van Namen  
d.vannamen@maastrichtuniversity.nl

<sup>1</sup> Research Center Innovations in Care, Rotterdam University of Applied Sciences, Rotterdam, The Netherlands

<sup>2</sup> Department of Health Promotion, CAPHRI Care and Public Health Research Institute, Maastricht University, Maastricht, The Netherlands

<sup>3</sup> IVO Research Institute, The Hague, The Netherlands

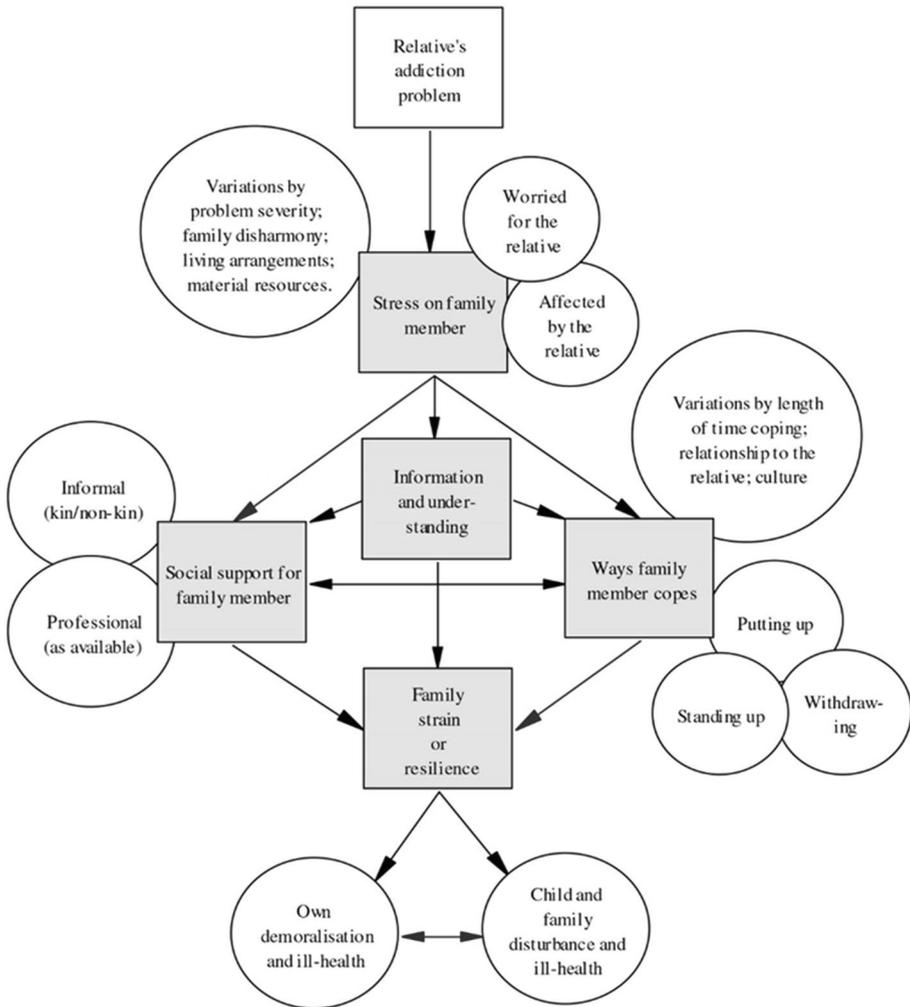
AFMs have been found to suffer from general poor health, anemia, headaches, back pain, hypertension, migraines, various mental health problems—especially depression and anxiety—and sleep and eating problems (Orford et al., 2013; Velleman & Orford, 1999; Velleman & Templeton, 2007, 2016). Children of parents with problematic substance use have a greater risk of poorer parent–child relationships (Pisinger et al., 2016), adopting parenting roles at a young age (Kelley et al., 2007; Velleman & Orford, 1999) and developing behavioral problems (Harwin et al., 2010; Kelley et al., 2010; Velleman & Templeton, 2016) than the children of parents without substance use problems.

AFMs use more addictive substances than do people without relatives with problematic substance use (Orford et al., 2013; Rossow et al., 2016). While there is a genetic component contributing to a vulnerability for addictive behavior in general, environmental factors such as parental monitoring, peer pressure or socioeconomic status also play an important role (Vink, 2016). The use of alcohol and drugs carries not only a significant risk of adverse health outcomes, but also of other adverse social outcomes such as poor academic performance (Rehm & Shield, 2021). Nevertheless, Kuppens et al. (2020) and Lowthian (2022) pointed out that limited research on educational outcomes is available.

Children and adolescents of parents with problematic substance use are at greater risk of lower school grades, attention and conduct problems at school, repeating a grade, poorer abstract planning and attention abilities, skipping school days and dropping out of school (McGrath et al., 1999; Poon et al., 2000; Romanowicz et al., 2019; Serec et al., 2012; Torvik et al., 2011). Research findings on the relationship between problematic substance use in the family and academic success in higher education (students 18 years and older) are inconsistent. Lower levels of academic achievement and verbal ability were found (Sher et al., 1991). On the other hand, there was no evidence that academic skills and metacognitive abilities (e.g., working memory, organization, planning skills) differed between AFM students and non-AFM students (Hinz, 1990; Schroeder & Kelley, 2008).

To describe and explain the experience of AFMs, Orford and colleagues designed the Stress-Strain-Information-Coping-Support-model (SSICS) (shown in Fig. 1) (Orford et al., 2013). The model assumes that having a relative with problematic substance use is very stressful, and that the subsequent strain affects the AFM's health, including substance use (Orford et al., 2005). Whatever a family member's health may have been prior to or in the absence of the development of the relative's problematic substance use, having a relative with problematic substance use is bound to put a family member's health at risk (Orford et al., 2010). The model posits that AFM's stress and strain are mediated by the positive or negative influence of coping strategies used and the extent and quality of the social and/or professional support they receive (Toner & Velleman, 2014). A basic assumption of the SSICS model is that AFMs are not powerless, but can improve their life circumstances and health. To realize improvement, good-quality social support—formal and informal—is essential (Orford et al., 2010). In this study, the focus is on the Strain-element of the SSICS-model.

Research into harm experienced by AFMs focuses mainly on female partners or on children growing up with parental alcohol problems (Harwin et al., 2010; Orford et al., 2013). The fact of having siblings with alcohol or drug problems or relatives with gambling or sex addiction has received much less attention. Most studies do not take into account whether an AFM's stress and strain have to do with having one or more relatives with addiction problems. A few studies, however, showed greater risk of strain in children from families with two parents with problematic alcohol use in comparison with children from families with one parent with problematic substance use (Hussong et al., 2008; Solis et al., 2012). Hussong and colleagues explain this greater risk by suggesting that the primary caretaker



**Fig. 1** Stress-Strain-Information-Coping-Support (SSICS) Model (Orford et al., 2013)

is affected, the familial stress load and dysfunction are heightened, and the potential protective influence of a non-affected parent is missing (Hussong et al., 2008). Compared to children from families with one parent with problematic substance use, these children are at greater risk of social competence deficits, anxiety and depression, aggression from parents and externalizing symptoms during late adolescence (Solis et al., 2012). As far as we know, the impact of having multiple relatives other than parents with problematic substance use, for example, a father and a sister or multiple siblings, has not been studied yet.

The aim of this study is therefore to describe the socio-demographic characteristics of young adult AFMs (university students), to examine differences in health, substance use and study success between AFMs with and without relatives with problematic substance use. In addition, within the AFM group, we examined differences in health, substance use and study success between AFMs having one versus multiple relatives with problematic

substance use, and between AFMs with genetic (parents, siblings) versus non-genetic relatives (stepparents, stepsiblings, partners) with problematic substance use.

## Materials and Methods

### Study Design

A cross-sectional, online questionnaire study at a University of Applied Sciences in the Netherlands.

### Respondents and Procedure

In December 2018/January 2019, an online questionnaire in Dutch language was sent by e-mail to 35,671 Dutch-speaking students of Rotterdam University of Applied Sciences (RUAS). This e-mail contained information about the aim of the study as well as the statement that participation was voluntary. To stimulate participation, reminders were sent after one week and after four weeks. Filling in the questionnaire took approximately twenty minutes. The questionnaire could be filled in anonymously. Students were free to withdraw from the study at any time point before or during filling out the questionnaire (by not answering all the questions), without giving a reason or explanation. For privacy reasons, any data that could lead back to respondents have been deleted at the end of the study.

After having consulted the RUAS Privacy Officer, the executive board of RUAS granted permission to approach all students of RUAS. The Central Committee on Research Involving Human Subjects in the Netherlands requires no ethical approval for non-medical survey research among non-patient populations.

### Variables

#### Background Characteristics

The questionnaire assessed basic demographic characteristics: gender (0=woman; 1=man), age, study program (one of the 12 faculties (0=no; 1=yes)), study year: ((1) first year, (2) second year, (3) second year with delay, (4) third year, (5) third year with delay, (6) fourth year, (7) fourth year with delay, (8) more than five years) and religion: ((1) no religion, (2) Christian, (3) Muslim, (4) Hindu, (5) other religion). For the analyses, religion was dichotomized (0=non-religious; 1=religious).

#### Independent Variable—AFM

The independent variable ‘being an AFM’ was measured with three questions: ‘Is there anyone in your family with behavioral and/or health problems due to the consumption of (1) alcohol / (2) illegal drugs / (3) painkillers and sedatives?’ Ten (multiple) answer categories were presented: (1) father; (2) mother; (3) brother; (4) sister; (5) partner; (6) stepfather; (7) stepmother; (8) stepbrother/stepsister; (9) son/daughter;

(10) someone else. Answers were categorized as 0 = no, 1 = yes. If the participant identified one or more relatives with problematic substance use, the participant was considered an AFM. To test whether the number of relatives with problematic substance use related to the outcomes of the study, a variable was constructed (1 = one; 2 = two or more). In addition, we distinguished between genetic relatives (parents, siblings) and non-genetic relatives (stepparents, stepsiblings, partners) (1 = genetic; 2 = non-genetic).

### Dependent Variables—Health

Health was assessed by five items of the Short Form Health Survey-12 (SF-12) (Ware et al., 1996). The SF-12 is designed to measure health for physical and mental domains. Translation of the SF-36 into Dutch followed the stepwise, iterative procedures developed by the IQOLA Project (Aaronson et al., 1998). The SF-12 has good psychometric properties (Gandek et al., 1998). We used five items about general physical and mental health: (a) ‘In general, would you say your physical health is...?’ and (b) ‘In general, would you say your mental health is...?’ The five answer options were (1) poor, (2) fair, (3) good, (4) very good, (5) excellent. (c) ‘During the past four weeks, how often have you felt calm and peaceful?’, (d) ‘...how often did you have a lot of energy?’ and (e) ‘...how often have you felt downhearted and blue?’ There were six answer options: (1) never, (2) rarely, (3) sometimes, (4) often, (5) mostly, (6) always.

### Dependent Variables—Substance Use

Substance use was measured with items from the Health Survey Questionnaire of Statistics Netherlands (CBS), containing three questions about tobacco, fifteen questions about alcohol and seven questions about illegal drugs use (Cannabis, Amphetamine, XTC, LSD, Mushrooms or truffles/philosophers stone, 2-CB, Salvia, DMT, Ketamine, Cocaine, Heroin, GHB, Methadone, 4-Fluoramphetamine, nitrous oxide, Other drug) (CBS, 2017). These questions assessed substance use in the past month. The use of stimulant medication (ever) was assessed by one question (Van Damme et al., 2018).

Hazardous drinking was assessed with the AUDIT-C, which is the brief three-item version of the Alcohol Use Disorders Identification Test (AUDIT), a screening instrument for measuring hazardous alcohol use among the adult population developed by the World Health Organization (Babor et al., 2001). The AUDIT has been officially translated into Dutch with the approval of the WHO (Schippers & Broekman, 2010). The questions assessed frequency of drinking, typical number of drinks consumed on a drinking day and frequency of binge drinking. Scoring of the AUDIT-C is based on a 5-point Likert scale. A range of 0–4 points is possible for each item with total scores ranging from 0 to 12 and higher scores reflecting more problematic alcohol use. Recent research showed the AUDIT-C to be a valid screening instrument for identifying students with high-risk and problematic drinking behavior, with suggested cutoff points 7 (women) and 8 (men) (Verhoog et al., 2020). We have used these cutoff points in this study (0 = no hazardous drinking; 1 = hazardous drinking).

## Dependent Variables—Contextual Factors

The context of drinking was assessed with the questions: (a) ‘How often in the past 12 months did you drink alone?’ and (b) ‘How often in the past 12 months did you drink with friends?’ These questions had five response categories: (1) never/almost never, (2) sometimes, (3) half of the time, (4) most of the time, (5) almost always/always (Van Damme et al., 2018). Only alcohol users in past month were included in the data analysis.

Alcohol and/or drug use at the university was measured with five questions from a questionnaire of the city of Rotterdam (City of Rotterdam, 2017) (0=no; 1=yes). ‘Have you during the past 4 weeks at university: (a) ...been under the influence of alcohol?’, (b) ‘...been under the influence of drugs?’, (c) ‘...had a hangover (from alcohol, soft drugs or hard drugs)?’. ‘Have you, during the past 4 weeks at university, during a break or in a free period of time, (a) ...used alcohol?’, (b) ‘...used drugs?’.

One self-designed question for AFMs was added: ‘If a relative drinks too much/uses drugs in a problematic way, do you feel safe enough to discuss this with someone at university, such as a teacher or study coach?’ Three answers were possible: (1) yes, (2) no, (3) I do feel safe to do so, but I am too ashamed to do it.

## Dependent Variables—Negative Consequences of Alcohol and Drug Use for Academic Functioning

The negative consequences of alcohol and substance use were assessed by three items selected from the Core Alcohol and Drug Survey (CADS), short form (CORE Institute, 2015): ‘How often have you experienced the following due to your drinking or drug use?’ (a) I performed poorly on a test or important project, (b) I missed class and (c) I suffered from memory loss. There were six response categories: (1) never; (2) once; (3) twice; (4) three to five times; (5) six to nine times; (6) ten times or more. We used the Dutch translation of the CADS that was prepared for the Flemish inter-university project ‘Head in the clouds’, aimed at measuring substance use among students (Van Damme et al., 2018).

## Dependent Variables—Study Success

We determined study success on the basis of the study year item. Respondents who indicated they were in the second, third or fourth study year with delay or had been studying for five or more years (which is the official cutoff point for study delay in a bachelor program in the Netherlands) were coded 0, while students with no delay were coded 1 on the variable ‘study success’. Because the study took place in the months of December and January, first-year students could by definition not be considered as possibly delayed. Delay can only be established at the end of the first study year, in July. Therefore, first year students were excluded from this parameter.

## Data Analysis

Responders were compared to the total RUAS student population regarding gender, age, study year and study program. Age and study year were tested with the one-sample t-test. Gender and study program were tested with the binomial test for proportions.

Background characteristics, health, substance use, context and consequences of substance use and study success were compared between AFMs and students without relatives

with problematic substance use. For the comparisons, we used Chi-square tests (for categorical variables) and independent samples t-tests (for continuous variables). Statistical significance was defined as a  $p$ -value  $< 0.05$ . In addition, effect sizes (Cohen's  $d$  (for means) and Cohen's  $h$  (for proportions)) were calculated. A commonly used interpretation is to refer to effect sizes as small ( $d/h=0.2$ ), moderate ( $d/h=0.5$ ), and large ( $d/h=0.8$ ) based on benchmarks suggested by Cohen (1988). Data were analyzed using IBM SPSS Statistics 28.

## Results

### Background Characteristics

A total of 5,662 students (15.9%) responded. To explore the representativity of the respondents we compared their characteristics with those of the total population of 35,671 students. Responders were more often women (55.2% vs 47.2%,  $p < 0.001$ ) and younger (mean = 21.4; SD = 3.1 vs mean = 23.2; SD = 5.6,  $p < 0.001$ ) compared to the total student population; there were some significant differences in study programs, but effect sizes were small. Responders were more successful in their study compared to the total population (82.9% vs 71.1%,  $p < 0.001$ ). Effect sizes were small to moderate (Appendix I).

Of the respondents, 881 students (15.6%) were AFMs. They were more often female (63.0% vs 53.8%,  $p < 0.001$ ) and older (mean = 21.9; SD = 3.28 vs mean = 21.3; SD = 3.07,  $p < 0.001$ ) than students without relatives with problematic substance use. There were no differences between the two groups in terms of being religious. AFMs were overrepresented in the study programs Social work (11.8% vs 6.4%,  $p < 0.001$ ), Teacher training (14.8% vs 10.8%,  $p = 0.001$ ) and Arts (6.5% vs 4.7%,  $p = 0.022$ ), and underrepresented in the study programs Management (4.8% vs 8.0%,  $p = 0.001$ ) and Built environment (7.9 vs 12.6%,  $p < 0.001$ ) (Table 1).

61.5% of the AFMs had parents, 26.2% siblings and 5.1% partners with problematic substance use; 32.5% had two relatives or more with problematic substance use. 86.3% had genetic relatives, 7.6% had non-genetic relatives, and 6.1% had both genetic and non-genetic relatives ('other relatives' not included). 26.4% had relatives using more than one substance. Relatives with problematic substance mostly used alcohol (67.9%), followed by drugs (33.5%) and painkillers or sedatives (31.4%) (Table 2).

### Health

Most respondents reported good physical (mean = 2.39; SD = 0.89) and good mental health (mean = 2.31; SD = 1.01). AFMs reported poorer health than did non-AFMs, with small to moderate effect sizes. AFMs had significantly lower physical (mean = 2.20; SD = 0.91 vs mean = 2.43; SD = 0.88,  $p < 0.001$ ,  $d = 0.26$ ), and mental health levels (mean = 1.90; SD = 1.02 vs mean = 2.38; SD = 1.00,  $p < 0.001$ ,  $d = 0.44$ ) were less calm and peaceful (mean = 2.75; SD = 1.15 vs mean = 3.19; SD = 1.06,  $p < 0.001$ ,  $d = 0.42$ ), felt more downhearted and blue (mean = 2.15; SD = 1.06 vs mean = 1.75; SD = 0.98,  $p < 0.001$ ,  $d = -0.40$ ) and less energetic (mean = 2.64; SD = 1.13 vs mean = 2.98; SD = 1.06,  $p < 0.001$ ,  $d = 0.31$ ) in comparison with non-AFMs (Table 3).

**Table 1** Sample characteristics of respondents without and with relatives with problematic substance use

Variable	Total (n = 5,662)	Students without relatives with problematic substance use (n = 4,781, 84.4%)	Affected Family Members (AFMs) (n = 881, 15.6%)	p	Effect size <sup>ab</sup>
Male (n (%))	2,534 (44.8)	2,208 (46.2)	326 (37.0)	<.001	0.19 <sup>a</sup>
Age (mean (SD))	21.4 (3.11)	21.3 (3.07)	21.9 (3.28)	<.001	-.20 <sup>b</sup>
Study year (mean (SD))	2.4 (1.21)	2.4 (1.21)	2.5 (1.22)	.010	-.10 <sup>b</sup>
Religious (yes) (n (%))	1,680 (29.7)	1,426 (29.9)	255 (28.9)	.543	0.14 <sup>a</sup>
Christian	1,181 (20.9)	1,035 (21.7)	146 (16.6)	.001	0.13 <sup>a</sup>
Muslim	308 (5.4)	249 (5.2)	59 (6.7)	.074	0.06 <sup>a</sup>
Hindu	62 (1.1)	41 (0.9)	21 (2.4)	<.001	0.12 <sup>a</sup>
Other	129 (2.3)	101 (2.1)	28 (3.2)	.052	0.07 <sup>a</sup>
Study program (n (%)):					
Communication/Multimedia/ICT	480 (8.5)	402 (8.4)	78 (8.9)	.648	0.02 <sup>a</sup>
Management	425 (7.5)	383 (8.0)	42 (4.8)	.001	0.13 <sup>a</sup>
Engineering	568 (10.0)	486 (10.2)	82 (9.3)	.449	0.03 <sup>a</sup>
Financial management	278 (4.9)	240 (5.0)	38 (4.3)	.380	0.03 <sup>a</sup>
Built environment	671 (11.9)	602 (12.6)	69 (7.9)	<.001	0.16 <sup>a</sup>
Social work	412 (7.3)	308 (6.4)	104 (11.8)	<.001	0.19 <sup>a</sup>
Healthcare	731 (12.9)	618 (12.9)	113 (12.9)	.955	0.00 <sup>a</sup>
Teacher training	644 (11.4)	514 (10.8)	130 (14.8)	.001	0.12 <sup>a</sup>
Associate degree	277 (4.9)	235 (4.9)	42 (4.8)	.863	0.01 <sup>a</sup>
Rotterdam Business School	671 (11.9)	575 (12.0)	96 (10.9)	.352	0.04 <sup>a</sup>
Port training	181 (3.2)	159 (3.3)	22 (2.5)	.203	0.05 <sup>a</sup>
Arts	280 (5.0)	223 (4.7)	57 (6.5)	.022	0.08 <sup>a</sup>
Study success (n (%))	4687 (82.9)	3,991 (83.6)	696 (79.1)	.001	0.12 <sup>a</sup>

& first year students not included

<sup>a</sup> = Cohen's *h*

<sup>b</sup> = Cohen's *d*

**Table 2** Relationship AFMs and substance use of relatives with problematic substance use ( $n = 881$ )

Variable	<i>n</i> (%)
Parents	542 (61.5)
Father	357 (40.5)
Stepfather	39 (4.4)
Mother	202 (22.9)
Stepmother	18 (2.0)
One genetic parent with problematic substance use	418 (47.4)
Two genetic parents with problematic substance use	96 (10.9)
One parent with problematic substance use (including stepparents)	427 (48.5)
Two parents with problematic substance use (including stepparents)	115 (13.1)
Siblings	231 (26.2)
Stepsiblings	10 (1.1)
One sibling (including stepsiblings)	167 (19.0)
Two or more siblings (including stepsiblings)	64 (7.3)
Partner	45 (5.1)
Child	5 (0.6)
Other relationship	194 (22.0)
Genetic relatives	636 (86.3)
Non-genetic relatives	56 (7.6)
Both genetic and non-genetic relatives	45 (6.1)
Relative uses alcohol	598 (67.9)
Relative uses drugs	295 (33.5)
Relative uses painkillers and/or sedatives	277 (31.4)
More than one relative with problematic substance use	286 (32.5)
Relative(s) using more than one substance	233 (26.4)

## Substance Use

The respondents who reported substance use in the past month, mostly used alcohol (84.9%), followed by illegal drugs (26.5%). Cannabis (75.1%) and XTC (29.7%) were the most used drugs.

AFMs were more often daily smokers (21.3% vs 12.9%,  $p < 0.001$ ,  $h = 0.22$ ), used more often illegal drugs (30.9% vs 25.7%,  $p = 0.001$ ,  $h = 0.12$ ) and stimulant medication (23.0% vs 14.1%,  $p < 0.001$ ,  $h = 0.23$ ) than non-AFMs. Cannabis was used more often (85.2% vs 72.8%,  $p < 0.001$ ,  $h = 0.31$ ) among AFMs, as was LSD (3.0% vs 0.8%,  $p < 0.001$ ,  $h = 0.17$ ); the absolute number of LSD-users was small though ( $n = 18$ ). In contrast, XTC was used more often by students without relatives with problematic substance use (31.8% vs 20.4%,  $p < 0.001$ ,  $h = 0.26$ ). Effect sizes were small. No differences in alcohol use or hazardous alcohol use were found between both groups (Table 4).

## Context and Consequences of Substance Use

AFMs drank significantly more often alone than did their peers without relatives with problematic substance use (mean = 1.52; SD = 0.44 vs mean = 1.34; SD = 0.64,  $p < 0.001$ ,  $d = -0.28$ ) while students without relatives with problematic substance use drank more

**Table 3** Health of students without and with relatives with problematic substance use

Variable Mean (SD)	Total (n = 5,662)	Students without relatives with prob- lematic substance use (n = 4781)	Affected Family Members (AFMs) (n = 881, 15.6%)	<i>t</i>	<i>p</i>	Effect size <sup>b</sup>
Physical health	2.39 (0.89)	2.43 (0.88)	2.20 (0.91)	-6.806	<.001	.26
Mental health	2.31 (1.01)	2.38 (1.00)	1.90 (1.02)	-11.775	<.001	.44
Feeling calm and peaceful	3.12 (1.08)	3.19 (1.06)	2.75 (1.15)	-10.687	<.001	.42
Feeling downhearted and blue	1.80 (1.00)	1.75 (.98)	2.15 (1.06)	10.154	<.001	-.40
Feeling energetic	2.90 (1.08)	2.98 (1.06)	2.64 (1.13)	-8.133	<.001	.31

<sup>b</sup>=Cohen's *d*

**Table 4** Substance use of students without and with relatives with problematic substance use

Variable (n(%))	Total (n = 5,662)	Students without relatives with problematic substance use (n = 4,781)	Affected Family Members (AFMs) (n = 881, 15.6%)	<i>p</i>	Effect size <sup>a</sup>
Daily smoker	804 (14.2)	616 (12.9)	188 (21.3)	< .001	0.22 <sup>a</sup>
Alcohol past month	4,807 (84.9)	4,064 (85.0)	743 (84.3)	.611	0.019 <sup>a</sup>
AUDIT-C <sup>&amp;</sup>	1,272 (26.7)	1,094 (27.1)	178 (24.3)	.105	0.06 <sup>a</sup>
Drug use past month	1,501 (26.5)	1,229 (25.7)	272 (30.9)	.001	0.12 <sup>a</sup>
Cannabis <sup>#</sup>	1,121 (75.1)	890 (72.8)	231 (85.2)	< .001	0.31 <sup>a</sup>
XTC/MDMA <sup>#</sup>	440 (29.7)	385 (31.8)	55 (20.4)	< .001	0.26 <sup>a</sup>
Nitrous oxide <sup>#</sup>	350 (23.7)	293 (24.3)	57 (21.1)	.272	0.08 <sup>a</sup>
Cocaine <sup>#</sup>	255 (17.4)	206 (17.2)	49 (18.3)	.671	0.03 <sup>a</sup>
Amphetamines <sup>#</sup>	208 (14.2)	171 (14.3)	37 (13.7)	.797	0.02 <sup>a</sup>
Ketamine <sup>#</sup>	159 (10.9)	127 (10.7)	32 (12.0)	.528	0.04 <sup>a</sup>
Paddo's <sup>#</sup>	54 (3.7)	46 (3.9)	8 (3.0)	.495	0.05 <sup>a</sup>
4-FA <sup>#</sup>	48 (3.3)	43 (3.6)	5 (1.9)	.147	0.11 <sup>a</sup>
2C-B <sup>#</sup>	48 (3.3)	36 (3.0)	12 (4.4)	.230	0.07 <sup>a</sup>
GHB <sup>#</sup>	34 (2.3)	30 (2.5)	4 (1.5)	.317	0.07 <sup>a</sup>
LSD <sup>#</sup>	18 (1.2)	10 (0.8)	8 (3.0)	< .001	0.17 <sup>a</sup>
DMT <sup>#</sup>	8 (0.5)	6 (0.5)	2 (0.7)	.629	0.03 <sup>a</sup>
Polydrug use <sup>#</sup>	625 (41.6)	514 (41.8)	111 (40.8)	.759	0.02 <sup>a</sup>
Stimulant medication	874 (15.5)	672 (14.1)	202 (23.0)	< .001	0.23 <sup>a</sup>

<sup>&</sup> only alcohol consumers past month included; <sup>#</sup> only drug consumers past month included

<sup>a</sup> = Cohen's *h*

often with friends (mean = 4.10; SD = 1.14 vs mean = 3.87; SD = 1.24,  $p < 0.001$ ,  $d = 0.19$ ). There were no differences between AFMs and students without relatives with problematic substance use regarding substance use at the university and being under the influence of alcohol and/or drugs or being hungover while at university. Because of drug use, AFMs missed class more often than did students without relatives with problematic substance use (mean = 1.87; SD = 1.47 vs mean = 1.67; SD = 1.31,  $p = 0.44$ ,  $d = -0.15$ ). Only substance users in the past month were included. Effect sizes were small (Table 5).

## Study Success

82.9% of all respondents (first year students not included) had no study delay. Students without relatives with problematic substance use had more study success than AFMs (83.6% vs 79.1%,  $p = 0.001$ ,  $h = 0.12$ ). The effect size was small (Table 1). Almost half of AFMs (45.2%) felt unsafe or too ashamed to disclose at the university having relatives with problematic substance use (Table 5).

**Table 5** Context and consequences of drinking and drug use of students without and with relatives with problematic substance use in relation to study

Variable	Total (n = 5,662)	Students without relatives with problematic substance use (n = 4,781)	Students with relatives with prob- lematic substance use (n = 881)	t	p	Effect size <sup>ab</sup>
Drinking alone (Mean (SD)) <sup>&amp;</sup>	1.37 (0.68)	1.34 (0.64)	1.52 (0.44)	-4.571	<.001	-.28 <sup>b</sup>
Drinking with friends (Mean (SD)) <sup>&amp;</sup>	4.06 (1.16)	4.10 (1.14)	3.87 (1.24)	3.660	<.001	.19 <sup>b</sup>
During the past 4 weeks, have you, at the university, been... (Mean (SD))						
under the influence of alcohol? <sup>&amp;</sup>	1.93 (0.25)	1.93 (0.25)	1.94 (0.24)	-.646	.518	-.032 <sup>b</sup>
under the influence of drugs? <sup>#</sup>	1.88 (0.32)	1.89 (0.32)	1.86 (0.35)	1.338	.182	-.10 <sup>b</sup>
hangover (by alcohol and/or drugs) <sup>&amp;</sup>	1.82 (0.38)	1.82 (0.38)	1.82 (0.38)	-.016	.987	-.001 <sup>b</sup>
During the last 4 weeks, have you spent any time at university, e.g., during a break...						
(n (%))	147 (4.7)	132 (4.9)	15 (3.2)		.100	0.09 <sup>a</sup>
using alcohol? <sup>&amp;</sup>	133 (9.0)	101 (8.3)	32 (11.9)		.065	0.12 <sup>a</sup>
using drugs? <sup>#</sup>						
Have you ever experienced any of the following negative consequences of alcohol/drug use?						
(Mean (SD))						
I did badly on a test or in a project (alcohol) <sup>&amp;</sup>	1.50 (1.02)	1.49 (1.00)	1.57 (1.13)	-1.36	.174	-.07 <sup>b</sup>
I missed class (alcohol) <sup>&amp;</sup>	2.13 (1.60)	2.12 (1.59)	2.17 (1.62)	-.69	.491	-.03 <sup>b</sup>
I suffered from memory loss (alcohol) <sup>&amp;</sup>	2.61 (1.74)	2.60 (1.73)	2.67 (1.75)	-9.12	.362	-.05 <sup>b</sup>
I did badly on a test or in a project (drugs) <sup>#</sup>	1.38 (0.91)	1.35 (0.87)	1.48 (1.07)	-1.871	.062	-.14 <sup>b</sup>
I missed class (drugs) <sup>#</sup>	1.71 (1.35)	1.67 (1.31)	1.87 (1.47)	-2.022	.044	-.15 <sup>b</sup>
I suffered from memory loss (drugs) <sup>#</sup>	1.89 (1.48)	1.87 (1.46)	2.01 (1.56)	-1.500	.134	-.10 <sup>b</sup>
Not feeling safe, or being ashamed to discuss the substance use of a relative at university (n(%))			398 (45.2)			

<sup>&</sup> only alcohol consumers past month included

<sup>#</sup> only drug consumers past month included

<sup>a</sup> = Cohen's h

<sup>b</sup> = Cohen's d

## AFMs with More than One Relative with Problematic Substance Use

Students with more than one relative with problematic substance use had significantly worse physical (mean=2.10; SD=0.87 vs mean=2.25; SD=0.92,  $p=0.023$ ,  $d=0.16$ ) and mental health (mean=1.78; SD=0.99 vs mean=2.01; SD=1.02,  $p=0.003$ ,  $d=0.22$ ), felt less calm and peaceful (mean=2.53; SD=1.18 vs mean=2.86; SD=1.11,  $p<0.001$ ,  $d=0.29$ ), and were more likely to be downhearted and blue (mean=2.33; SD=1.05 vs mean=2.06; SD=1.06,  $p<0.001$ ,  $d=-0.26$ ) than were students with one relative with problematic substance use. Effect sizes were small (Table 6). There were no differences in substance use and study success between AFMs with one or with more than one relative with problematic substance use.

## AFMs with Genetic Relatives vs Non-genetic Relatives

There were no differences in health, substance use and study success between AFMs with only genetic relatives (parents, siblings) with problematic substance use and AFMs with only steprelatives and/or partners.

## Discussion

Our study aimed to describe the socio-demographic characteristics of students with relatives with problematic substance use and to examine differences in health, substance use and study success between students with and without relatives with problematic substance use. In addition, within the AFM group, we examined differences between AFMs with one vs multiple relatives with problematic substance use and AFMs with genetic vs non-genetic relatives with problematic substance use on the outcomes health, substance use and study success.

First, we found that 15.6% of the respondents had relatives with problematic substance use. Previously reported proportions of AFMs vary greatly. While some studies found that 3–6% children under the age of 18 years were AFMs (Berg et al., 2016), other studies found greater proportions, ranging from 10% (Berndt et al., 2017) to approximately 26–29% (Casswell et al., 2011; Schroeder & Kelley, 2008) or even 36% (Wamamili et al., 2022). Although these figures concerned different countries and different age groups, the proportion of 15.6% we found in the current study is large enough to stress the urgency to intervene for this group. Additionally, it is notable that significantly more students of the programs Social work, Teacher training and Arts had relatives with problematic substance use than had students of other study programs. A possible explanation is that a career choice in the helping

**Table 6** Health between students with one or more relatives with problematic substance use

Variable (Mean (SD))	One relative (n=595)	More than one relative (n=286)	<i>t</i>	<i>p</i>	Effect size <sup>b</sup>
Physical health	2.25 (0.92)	2.10 (0.87)	-2.281	.023	.16 <sup>b</sup>
Mental health	2.01 (1.02)	1.78 (0.99)	-3.005	.003	.22 <sup>b</sup>
Feeling calm and peaceful	2.86 (1.11)	2.53 (1.18)	-4.017	<.001	.29 <sup>b</sup>
Feeling downhearted and blue	2.06 (1.06)	2.33 (1.05)	3.631	<.001	-.26 <sup>b</sup>
Feeling energetic	2.66 (1.09)	2.59 (1.22)	-.858	.391	.06 <sup>b</sup>

<sup>b</sup>=Cohen's *d*

professions, such as psychology, nursing, counseling, social work, human services and education, is known to be associated with family of origin dysfunction, parentification and childhood adversity (Bryce et al., 2021; Thomas, 2016). Especially in these study programs, it is important to be aware that students may have a family history of problematic substance use.

We used the SSICS-model to describe and explain the experiences of AFMs, focusing on the Strain-element. Strains on the AFMs' health, substance use and study success were identified. AFMs scored lower on these outcome measures than students without relatives with problematic substance use. AFMs had poorer physical and mental health, were more often daily smokers, used more often illegal drugs and stimulant medication and had less study success than their peers who did not have relatives with problematic substance use. Effect sizes were small to moderate. Still, Thompson (2007) emphasized that effect size values are arbitrary and should not be interpreted rigidly, as the cumulative impacts of small changes over time may be huge, even when the initial impacts seem small.

That AFM university students are more likely to have health problems such as depression and anxiety and use more substances themselves has been described previously (Braitman et al., 2009; Kelley et al., 2011). The fact that in the current study being an AFM was not associated with the amount of alcohol consumed may reflect that the vast majority of the total sample were drinkers (84.9% past month). The same lack of differences in alcohol consumption has been found before among students from the USA (Braitman et al., 2009).

Concerning study success, AFMs had less study success and missed class more often under the influence of drugs than students without relative(s) with problematic substance use. Here also effect sizes were small to moderate. Studies that have examined the association between psychosocial problems and academic delay and dropout are scarce (Dopmeijer et al., 2021; Lowthian, 2022). In the graphical display of the SSICS-model (Figure 1), the element Strain focuses on health. The Strain-component in the diagram needs amending to show effects on education too.

In this study, we also found results on the Coping and Support-elements of the SSICS-model. AFMs drank alone significantly more frequently than students without relatives with problematic substance use. The effect size was small. Solitary drinking is linked to coping with negative emotions (Chalder et al., 2006; Creswell, 2021). The increased use of cannabis by AFMs may indicate a similar pattern. Heavy cannabis use has been frequently associated with increased rates of mental illness and cognitive impairment. Adolescence is a period of particular risk, with exposure to cannabis during this stage of development potentially resulting in more severe and persistent adverse effects than exposure during adulthood (Lubman et al., 2015). Moreover, almost half of the AFMs of this study felt unsafe or too ashamed to disclose at university the problematic substance use in their family, which prevents them from seeking support. Making the experiences of AFMs discussable could help them find support. AFMs' degree of willingness to disclose or not disclose the family situation has not been described before.

Lastly, almost one third (32.5%) of the AFMs had more than one relative with problematic substance use. This group had poorer health than AFMs with only one relative. The effect size was small. There were no differences in substance use and study success between AFMs with one or more than one relative with problematic substance use. There were also no differences in health, substance use and study success between AFMs with only genetic relatives with problematic substance use and AFMs with non-genetic relatives (steprelatives and/or partners). This is in line with recent research which shows that severe psychological suffering—such as depression—is caused only to a limited extent by genetic variants (Marsman et al., 2020). Environmental factors play a much larger role. In particular, social frustration and childhood trauma increase the risk of severe psychological suffering (Marsman et al., 2020).

Further research should establish if and how the observed differences in AFMs health, substance use and academic performance may be related to each other. AFM-status may impact individual substance use, which in turn impacts the individual's health and academic performance. It is also possible that AFM-status influences health and thereby academic performance, independent of individual substance use status. This assumption is illustrated by the fact that prenatal substance use (including smoking) by the mother is associated with a higher prevalence of childhood Attention Deficit Hyperactivity Disorder (ADHD), and that a history of childhood ADHD is associated with educational problems (Ingavale & Suman, 2012; Knopik et al., 2009). AFMs in our sample used more stimulant medication, such as Ritalin, than did students without relatives with problematic substance use, suggesting that the prevalence of ADHD might be higher among AFMs. Prenatal alcohol exposure, too, can lead to poor academic performance (Howell et al., 2006). Also, more research is needed to determine which AFMs are at greater risk of health damage or study problems than others, so that preventive interventions can be more targeted. For example, shared living with relatives with problematic substance use may impact the observed associations.

### Strengths and Limitations

The overall response percentage was 15.9%, which is comparable with the response rates of other all-sample studies of Universities of Applied Sciences in the Netherlands (Dopmeijer, 2021). Although the response rate was low, our study included a large sample of young adults with relatives with problematic substance use. The sample was heterogeneous in terms of type of relationship with the relative, type of substance use of the relative, number of relatives with problematic substance use, gender and religion of the student. Research on the impact of having relatives with substance use problems on educational outcomes is limited. This study adds knowledge on this point. Most research on AFM focused on partner relationships or on children of parents with problematic substance use. This study involves relatives in their entirety. Siblings, stepparents, stepbrothers and -sisters are also represented in the sample. About one in five AFMs had also reported 'other relationships' when asked about their relationship with relatives with problematic substance use. It is not clear whether these other relationships are relatives or friends/classmates/colleagues. We did include respondents who also mentioned 'other relationships' in our analyses. It is recommended that these relationships be specifically questioned in future research.

The cross-sectional nature of the data is a limitation of this study. Observed differences cannot be interpreted causally. Also, only problems with substance use were asked, not gambling or sex addiction of relatives. The impact of these problems on AFMs has been relatively neglected and is at least as great as that of problematic substance use (Orford et al., 2017; Schneider et al., 2012). Qualitative research among the same population as in the current study shows that these types of addiction of relatives are also present (Van Namen et al., submitted for publication). It appeared that respondents in the present study were more successful in their studies compared to the total RUAS student population. However, the two data sources are not entirely comparable. RUAS defines study success as having obtained a bachelor's degree within five years. In this study, study success was surveyed per academic year, which implies that study success might be underestimated. Other limitations involve the fact that some validated questionnaires were shortened or modified to optimize study participation, and that some questions were self-designed and had not been pre-tested or validated. And finally, the present study focused on the Strain-element of the SSICS-model (strain on health, substance use and study), but also found components of the elements

Coping and Support. We did not assess the Stress component of the SSCS-model; thus, the analyses failed to explore how different kinds of stress influence Strain, Coping and Support.

## Recommendations

Although family members with problematic substance use constitute a large group, they remain largely unknown (Orford et al., 2013). Almost half of AFMs in our study felt unsafe or too ashamed to disclose at the university having relatives with problematic substance use. Because of the size of this group and the risks they are exposed to (both in terms of health and substance use and in terms of less study success), special attention for AFMs in higher education is needed. Creating awareness among the staff of universities about the relatively high prevalence and these young adults' emotional, physical and social burden might help prevent ill health, study delay or even school dropout.

Education and health professionals should provide and support coping strategies to deal with difficult life circumstances for students with relatives with problematic substance use. For example, by using trauma-informed care programs. These programs include acknowledging the prevalence of trauma, recognizing the impact of these experiences on individuals, utilizing trauma-sensitive practices and policies and avoiding practices that may retraumatize (SAMHSA, 2014). Trauma-informed approaches in schools and universities are growing rapidly, especially in the USA. However, these initiatives are poorly documented and evaluated, and not evidence based (Maynard et al., 2019; Thomas et al., 2019). Therefore, we recommend that colleges and universities, through co-creation with AFMs, build knowledge, train team and staff, conduct small-scale trauma-informed interventions and properly document and evaluate these. Colleges and universities are pre-eminently the place to do this because educational professionals are confronted with the impact of trauma on the lives of students on an almost daily basis. The obvious place to start is in study programmes where AFMs are over-represented, such as Social work, Teacher training and Arts. Furthermore, it is recommended that universities are sensitive to the presence of trauma by conducting exit interviews, which is not standard procedure. During these interviews, students should be referred to support if adverse life experiences indeed appear to relate to study delay or school dropout.

Finally, more qualitative research is needed into the effects of relatives' addiction problems, including gambling, on young adults' study success. Qualitative research could provide in-depth insights into AFMs' experiences that hamper or stimulate study success, the kind of support they received or did not receive from teachers and study coaches, and how disclosure about their experiences could be stimulated.

## Conclusions

We used the SSICS-model to describe and explain the experiences of AFMs, focusing on the Strain-element. Strains on the AFMs' health, substance use and study success were identified. AFMs reported poorer physical and mental health, were more often daily smokers and used more often stimulant medication and illegal drugs than students without relatives with problematic substance use. AFMs had less study success and experienced more negative effects of their drug use on academic functioning, such as missing class, than their peers without relatives with problematic substance use. AFMs with more than one relative

with problematic substance use had poorer health than AFMs with only one relative. We also found components of the elements Coping and Support of the SSICS-model. Drinking alone and more use of cannabis show a pattern of AFMs using unhealthy coping strategies to deal with negative emotions. Almost half of the AFMs of this study felt unsafe or too ashamed to disclose at university the problematic substance use in their family, which prevents them from seeking support. Professionals in education should provide support, for example, by trauma-informed care programs.

## Data Availability

Raw data were generated at Rotterdam University of Applied Sciences, in Rotterdam, the Netherlands. Derived data supporting the findings of this study are available from the corresponding author on request.

## Appendix

**Table 7** Non-response analysis: background characteristics of the total student population compared with respondents

	Total student population RUAS(n=35,671)*	Respondents (n=5,662, 15.9%)*	<i>p</i>	Effect size <sup>ab</sup>
Male (n (%))	18,857 (52.8)	2,534 (44.8)	<.001	0.16 <sup>a</sup>
Age (mean (SD))	23.2 (5.6)	21.4 (3.1)	<.001	0.40 <sup>b</sup>
Study year (mean (SD))	3.0 (2.2)	2.4 (1.2)	<.001	0.34 <sup>b</sup>
Study success <sup>&amp;</sup> (%):	71.1 <sup>#</sup>	82.9	<.001	0.28 <sup>a</sup>
Study program (n (%)):				
Communication, Multimedia, ICT	2,685 (7.5)	480 (8.5)	.003	0.04 <sup>a</sup>
Management	3,327 (9.3)	425 (7.5)	<.001	0.07 <sup>a</sup>
Engineering	2,831 (7.9)	568 (10.0)	<.001	0.07 <sup>a</sup>
Financial management	2,321 (6.5)	278 (4.9)	<.001	0.07 <sup>a</sup>
Built environment	3,690 (10.3)	671 (11.9)	<.001	0.05 <sup>a</sup>
Social work	2,847 (8.0)	412 (7.3)	.024	0.03 <sup>a</sup>
Health	3,874 (10.9)	731 (12.9)	<.001	0.06 <sup>a</sup>
Teacher training	3,864 (10.8)	644 (11.4)	<.001	0.02 <sup>a</sup>
Two-year college	2,629 (7.4)	277 (4.9)	<.001	0.10 <sup>a</sup>
Rotterdam Business School	4,878 (13.7)	671 (11.9)	<.001	0.05 <sup>a</sup>
Rotterdam Mainport Institute	955 (2.7)	181 (3.2)	.013	0.06 <sup>a</sup>
Arts	1,827 (5.0)	280 (5.0)	.450	0.00 <sup>a</sup>
Master	n.a.	36 (0.6)	-	-

\*Non-Dutch speaking students not included, & first year students not included, # studied 5 years or longer, drop-outs not included

n.a.: not available

<sup>a</sup> = Cohen's *h*

<sup>b</sup> = Cohen's *d*

## Declarations

**Conflict of Interest** The authors Dorine M. van Namen, MSc, Sander R. Hilberink, Ph.D., Hein de Vries, Ph.D., AnneLoes van Staa, Ph.D. MD RN, and Gera E. Nagelhout, Ph.D., declare that they have no conflict of interest.

**Open Access** This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>.

## References

- Aaronson, N. K., Muller, M., Cohen, P. D. A., Essink-Bot, M. L., Fekkes, M., Sanderman, R., Sprangers, M. A. G., Te Velde, A., & Verrips, E. (1998). Translation, validation, and norming of the Dutch language version of the SF-36 Health Survey in community and chronic disease populations. *Journal of Clinical Epidemiology*, *51*(11), 1055–1068. [https://doi.org/10.1016/S0895-4356\(98\)00097-3](https://doi.org/10.1016/S0895-4356(98)00097-3)
- Babor, T. F., Higgins-Biddle, J. C., Saunders, J. B., & Monteiro, M. G. (2001). *AUDIT: the Alcohol Use Disorders Identification Test: guidelines for use in primary health care, 2nd ed.*
- Berg, L., Bäck, K., Vinnerljung, B., & Hjern, A. (2016). Parental alcohol-related disorders and school performance in 16-year-olds—a Swedish national cohort study. *Addiction (abingdon, England)*, *111*(10), 1795–1803. <https://doi.org/10.1111/add.13454>
- Berndt, J., Bischof, A., Besser, B., Rumpf, H.-J., & Bischof, G. (2017). *Abschlussbericht Belastungen und Perspektiven Angehöriger Suchtkranker: ein multi-modaler Ansatz (BEPAS)*.
- Braitman, A. L., Kelley, M. L., Ladage, J., Schroeder, V., Gumienny, L. A., Morrow, J. A., & Klostermann, K. (2009). Alcohol and drug use among college student adult children of alcoholics. *Journal of Alcohol and Drug Education*, *53*(1), 69–88.
- Bryce, I., Pye, D., Beccaria, G., McIlveen, P., & Du Preez, J. (2021). A Systematic Literature Review of the Career Choice of Helping Professionals Who Have Experienced Cumulative Harm as a Result of Adverse Childhood Experiences. *Trauma, Violence, and Abuse*. <https://doi.org/10.1177/15248380211016016>
- Casswell, S., You, R. Q., & Huckle, T. (2011). Alcohol's harm to others: Reduced wellbeing and health status for those with heavy drinkers in their lives. *Addiction*, *106*(6), 1087–1094. <https://doi.org/10.1111/j.1360-0443.2011.03361.x>
- CBS. (2017). *Gezondheidsenquête (Health Survey) 2018*. <https://www.cbs.nl/nl-nl/onze-diensten/methoden/onderzoeksomschrijvingen/aanvullendeonderzoeksbeschrijvingen/vragenlijsten-gezondheidsenquête-vanaf-2014>
- Chalder, M., Elgar, F. J., & Bennett, P. (2006). Drinking and motivations to drink among adolescent children of parents with alcohol problems. *Alcohol and Alcoholism*, *41*(1), 107–113. <https://doi.org/10.1093/alcal/agh215>
- Choenni, V., Hammink, A., & van de Mheen, D. (2017). Association Between Substance Use and the Perpetration of Family Violence in Industrialized Countries: A Systematic Review. *Trauma, Violence, and Abuse*, *18*(1), 37–50. <https://doi.org/10.1177/1524838015589253>
- City of Rotterdam. (2017). *Vragenlijst Drugs- en alcoholgebruik (Survey Drugs and alcohol use)*.
- Cleaver, H., Nicholson, D., Tarr, S., & Cleaver, D. (2007). *Child protection, domestic violence and parental substance misuse: Family experiences and effective practice*. Jessica Kingsley Publishers.
- CORE Institute. (2015). *Alcohol and Drug Surveys 2015*.
- Creswell, K. G. (2021). Drinking Together and Drinking Alone: A Social-Contextual Framework for Examining Risk for Alcohol Use Disorder. *Current Directions in Psychological Science*, *30*(1), 19–25. <https://doi.org/10.1177/0963721420969406>
- Dopmeijer, J. M., Zondervan-Zwijenburg, M. A. J., Peeters, M., Visscher, T. L. S., Bovens, R. H. L. M., De Jonge, J. M., & Wiers, R. W. (2021). Predicting the risk of academic delay and dropout for students in

- higher education based on personality profiles and psychosocial problems. In *Running on empty The impact of challenging student life on wellbeing and academic performance* (pp. 62–85). University of Amsterdam.
- Dopmeijer, J. M. (2021). *Running on empty The impact of challenging student life on wellbeing and academic performance*. University of Amsterdam.
- Gandek, B., Ware, J. E., Aaronson, N. K., Apolone, G., Bjorner, J. B., Brazier, J. E., Bullinger, M., Kaasa, S., Lepage, A., Prieto, L., & Sullivan, M. (1998). Cross-validation of item selection and scoring for the SF-12 Health Survey in nine countries: Results from the IQOLA Project. *Journal of Clinical Epidemiology*, *51*(11), 1171–1178. [https://doi.org/10.1016/S0895-4356\(98\)00109-7](https://doi.org/10.1016/S0895-4356(98)00109-7)
- Grant, B., Saha, T., Ruan, W., Goldstein, R., Chou, S., Jung, J., Zhang, H., Smith, S., Pickering, R., Huang, B., & Hasin, D. (2016). Epidemiology of DSM-5 Drug Use Disorder: Results From the National Epidemiologic Survey on Alcohol and Related Conditions-III. *JAMA Psychiatry*, *73*(1), 39–47.
- Harwin, J., Madge, N., & Heath, S. (2010). *Children affected by Parental Alcohol Problems (ChAPAPs)*.
- Hinz, L. D. (1990). College student adult children of alcoholics: Psychological resilience or emotional distance? *Journal of Substance Abuse*, *2*(4), 449–457. [https://doi.org/10.1016/S0899-3289\(12\)80005-8](https://doi.org/10.1016/S0899-3289(12)80005-8)
- Howell, K. K., Lynch, M. E., Platzman, K. A., Smith, G. H., & Coles, C. D. (2006). Prenatal alcohol exposure and ability, academic achievement, and school functioning in adolescence: A longitudinal follow-up. *Journal of Pediatric Psychology*, *31*(1), 116–126. <https://doi.org/10.1093/jpepsy/jsj029>
- Hussong, A. M., Flora, D. B., Curran, P. J., Chassin, L. A., & Zucker, R. A. (2008). Defining Risk Heterogeneity for Internalizing Symptoms among Children of Alcoholic Parents. *Development and Psychopathology*, *20*(1), 165–193. <https://doi.org/10.1017/S0954579408000084>
- Ingavale, A., & Suman, L. N. (2012). Psychological problems among college students: Relationship with ADHD and parental alcoholism. *Indian Journal of Clinical Psychology*, *39*(2), 103–109.
- Kelley, M., French, A., Bountress, K., Keefe, H., Schroeder, V., Steer, K., Fals-Stewart, W., & Gumienny, L. (2007). Parentification and family responsibility in the family of origin of adult children of alcoholics. *Addictive Behaviors*, *32*(4), 675–685. <https://doi.org/10.1016/j.addbeh.2006.06.010>
- Kelley, M., Braitman, A., Henson, J., Schroeder, V., Ladage, J., & Gumienny, L. (2010). Relationships among depressive mood symptoms and parent and peer relations in collegiate children of alcoholics. *American Journal of Orthopsychiatry*, *80*(2), 204–212. <https://doi.org/10.1111/j.1939-0025.2010.01024.x>
- Kelley, M. L., Pearson, M. R., Trinh, S., Klostermann, K., & Krakowski, K. (2011). Maternal and paternal alcoholism and depressive mood in college students: Parental relationships as mediators of ACOA-depressive mood link. *Addictive Behaviors*, *37*(7), 700–706. <https://doi.org/10.1016/j.addbeh.2011.01.028>
- Knopik, V. S., Jacob, T., Haber, J. R., Swenson, L. P., & Howell, D. N. (2009). Paternal alcoholism and offspring ADHD problems: A children of twins design. *Twin Research and Human Genetics*, *12*(1), 53–62. <https://doi.org/10.1375/twin.12.1.53>
- Kuppens, S., Moore, S. C., Gross, V., Lowthian, E., & Siddaway, A. P. (2020). The Enduring Effects of Parental Alcohol, Tobacco, and Drug Use on Child Well-being: A Multilevel Meta-Analysis. *Development and Psychopathology*, *32*(2), 765–778. <https://doi.org/10.1017/S0954579419000749>
- Lowthian, E. (2022). The Secondary Harms of Parental Substance Use on Children’s Educational Outcomes: A Review. *Journal of Child and Adolescent Trauma*. <https://doi.org/10.1007/s40653-021-00433-2>
- Lubman, D. I., Cheetham, A., & Yücel, M. (2015). Cannabis and adolescent brain development. *Pharmacology and Therapeutics*, *148*, 1–16. <https://doi.org/10.1016/j.pharmthera.2014.11.009>
- Marsman, A., Pries, L. K., Ten Have, M., De Graaf, R., Van Dorsselaer, S., Bak, M., Kenis, G., Lin, B. D., Luyckx, J. J., Rutten, B. P. F., Guloksuz, S., & Van Os, J. (2020). Do Current Measures of Polygenic Risk for Mental Disorders Contribute to Population Variance in Mental Health? *Schizophrenia Bulletin*, *46*(6), 1353–1362. <https://doi.org/10.1093/schbul/sbaa086>
- Maynard, B. R., Farina, A., Dell, N. A., & Kelly, M. S. (2019). Effects of trauma-informed approaches in schools: A systematic review. *Campbell Systematic Reviews*, *15*(1–2). <https://doi.org/10.1002/c12.1018>
- McGrath, C. E., Watson, A. L., & Chassin, L. (1999). Academic achievement in adolescent children of alcoholics. *Journal of Studies on Alcohol*, *60*(1), 18–26. <https://doi.org/10.15288/jsa.1999.60.18>
- Orford, J., Copello, A., Velleman, R., & Templeton, L. (2010). Family members affected by a close relative’s addiction: The stress-strain-coping-support model. *Drugs: Education, Prevention and Policy*, *17*(sup1), 36–43. <https://doi.org/10.3109/09687637.2010.514801>
- Orford, J., Velleman, R., Natera, G., Templeton, L., & Copello, A. (2013). Addiction in the family is a major but neglected contributor to the global burden of adult ill-health. *Social Science and Medicine*, *78*, 70–77. <https://doi.org/10.1016/j.socscimed.2012.11.036>

- Orford, J., Cousins, J., Smith, N., & Bowden-Jones, H. (2017). Stress, strain, coping and social support for affected family members attending the National Problem Gambling Clinic London. *International Gambling Studies*, 17(2), 259–275. <https://doi.org/10.1080/14459795.2017.1331251>
- Orford, J., Natera, G., Copello, A., Atkinson, C., Mora, J., Velleman, R., Crundal, I., Tiburcio, M., Templeton, L., & Walley, G. (2005). *Coping with Alcohol and Drug Problems: The Experiences of Family Members in Three Contrasting Cultures*. Routledge.
- Pisinger, V. S. C., Bloomfield, K., & Tolstrup, J. S. (2016). Perceived parental alcohol problems, internalizing problems and impaired parent — child relationships among 71 988 young people in Denmark. *Addiction*, 111(11), 1966–1974. <https://doi.org/10.1111/add.13508>
- Poon, E., Ellis, D., Fitzgerald, H., & Zucker, R. (2000). Intellectual, cognitive, and academic performance among sons of alcoholics, during the early school years: differences related to subtypes of familial alcoholism. *Alcoholism: Clinical and Experimental Research*, 24, 1020–1027. <https://doi.org/10.1111/j.1530-0277.2000.tb04645.x>
- Rehm, J., & Shield, K. D. (2021). Alcohol Use and Cancer in the European Union. *European Addiction Research*, 27(1), 1–8. <https://doi.org/10.1159/000507017>
- Romanowicz, M., Vande Voort, J. L., Shekunov, J., Oesterle, T. S., Thusius, N. J., Rummans, T. A., Croarkin, P. E., Karpayak, V. M., Lynch, B. A., & Schak, K. M. (2019). The effects of parental opioid use on the parent-child relationship and children's developmental and behavioral outcomes: A systematic review of published reports. *Child and Adolescent Psychiatry and Mental Health*, 13(1), 1–11. <https://doi.org/10.1186/s13034-019-0266-3>
- Rossow, I., Felix, L., Keating, P., & McCambridge, J. (2016). Parental drinking and adverse outcomes in children: A scoping review of cohort studies. *Drug and Alcohol Review*, 35(4). <https://doi.org/10.1111/dar.12319>
- SAMHSA. (2014). *SAMHSA's Concept of Trauma and Guidance for a Trauma- Informed Approach*.
- Schippers, G., & Broekman, T. (2010). *De AUDIT. Nederlandse vertaling van de Alcohol Use Disorders Identification Test (Dutch translation of the Alcohol Use Disorders Identification Test)*.
- Schneider, J. (2003). The impact of compulsive cybersex behaviours on the family. *Sexual and Relationship Therapy*, 18(3), 329–354. <https://doi.org/10.1080/146819903100153946>
- Schneider, J. P., Weiss, R., & Samenow, C. (2012). Is It Really Cheating? Understanding the Emotional Reactions and Clinical Treatment of Spouses and Partners Affected by Cybersex Infidelity. *Sexual Addiction and Compulsivity*, 19(1–2), 123–139. <https://doi.org/10.1080/10720162.2012.658344>
- Schroeder, V. M., & Kelley, M. L. (2008). The influence of family factors on the executive functioning of adult children of alcoholics in college. *Family Relations*, 57(3), 404–414. <https://doi.org/10.1111/j.1741-3729.2008.00509.x>
- Serec, M., Švab, I., Kolšek, M., Švab, V., Moesgen, D., & Klein, M. (2012). Health-related lifestyle, physical and mental health in children of alcoholic parents. *Drug and Alcohol Review*, 31(7), 861–870. <https://doi.org/10.1111/j.1465-3362.2012.00424.x>
- Sher, K. J., Walitzer, K. S., Wood, P. K., & Brent, E. E. (1991). Characteristics of Children of Alcoholics: Putative Risk Factors, Substance Use and Abuse, and Psychopathology. *Journal of Abnormal Psychology*, 100(4), 427–448. <https://doi.org/10.1037/0021-843X.100.4.427>
- Solis, J. M., Shadur, J. M., Burns, A. R., & Hussong, A. M. (2012). Understanding the diverse needs of children whose parents abuse substances. *Current Drug Abuse Reviews*, 5(2), 135–147. <https://doi.org/10.2174/1874473711205020135>
- Thomas, J. T. (2016). Adverse childhood experiences among MSW students. *Journal of Teaching in Social Work*, 36(3), 235–255. <https://doi.org/10.1080/08841233.2016.1182609>
- Thomas, M. S., Crosby, S., & Vanderhaar, J. (2019). Trauma-Informed Practices in Schools Across Two Decades: An Interdisciplinary Review of Research. *Review of Research in Education*, 43(1), 422–452. <https://doi.org/10.3102/0091732X18821123>
- Thompson, B. (2007). *Effect sizes, confidence intervals, and confidence intervals for effect sizes*. 44(5). <https://doi.org/10.1002/pits.20234>
- Toner, P., & Velleman, R. (2014). Initial reliability and validity of a new measure of perceived social support for family members of problem substance users. *Addiction Research and Theory*, 22(2), 147–157.
- Torvik, F. A., Rogmo, K., Ask, H., Røysamb, E., & Tambs, K. (2011). Parental alcohol use and adolescent school adjustment in the general population: Results from the HUNT study. *BMC Public Health*, 11, 706–717. <https://doi.org/10.1186/1471-2458-11-706>
- Van Damme, J., Thienpondt, A., Rosiers, J., De Bruyn, S., Soyev, V., Sisk, M., Van Hal, G., & Deforche, B. (2018). *In hogere sferen (In higher spheres)?* (volume 4). VAD.
- Van der Kolk, B. (2022). Posttraumatic stress disorder and the nature of trauma. *Dialogues in Clinical Neuroscience*, 2(1), 7–22. <https://doi.org/10.31887/DCNS.2000.2.1/BVDKOLK>

- Velleman, R., & Orford, J. (1999). *Risk and Resilience: Adults Who Were the Children of Problem Drinkers*. Routledge.
- Velleman, R., & Templeton, L. (2007). Understanding and modifying the impact of parents substance misuse on children. *Advances in Psychiatric Treatment*, 13, 79–89. <https://doi.org/10.1192/apt.bp.106.002386>
- Velleman, R., & Templeton, L. (2016). Impact of parents' substance misuse on children: An update. *Bjpsych Advances*, 22(2), 108–117. <https://doi.org/10.1192/apt.bp.114.014449>
- Verhoog, S., Dopmeijer, J. M., De Jonge, J. M., Van Der Heijde, C. M., Vonk, P., Bovens, R. H. L. M., De Boer, M. R., Hoekstra, T., Kunst, A. E., Wiers, R. W., & Kuipers, M. A. G. (2020). The Use of the Alcohol Use Disorders Identification Test - Consumption as an Indicator of Hazardous Alcohol Use among University Students. *European Addiction Research*, 26(1), 1–9. <https://doi.org/10.1159/000503342>
- Vink, J. M. (2016). Genetics of addiction: Future focus on gene × environment interaction? *Journal of Studies on Alcohol and Drugs*, 77(5), 684–687. <https://doi.org/10.15288/jsad.2016.77.684>
- Wamamili, B., Stewart, P., & Wallace-bell, M. (2022). Factors Associated with Having Family/Whanau or Close Friends Who Used Alcohol or Other Drugs in Harmful Ways among University Students in New Zealand. <https://doi.org/10.3390/ijerph19010243>
- Ware, J. E., Kosinski, M., & Keller, S. D. (1996). A 12-Item Short-Form Health Survey: Construction of Scales and Preliminary Tests of Reliability and Validity. *Medical Care*, 34(3), 220–233. <https://doi.org/10.1097/00005650-199603000-00003>

**Publisher's Note** Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.