

**UNDER PRESSURE: SOCIAL SUPPORT AND
PERFORMANCE PRESSURE IN THE RELATIONSHIP
BETWEEN SUBSTANCE USE AND MENTAL HEALTH**

MASTERTHESIS

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June 16, 2023

This thesis has been written as a study assignment under the supervision of an Utrecht University teacher. Ethical permission has been granted for this thesis project by the ethics board of the Faculty of Social and Behavioral Sciences, Utrecht University, and the thesis has been assessed by two university teachers. However, the thesis has not undergone a thorough peer-review process, so conclusions and findings should be read as such.

ABSTRACT

Existing research widely acknowledges the frequently co-occurrence and mutual reinforcement of substance use and problems in mental health. However, there is inconsistency: not every individual using substances experiences mental health concerns, and not every individual struggling with a mental health disorder initiates substance use. A knowledge gap exists regarding what mechanisms cause these differences. Literature presupposes that social support and performance pressure are likely to be of influence within the context of Dutch youth. Therefore, the current study investigated the moderating role of social support and performance pressure in the relationship between substance use (i.e., alcohol, cannabis and hard drugs) and mental health. Data of the young adult health monitor 2021 were used. This monitor was conducted within the municipality of Utrecht ($N = 1913$) among youth aged 16-25 years. Based on these data, regression analyses were conducted, in which social support and performance pressure were singly included as interaction terms. Results show that levels of social support do not modify the relationship between substance use and mental health. In contrast, the level of performance pressure does matter, but opposite to what was expected: the combination of the use of alcohol or hard drugs and high performance pressure results in better mental health, compared to those that experience high performance pressure and do not use alcohol or hard drugs. Based on additional literature, it seems plausible that using these substances buffers the negative relationship between performance pressure and mental health, at least on the short term. However, future research with a longitudinal approach is needed to confirm and clarify this explanation. The findings of the current study imply that within a population of high educated students, one should be aware that targeting social support and performance pressure, although beneficial for mental health, will not necessarily result in reduced substance use.

Keywords: *substance use, mental health, social support, performance pressure*

INTRODUCTION

Concerns are mounting regarding mental health and substance use among Dutch youth (Dopmeijer et al., 2021). The World Health Organization (WHO, 2004) defines adequate mental health as “a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community” (p. 12). Considering Dutch youth (aged 12-25 years), nearly one out of five individuals experienced mental health problems in 2022, while this used to be nearly one out of ten in 2019 (CBS, 2022). Simultaneously to this deterioration of mental health, substance use has increasingly normalized among youth over the past decade (Dopmeijer et al., 2021; Van den Bos et al., 2022). Substance use can be defined as the use of psychoactive compounds that have the potential to cause health and social problems (McLellan et al., 2016).

Substance use and mental health disorders often co-occur, which has been widely recognized within scientific literature (Boson et al., 2022; Bukstein et al., 1989; Erskine et al., 2014; MacLeod et al., 2004). For instance, in a study conducted by De Veld et al. (2021), 34% of Dutch adolescents diagnosed with alcohol intoxication suffered from a co-occurring mental health disorder. Popma et al. (2012) confirm this, while adding that this prevalence is even higher for individuals using other substances, such as cannabis and hard drugs. Moreover, it is estimated that nearly a third of those suffering from a psychiatric disorder simultaneously use substances (Popma et al., 2012). This co-existence of substance use and psychiatric symptoms is worrisome since they reinforce each other: substance use might trigger or worsen psychiatric symptoms, and mental disorders increase the risk of progressing to problematic substance use (Degenhardt et al., 2016).

Although a large evidence base exists for this relationship between substance use and mental health, some studies and meta-analyses show inconsistency in their results (Dopmeijer et al., 2021; Hussong et al., 2017; Merikangas et al., 1998). Apparently, not every individual using substances experiences mental health concerns, and not every individual struggling with a mental health disorder initiates substance use. Unfortunately, a knowledge gap exists with regard to what mechanisms cause these differences. Stockings et al. (2016) suggest that it might be explained by the fact that substance users entail a heterogenous group, which results in substantially different responses that might be due to moderation by environmental factors (Degenhardt et al., 2016; National Institute on Drug Abuse [NIDA], 2020a; Stockings et al., 2016). Within the context of Dutch youth, social support and performance pressure are two of such factors which are particularly likely to be of influence. First, social support is considered

to be a protective factor for both substance use and mental health disorders (Mason et al., 2014; Mazhin et al., 2022), due to its buffering effects on stigma and other psychological distress among youth (Birtel et al., 2017; Camara et al., 2013). Second, performance pressure is a topical issue given its rising impact on Dutch youth (Doornwaard et al., 2021). Within the relationship between substance use and mental health, it is considered to be a risk factor. The chronic stress response it causes has a negative impact on one's coping resources and mental health (De Haan et al., 2021; Doornwaard et al., 2021; Leonard et al., 2015).

Despite the acknowledged influence of social support and performance pressure on both substance use and mental health disorders, far less is known about their potential influence on the frequent co-occurrence of these (Boson et al., 2022; Henderson et al., 2017; NIDA, 2020a), which substantiates the aim of the current study and its scientific relevance. In addition, its social relevance is evident in the adverse consequences, such as intoxication, poor educational outcomes, and unemployment, and the associated social and economic costs of both substance use and mental health disorders, which are enhanced in case of co-existence (Hale et al., 2014). According to Henderson et al. (2017), to effectively prevent the co-occurrence of substance use and mental health conditions, extensive knowledge of developmental trajectories of these problems is essential. Therefore, the current study addresses the potential moderating influence of social support and performance pressure on the association between substance use and mental health, with the aim to identify new target points for future effective prevention strategies.

THEORY & EXISTING RESEARCH

The fact that not everyone in the same situation develops the same outcomes can be explained by the positive deviance approach, which is based on the commonly observed phenomenon that in every community there are some individuals or groups “who are otherwise predicted to fail or have a poor outcome, but instead have a positive or even exceptional outcome – that is they deviate in a positive way” (Foster et al., 2022, p. 48). Applying this approach, it is assumed that for every problem within a community, a solution already exists and is employed by positive deviants. By finding these positive deviants and examining what it is that makes them achieving more positive outcomes than others, important starting points for future policy and interventions can be identified (Sarnkhaowkhom et al., 2022).

With regard to the relationship between substance use and mental health, research into factors explaining positive deviance is lacking (Boson et al., 2022). Only some demographic characteristics, such as gender and age, have been examined for their potentially moderating effects. For instance, Conway et al. (2016) and Hussong et al. (2017) have shown that men and adolescents are at higher risk of developing co-existing substance use and mental disorders than women and adults. In contrast, little is known with regard to moderation by environmental factors, such as social support and performance pressure.

In the current study, social support and performance pressure can be considered factors in which individuals might differ, potentially explaining positive deviance. The extent to which individuals experience social support or performance pressure might influence whether they do or do not develop co-occurring substance use and psychiatric symptoms when suffering from the one or the other.

Social support

Social support is considered an important protective factor for substance use (Mason et al., 2014; Piko & Kovács, 2010), adequate emotion regulation and maintaining good mental health, due to enhancing adequate coping mechanisms (Birtel et al., 2017; Hussong et al., 2017). However, few studies specifically focus on its potential role in the co-existence of substance use and mental health. These studies explain the possible moderation of social support by the significant role this factor has in promoting positive mental health outcomes at times of stressful situations (Birtel et al., 2017; Cheng et al., 2014; Mazhin et al., 2022).

First, social support can be considered a form of social capital that individuals can draw upon to help them cope with stressors, as is substantiated by coping theory (Cheng et al., 2014; Mazhin et al., 2022; Stewart, 1989). It is assumed that social support can either function directly as a coping strategy by offering the individual the required resources to cope with

distress and negative affect, or indirectly by enabling reappraisal, inhibition of maladaptive coping responses, such as substance use, or facilitating adaptive counterresponses (Stewart, 1989). As such, social support might prevent substance use in individuals with mental health problems.

Second, social support can function as an important buffer, since it increases the ability of the substance user to deal with the negative impact of the stigma associated with substance use, which is beneficial for both mental and physical health (Birtel et al., 2017). Social support thus decreases the impact of the stigma and therefore, according to the stigma-induced identity threat model, reduces the burden placed on substance users.

Performance pressure

Far less literature is available regarding the plausible role of performance pressure in the relationship between mental health and substance use. Those studies that have been conducted show a clear negative effect of academic-related stress on learning capacity and academic performance, mental health problems, sleep disturbances and substance use. Young people who experience high levels of performance pressure are more likely to experience deprived mental health and to use alcohol and drugs (Leonard et al., 2015; McIntyre et al., 2017; Pascoe et al., 2019; Suldo et al., 2008), which can be explained by a combination of theories.

First, the stress-vulnerability model presumes that exposure to chronic or severe stressors, such as performance pressure (Leonard et al., 2015), brings about a physiological, cognitive and affective stress response, which might result in a reduced ability to cope, solve problems, and make decisions (Fishbein et al., 2006; Sinha, 2008). Thus, following coping theory, enduring performance pressure decreases one's ability to cope with mental adversities and increases the likelihood of substance use as a self-medication strategy (Hussong et al., 2017; Khantzian, 1997; Leonard et al., 2015).

In line with this, performance pressure might have adverse consequences for one's ability to cope with the stigma associated with substance use, increasing the likelihood one subsequently develops mental health problems, as is substantiated by the stigma-induced identity threat model (Leonard et al., 2015; Birtel et al., 2017). Finally, it is shown that performance pressure activates the same mesolimbic pathways that are affected in mental disorders and when using substances (Macleod et al., 2004; Ross & Peselow, 2012; Sinha, 2008), meaning that when substance use is accompanied by performance pressure this might exacerbate the probability of co-occurring mental disorders.

RESEARCH QUESTION

Considering the above described scientific and social relevance of expanding the knowledge on the possibly moderating effects of social support and performance pressure in the relationship between mental health and substance use, the current study addresses the following research question: *What is the moderating role of social support and performance pressure in the relationship between mental health and substance use among Dutch youth?* Predicated upon the empirical findings and theoretical framework described above, a conceptual model has been constructed (figure 1), based on which the following hypotheses are formulated:

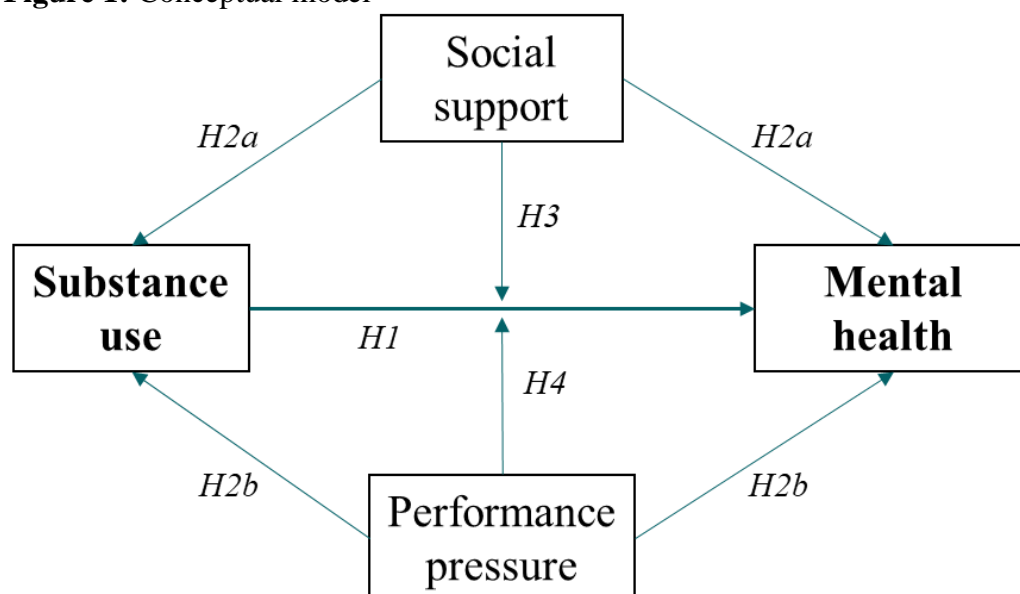
H1: A negative relationship exists between mental health and substance use.

H2: Social support is positively related to mental health, but negatively with substance use (H2a). Performance pressure is negatively related with mental health, but positively with substance use (H2b).

H3: The negative relationship between mental health and substance use is moderated by social support: high levels of social support buffer the relationship between mental health and substance use.

H4: The negative relationship between mental health and substance use is moderated by performance pressure: high levels of performance pressure exacerbate the relationship between mental health and substance use.

Figure 1: Conceptual model*



* Despite the endorsed bidirectional nature of the relationship between substance use and mental health, a unidirectional model is used in the current study, in which substance use is included as independent variable and mental health as dependent variable.

METHODS

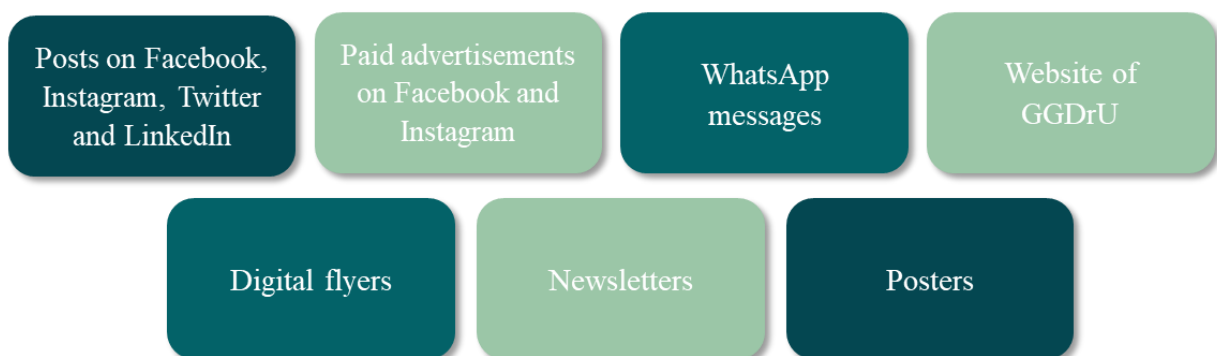
Study design

The current study is conducted using data of young people (16-25 years old) living in the municipality of Utrecht, which were collected as part of the young adult health monitor (*Gezondheidsmonitor Jongvolwassenen*). This monitor has been conducted within the all 25 municipalities of the province of Utrecht in the spring of 2021, and was carried out by the municipality of Utrecht and the public health service of the region of Utrecht (GGDrU). To adequately test the formulated hypotheses, a quantitative, cross-sectional design was used.

Procedure and participants

The monitor consisted of a large-scale survey including items on health, lifestyle, social relationships and the impact of COVID-19. This online survey was based on previously conducted surveys by public health services in other regions of the Netherlands and supplemented with topics and questions specifically relevant for the province and/or municipality of Utrecht. Prior to distribution, the survey was tested within a small pilot study. After incorporating feedback, the survey was spread via social media and other digital platforms (figure 2).

Figure 2: Recruitment methods



This way, a single random sample has been obtained, meaning that the aim was to offer all youth within the province of Utrecht the same opportunity to participate. The questionnaire could be completed at any time via one's own computer, laptop or smartphone, using an open link. After completion of the survey, which took twenty minutes on average, participants were automatically referred to the website of the GGDrU, which contained verified information regarding health and lifestyle. The participants were rewarded for their effort through a raffle of prizes. In total, 4401 individuals participated, which is 2.2% of the total population of youth within the province of Utrecht. All participants were between the ages of 16 and 25.

Participants from outside the province of Utrecht were excluded by using a built-in postal code check. Due to data accessibility, only the data of participants living in the municipality of Utrecht ($N = 1913$) were included in the current study.

Variables of interest and operationalization

While the health monitor included a wide variety of topics, only those variables that are relevant to answer the research question have been used. These are outlined below.

Dependent variable: Mental health

Adequate mental health was conceptualized as “a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community” (WHO, 2004, p. 12). Although literature shows that the relationship between mental health and substance use is bidirectional, in view of the current analyses mental health was applied as dependent variable. The Mental Health Inventory 5 (MHI-5) was used to operationalize this variable (appendix A), which is a validated international standard to measure mental health (Theunissen et al., 2011). The five questions within this scale each have six answer options (table 1), which were assigned a score ranging from 0 to 5. For each individual, the scores of all five questions were added up and multiplied by four, which resulted in a MHI-5 sum score, ranging from 0 (very unhealthy) to 100 (very healthy) (Driessen, 2011).

Table 1: Operationalization mental health

Operationalization	Categories
During the past four weeks, how often did you feel nervous?	All of the time
During the past four weeks, how often did you feel calm and peaceful?	Most of the time A good bit of the time
During the past four weeks, how often did you feel downhearted and blue?	Some of the time A little of the time
During the past four weeks, how often have you been a happy person?	None of the time
During the past four weeks, how often have you felt so down in the dumps that nothing could cheer you up?	

Independent variable: Substance use

Substance use was conceptualized as the use of psychoactive compounds that have the potential to cause health and social problems, including substance use disorders (McLellan et al., 2016). Since previous research has found varying results regarding the relationship between mental health and different types of substances (Popma et al., 2012), substance use was operationalized separately for the use of alcohol, cannabis and hard drugs (table 2). Given the relatively high societal normalization of alcohol consumption, alcohol was included by measuring binge drinking (i.e., five or more alcoholic drinks on an occasion). All variables were used at a dichotomous measurement level (table 2).

Table 2: Operationalization substance use

Variable	Operationalization	Categories
Binge drinking	Did you drink five or more drinks with alcohol on an occasion during the past four weeks?	Yes No
Cannabis/hash	Did you use cannabis or hash during the past four weeks?	Yes No
Hard drugs	Did you use hard drugs during the past four weeks?	Yes No

Moderator 1: Social support

Social support was conceptualized as the support an individual receives from significant others within one's social network (Birtel et al., 2017). Considering the presumed difference and distinction in parental and peer support for young people (Cole & Cole, 1996), the moderating influence of social support was operationalized by including social support from parents and social support from friends as separate variables. Both were operationalized using two questions (table 3), which were answered on a five-point Likert scale (i.e., 1 = totally disagree; 5 = totally agree). Sum scores were calculated by adding together these Likert scores, resulting in a score range from 2 (low social support) to 10 (high social support).

Table 3: Operationalization social support

Variable	Operationalization	Categories
Social support from parents	I have a good relationship with my parent(s)/guardian(s)	Totally agree, agree, not agree/not disagree, disagree,
	My parent(s)/guardian(s) support and help me when I need it	totally disagree, does not apply
Social support from friends	I have friends with whom I can share fun and less fun things	Totally agree, agree, not agree/not disagree, disagree,
	My friends support and help me when I need it	totally disagree, does not apply

Moderator 2: Performance pressure

Performance pressure was conceptualized as “the perceived pressure to meet predetermined expectations and requirements, for example with regard to education, sports, work, and social relationships” (Doornwaard et al., 2021, p. 10) and was operationalized by the question “In general, how do you experience performance pressure?” (i.e., ‘very high’, ‘pretty high’, ‘not that high’, ‘not high at all’, and ‘I don’t know’) (appendix A). The variable was recoded in such a way that a higher score indicated a higher level of perceived performance pressure.

Confounding factors

Considering the established moderating influence of age and gender (Conway et al., 2016; Hussong et al., 2017), these variables were included as potential confounders. First, age was operationalized using ten answer options varying from 16 years up to 25 years old (appendix A). Second, gender was obtained using three categories: ‘man’, ‘woman’, and ‘otherwise, namely...’ (appendix A). The category ‘otherwise’ was excluded from the analyses considering its low response rate. Additionally, living condition and education level were included as confounders, based on their presumed relationship with substance use, mental health, social support and performance pressure (Bi et al., 2021; CBS, 2021; Dopmeijer et al., 2021; Gfroerer et al., 1997; Yu et al., 2022). The variable living condition was divided into three categories: ‘living with parent(s)/guardian(s)’, ‘living with other young people’ and ‘different living condition’ (appendix A). The variable education level encompasses the education level participants were following or had finished, using three categories: ‘practical education, vmbo or mbo’, ‘havo or hbo’ and ‘vwo or university’ (appendix A).

Data analysis

The data was analysed using IBM SPSS Statistics version 28. Descriptive analyses were conducted to gain insight into the characteristics of the participants, which were weighted based on gender, age and neighbourhood to increase representativeness. After checking for outliers, linearity and normality, regression analyses were carried out to examine whether a relationship exists between the different types of substance use and mental health (H1). To test for a relationship between social support, performance pressure and mental health (H2), Pearson correlation coefficients were calculated. Considering the dichotomous measurement level of substance use, T-tests were conducted to map its relationship with social support and performance pressure (H2). Finally, to test the moderation hypotheses, regression analyses were conducted, in which mental health was included as the dependent variable, and social support from parents and friends (H3) and performance pressure (H4) were singly added as interaction terms. To ensure the interpretability of the main predictors, all independent variables were mean centred. When significant interactions were found, simple slope analyses were conducted to identify how the association between substance use and mental health differs for different levels (i.e., low – medium – high) of social support and/or performance pressure. All analyses were controlled for the confounding factors described above, which were included as dummy variables considering their categorical measurement level.

Ethical reflection

Before the study was conducted, the research design was approved by the Faculty Ethics Review Board from Utrecht University. To ensure integrity, the study was conducted in compliance with the VSNU code of conduct, assuring diligence, honesty, reliability, impartiality and verifiability through all phases of the study (Algra et al., 2018). With regard to the data collection, participation was voluntary and informed consent was retrieved. The data were confidentially and anonymously stored on the server of the GGDrU and municipality of Utrecht.

RESULTS

After taking into account the above described in- and exclusion criteria, the data of 1913 young adults living in the municipality of Utrecht were included in the analyses. The sample consisted of 45.7% males and 54.3% females (table 4). On average, participants scored 57.40 ($SD = 17.87$) on the MHI-5 scale, which can be classified as having mild psychological complaints (Driessen, 2011). With regard to binge drinking, prevalence was relatively high (63.3%), whereas about one-fifth of the sample engaged in the use of cannabis (21.8%) or hard drugs (17.7%) over the past four weeks (table 4). Given the characteristics outlined in table 4, it is noteworthy that the sample consisted of a disproportionately large number of high educated participants (86.1%).

Table 4: Sample characteristics

Variable	Total sample, N = 1913	
Gender (%)	Male	45.7
	Female	54.3
Age (%)	16-18 years old	18.2
	19-21 years old	28.5
	22-25 years old	53.3
Education (%)	Practical education, vmbo, vocational education	13.2
	Havo, higher vocational education	31.5
	Vwo, university	54.6
Living condition (%)	Living with parent(s)/guardian(s)	29.3
	Living with other youth (e.g., student house)	51.5
	Different living condition	19.2
Mental health (Mean (SD))	57.40 (17.87)	
Mental health (%)	Psychologically healthy	49.6
	Psychological complaints	50.4
	Severe psychological complaints	9.9
Substance use (%)	Binge drinking	
	Yes	63.3
	No	36.4
	Cannabis/hash	
	Yes	21.8

	No	78.2
	Hard drugs	
	Yes	17.7
	No	82.3
	Support from parents	
	Adequate	80.4
	Inadequate	19.6
	Support from friends	
	Adequate	81
	Inadequate	19
Social support (%)	(Relatively) high	69
	Low	31
Performance pressure (%)	(Relatively) high	69
	Low	31

Hypothesis 1: Substance use and mental health

With regard to cannabis, a significant relationship was found with mental health ($b = -3.946$, $t = -3.807$, $p = 0.000$). On average, participants who have used cannabis ($M = 54.22$, $SD = 17.27$) have a lower score on the MHI-5 than participants who have not ($M = 57.52$, $SD = 17.40$). However, no significant results were found considering the use of alcohol and hard drugs (table 5).

Table 5: Linear regression models with substance use (independent variable) and mental health (dependent variable), i.e. without (model 1a, 1b, and 1c) and with controlling for confounders (model 2a, 2b, and 2c)

Predictors	Model 1a				Model 2a			
	CI 95%				CI 95%			
	<i>b</i>	<i>SE</i>	<i>Lower</i>	<i>Upper</i>	<i>b</i>	<i>SE</i>	<i>Lower</i>	<i>Upper</i>
Binge drinking (ref: no binge drinking)	1.159	0.880	-0.566	2.884	0.890	0.940	-0.953	2.734
Binge drinking	Living condition (ref: living with parent(s)/ guardian(s))				-1.895	1.462	-4.763	0.973
	Living with other youth				-2.075	1.656	-5.323	1.173
	Different living condition							
Gender (ref: men)					-4.087***	0.931	-5.913	-2.262
Age (ref: 16 to 18 years old)	19 to 21 years old				-0.588	1.691	-3.904	2.728

old)				
19 to 21 years old	-0.589	1.705	-3.933	2.755
22 to 25 years old	0.914	1.765	-2.549	4.376
Education level (ref: practical education, vmbo, vocational education)				
Havo, higher vocational education	0.036	1.573	-3.050	3.121
Vwo, university	2.655	1.523	-0.332	5.643

Dependent variable: Mental health

*Note: * $p < .05$, ** $p < .01$, *** $p < .001$*

Hypothesis 2: Social support and performance pressure

Findings showed no significant associations between substance use and social support from parents (table 6). With regard to social support from friends, a significant relationship existed with binge drinking ($t = -4.044$, $p = 0.000$) and hard drugs ($t = -2.070$, $p = 0.039$). Meaning that those who use these substances generally receive more social support from their friends compared to those who do not (table 6). Considering performance pressure, no significant results were found (table 7).

Social support from parents ($r = 0.216$, $p = 0.000$) and friends ($r = 0.174$, $p = 0.000$) were both positively related to mental health, meaning that the more social support individuals receive, the better their mental health. In contrast, performance pressure was negatively related to mental health ($r = -0.293$, $p = 0.000$), indicating that a higher level of performance pressure is associated with a decrease in mental health.

Table 6: T-tests for the relationship between substance use and social support (H2a)

		Social support from parents				
		<i>M</i>	<i>SD</i>	<i>t</i>	<i>p</i>	
Substance use	Binge drinking	Yes	8.65	2.01	-1.865	0.062
		No	8.45	2.04		
	Cannabis/hash	Yes	8.48	1.99	1.063	0.288
		No	8.61	2.03		
	Hard drugs	Yes	8.64	2.04	-0.545	0.586
		No	8.57	2.01		

		Social support from friends				
			<i>M</i>	<i>SD</i>	<i>t</i>	<i>p</i>
Substance use	Binge drinking	Yes	8.42	1.67	-4.044	0.000***
		No	8.06	1.80		
	Cannabis/hash	Yes	8.37	1.51	-0.896	0.371
		No	8.28	1.76		
	Hard drugs	Yes	8.49	1.72	-2.070	0.039*
		No	8.26	1.72		

Note: * $p < .05$, ** $p < .01$, *** $p < .001$

Table 7: T-tests for the relationship between substance use and performance pressure (H2b)

		Performance pressure				
			<i>M</i>	<i>SD</i>	<i>t</i>	<i>p</i>
Substance use	Binge drinking	Yes	3.83	0.861	-1.556	0.120
		No	3.76	0.841		
	Cannabis/hash	Yes	3.80	0.879	0.158	0.874
		No	3.81	0.848		
	Hard drugs	Yes	3.76	0.851	0.997	0.319
		No	3.82	0.855		

Note: * $p < .05$, ** $p < .01$, *** $p < .001$

Hypothesis 3: Moderation by social support

For all three types of substances, no significant moderation was found for both the level of support from parents and support from friends (table 8). The strength of the relationship between substance use and mental health is thus not influenced by the level of social support an individual perceives.

Table 8: Linear regression models with substance use (independent variable), social support (moderator) and mental health (dependent variable), controlled for the confounders living condition, gender, age, and education level

		<i>b</i>	<i>SE</i>	<i>CI 95%</i>	
				<i>Lower</i>	<i>Upper</i>
Binge drinking	Binge drinking * Social support parents	-0.167	0.440	-1.030	0.696
	Binge drinking * Social support friends	0.624	0.514	-0.385	1.633

	(ref: 16 to 18 years old)								
	19 to 21 years old	-0.254	1.668	-3.526	3.017				
	22 to 25 years old	2.154	1.726	-1.231	5.540				
	Education level								
	(ref: practical education, vmbo, vocational education)								
	Havo, higher vocational education	3.134*	1.564	0.067	6.200				
	Vwo, university	5.772***	1.514	2.803	8.741				
		Model 1b				Model 2b			
		<i>CI 95%</i>				<i>CI 95%</i>			
	Predictors	<i>b</i>	<i>SE</i>	<i>Lower</i>	<i>Upper</i>	<i>b</i>	<i>SE</i>	<i>Lower</i>	<i>Upper</i>
Cannabis/hash	Cannabis/hash (ref: no cannabis/hash)	-3.188**	1.013	-5.176	-1.201	-3.616***	1.022	-5.620	-1.613
	Performance pressure	5.976***	0.545	4.907	7.045	6.033***	0.550	4.954	7.112
	Cannabis/hash * performance pressure	0.001	1.164	-2.281	2.283	0.092	1.154	-2.172	2.356
	Living condition								
	(ref: living with parent(s)/guardian(s))								
	Living with other youth	-0.532	1.403	-3.285	2.220				
	Different living condition	-0.696	1.618	-3.869	2.477				
	Gender (ref: men)	-3.203**	0.924	-5.016	-1.391				
	Age								
	(ref: 16 to 18 years old)								
	19 to 21 years old	-0.321	1.667	-3.591	2.949				
	22 to 25 years old	1.723	1.723	-1.657	5.102				
	Education level								
(ref: practical education, vmbo, vocational education)									
Havo, higher vocational education	3.222*	1.562	0.159	6.286					
Vwo, university	5.710***	1.514	2.741	8.680					
		Model 1c				Model 2c			
		<i>CI 95%</i>				<i>CI 95%</i>			
	Predictors	<i>b</i>	<i>SE</i>	<i>Lower</i>	<i>Upper</i>	<i>b</i>	<i>SE</i>	<i>Lower</i>	<i>Upper</i>
Hard drugs	Hard drugs (ref: no hard drugs)	-1.138	1.094	-3.284	1.008	-1.810	1.111	-3.990	0.369
	Performance pressure	6.794***	0.527	5.760	7.829	6.876***	0.534	5.829	7.923
	Hard drugs *	4.699***	1.293	2.163	7.236	4.754***	1.284	2.236	7.272

performance pressure				
Living condition				
(ref: living with parent(s)/guardian(s))				
Living with other youth	-0.607	1.410	-3.373	2.159
Different living condition	-0.738	1.625	-3.9926	2.449
Gender (ref: men)	-2.946**	0.924	-4.760	-1.133
Age				
(ref: 16 to 18 years old)				
19 to 21 years old	-0.098	1.675	-3.383	3.187
22 to 25 years old	2.198	1.735	-1.205	5.602
Education level				
(ref: practical education, vmbo, vocational education)				
Havo, higher vocational education	3.220*	1.560	0.159	6.280
Vwo, university	5.704	1.511	2.741	8.667

Dependent variable: Mental health

*Note: * $p < .05$, ** $p < .01$, *** $p < .001$*

Confounding

To control for their possible biasing influence, confounders were included in the regression models. Results showed that age and living condition did not have any influence on the relationship between substance use and mental health (table 5 & 9). In contrast, gender was identified as a significant confounder in all relationships tested for, and education level appeared to have a significant influence only when performance pressure was included as moderator (table 9).

Figure 3: Binge drinking and performance pressure

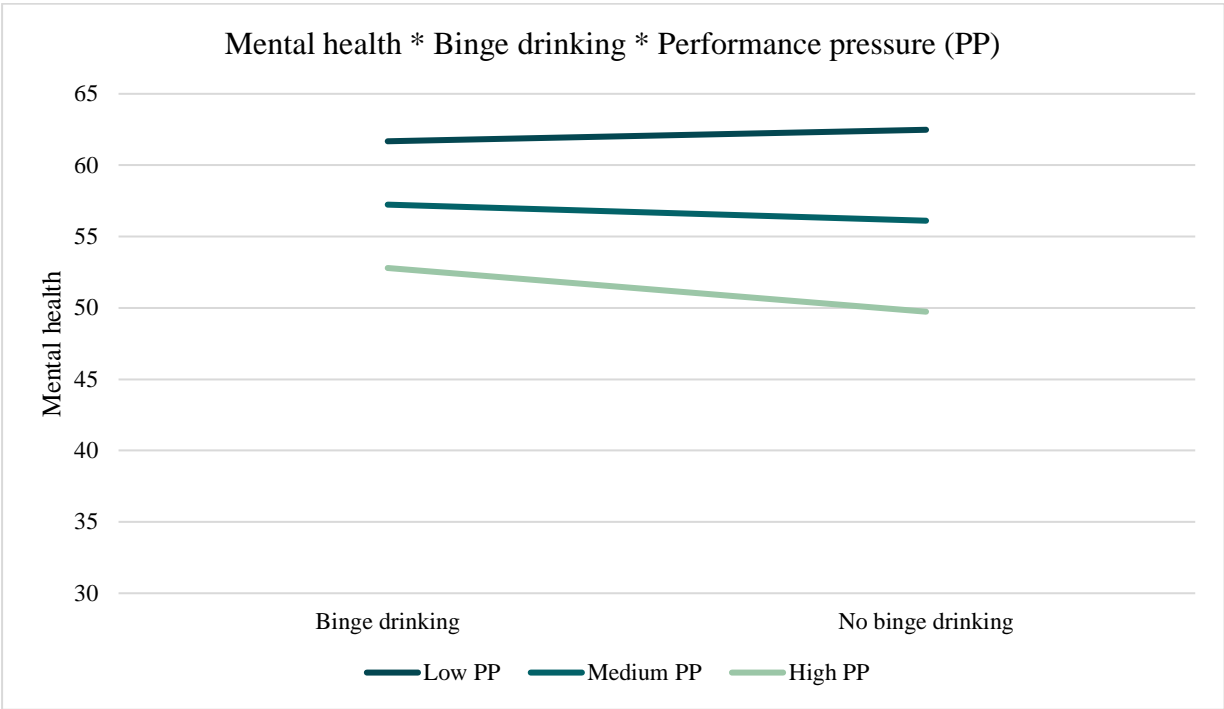
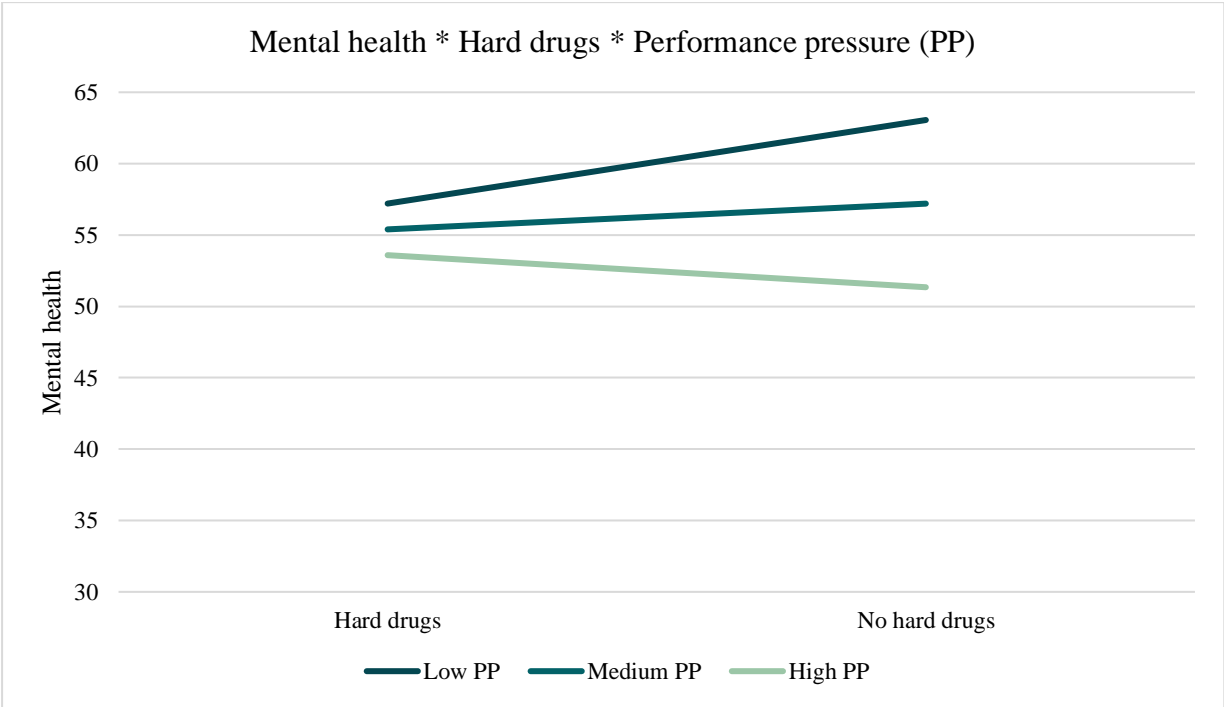


Figure 4: Hard drugs and performance pressure



DISCUSSION

Summary of findings

The purpose of the current study was to investigate the potential moderating role of social support and performance pressure in the relationship between substance use and mental health among Dutch youth. The supposed relationship between substance use and mental health (hypothesis 1) could only be replicated for the use of cannabis: those who had used cannabis had a poorer mental health compared to those who did not. As expected, a positive relationship was found between social support and mental health (hypothesis 2a), while a negative relationship was found between performance pressure and mental health (hypothesis 2b). With regard to the presupposed relationship between the moderators and substance use (hypothesis 2a and 2b), only social support from friends was found to be related to the use of alcohol and hard drugs. However, this is a positive relationship, which is opposite to what was expected. Considering the influence of social support in the relationship between substance use and mental health (hypothesis 3), no significant effects were found. In contrast, performance pressure did have a moderating role in this relationship (hypothesis 4), but only with regard to the use of alcohol and hard drugs and opposite to what was hypothesized. The combination of high levels of performance pressure and the use of alcohol or hard drugs results in better mental health, compared to when these substances are used in combination with low levels of performance pressure.

In sum, positive deviance with regard to the co-occurrence of substance use and mental health problems cannot be explained by differences in the levels of social support and performance pressure individuals perceive.

Interpretation of findings

This study only found a relationship between cannabis use and mental health, but no association of mental health with binge drinking or hard drugs, thereby partly confirming hypothesis 1. This contradicts with previous research (Boson et al., 2022; Bukstein et al., 1989; De Veld et al., 2021; Erskine et al., 2014; MacLeod et al., 2004; Popma et al., 2012), in which a negative relationship was found for all three included substances. However, it is consistent with Dopmeijer et al. (2021), who state that while cannabis is often used as a coping strategy to deal with mental health problems (coping motive), the use of alcohol and hard drugs is more often based on a social or enhancement motive. This reasoning is substantiated by results showing that young people use cannabis mainly at home or on the street, while alcohol and hard drugs are more often used on occasions, parties and events

(Dopmeijer et al., 2021). Although disproving hypothesis 2, the current finding that the use of alcohol and hard drugs is positively related to social support from friends, while cannabis is not, is in line with this explanation.

In addition, the findings show that the co-occurrence of substance use and mental health problems is not depending on the level of social support one receives, which invalidates hypothesis 3 and counters coping theory (Cheng et al., 2014; Mazhin et al., 2022; Stewart, 1989) and the stigma-induced identity threat model (Birtel et al., 2017). With regard to alcohol and hard drugs, this finding is consistent with the alternative explanation outlined above. For cannabis this finding is surprising and cannot be plausibly explained.

Finally, the contradictory findings with regard to the moderation by performance pressure invalidate the assumptions proposed by the stress-vulnerability model, coping theory and the stigma-induced identity threat model (Birtel et al., 2017; Fishbein et al., 2006; Hussong et al., 2017; Leonard et al., 2015; Sinha, 2008), and thus hypothesis 4. An alternative explanation for these findings is that substance use buffers the demonstrated negative relationship between performance pressure and mental health. It is plausible that individuals who experience high levels of performance pressure benefit from using alcohol or hard drugs on the short term, which is substantiated by the stress-coping model that positions substance use as a coping response to stress that can function to reduce negative affect or increase positive affect (Wagner et al., 1999). However, on the long term, it is likely to instead have a negative impact on mental health (Dekker, 2018; NIDA, 2020a, 2020b; Wagner et al., 1999).

Strengths and limitations

When interpreting the results of this study, several limitations should be kept in mind. First, bias might exist in the operationalization of substance use since no differentiation is being made in how often individuals have used the substances. Those who have used a substance incidentally on an occasion are placed in the same category as those who have used it every day. Also, a wide variety of hard drugs exists, with many different effects and consequences in the short and long term (Dekker, 2018). Since no distinction was made in the different kinds of hard drugs, this might have distorted the results somewhat. Second, the cross-sectional nature of the data used in this study means that long-term effects of substance use could not be investigated. Since substance use induced problems in mental health generally occur in the long term (Dekker, 2018; NIDA, 2020a, 2020b; Wagner et al., 1999), it might be possible that these effects could not yet be measured, which might explain in large part the limited and contradictory results that have been found.

Thirdly, since the purpose of the current study was to identify the potentially moderating influence of social support and performance pressure separately, both were singly added to the regression models. Consequently, when including one of them, the model was not controlled for possible influences of the other. Given the probable correlation of social support and performance pressure (Bovier et al., 2004; Verger et al., 2009), additional analyses were conducted, which show no major differences compared to the results presented above. Finally, sampling bias might have occurred considering the fact that the study sample mainly consisted of high educated students, which decreases the external validity of the findings and calls for caution when translating these to other populations.

Simultaneously, a strong point of the current study is its high ecological validity, resulting from the fact that participants completed the questionnaire online, in their own environment and anonymously. Additionally, by controlling for multiple confounders, many alternative explanations could be largely ruled out, which contributes to the study's internal validity. However, there may still be confounding factors of influence that have not been controlled for in this study. Finally, using an interdisciplinary approach to answer the research question contributed in gaining a thorough understanding of the issue and the interplay of factors involved. Such a perspective has been relevant considering the fact that the underlying theories that form the foundation for the accompanied hypotheses, are on the cutting edge between sociology and psychology.

Policy implications

Taking the strengths and limitations into account, the current study implies that it is important take into account the different motives underlying the use of different substances among high educated students. In addition, it is relevant for policymakers to be aware that interventions aimed to increase social support or reduce performance pressure are not necessarily effective in reducing substance use, although it is likely to improve mental health.

Future research is necessary to replicate the current findings within other populations. When doing so it is advisable to operationalize substance use as a continuous variable and differentiate between different kinds of hard drugs. Longitudinal research is necessary to consider the relationship between substance use and mental health on the long term, and how this is affected by social support and performance pressure. Furthermore, additional research is needed with regard to the potentially moderating effect of substance use in the relationship between performance pressure and mental health, which is supposed by the current study.

Conclusion

In conclusion, the use of cannabis was found to be negatively related with mental health, while alcohol and hard drugs were not. Apparently, cannabis is more likely to be used from a coping motive, in contrast to alcohol and hard drugs, which are generally used from a social motive. In addition, it is shown that the level of social support individuals perceive does not modify the relationship between substance use and mental health. Moreover, the level of performance pressure does matter considering the use of alcohol and hard drugs, but opposite to what was expected: the combination of the use of these substances and high performance pressure results in better mental health compared to experiencing high performance pressure but not using alcohol or hard drugs. It seems plausible that using these substances buffers the negative relationship between performance pressure and mental health, at least on the short term. These findings imply that within a population of high educated students, one should be aware that targeting social support and performance pressure, although beneficial for mental health, will not necessarily result in reduced substance use.

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APPENDIX A**Questions from the young adult health monitor 2021 (in Dutch)****Age**

Hoe oud ben je?

- 16
- 17
- 18
- 19
- 20
- 21
- 22
- 23
- 24
- 25
- Ik heb een andere leeftijd

Gender

Ben je

- Man
- Vrouw
- Anders, namelijk _____

Living condition

Wat past het beste bij jouw woonsituatie? Ik woon...

- Bij mijn ouder(s) of verzorger(s)
- Zelfstandig, met andere jongeren (bijvoorbeeld een studentenhuis)
- Zelfstandig, alleen
- In een zorginstelling of begeleid wonen
- Samen met mijn partner
- Samen met mijn kind(eren)
- Alleen met mijn kind(eren)
- Anders, namelijk _____

Education level

Wat is de hoogste opleiding die je hebt afgemaakt?

- Praktijkonderwijs
- Vmbo basis/kader
- Vmbo theoretische leerweg/mavo

- Havo
- Vwo
- Mbo
- Hbo
- Universiteit
- Een andere opleiding
- Ik heb (nog) geen opleiding afgemaakt

Welke opleiding volg je?

- Praktijkonderwijs
- Vmbo basis/kader
- Vmbo theoretische leerweg/mavo
- Havo
- Vwo
- Mbo
- Hbo
- Universiteit
- Een andere opleiding
- Ik volg geen opleiding

Mental health

Voelde je je in de afgelopen 4 weken zenuwachtig?

- Voortdurend
- Meestal
- Vaak
- Soms
- Zelden
- Nooit

Voelde je je in de afgelopen 4 weken kalm en rustig?

- Voortdurend
- Meestal
- Vaak
- Soms
- Zelden
- Nooit

Voelde je je in de afgelopen 4 weken neerslachtig en somber?

- Voortdurend
- Meestal
- Vaak
- Soms
- Zelden
- Nooit

Voelde je je in de afgelopen 4 weken gelukkig?

- Voortdurend
- Meestal
- Vaak
- Soms
- Zelden
- Nooit

Zat je zo erg in de put dat je niets kon opvrolijken?

- Voortdurend
- Meestal
- Vaak
- Soms
- Zelden
- Nooit

Substance use

Hoe vaak heb je in de laatste 4 weken vijf of meer drankjes met alcohol gedronken bij een gelegenheid?

- 0 keer
- 1 of 2 keer
- 3 of 4 keer
- 5 of 6 keer
- 7 of 8 keer
- 9 keer of vaker

Hoe vaak heb je de laatste 4 weken wiet of hasj gebruikt?

- 0 keer
- 1 of 2 keer
- 3 of 4 keer
- 5 of 6 keer
- 7 of 8 keer
- 9 keer of vaker

Performance pressure

Sommige deskundigen denken dat jongeren vaker stress hebben omdat ze altijd het gevoel hebben zich te moeten bewijzen op school/studie, van ouders, tijdens hun (bij)baan, in hun sociale leven etc.

Hoe ervaar jij de prestatiedruk over het algemeen?

- Heel hoog
- Redelijk hoog
- Niet zo hoog
- Helemaal niet hoog
- Weet ik niet

APPENDIX B**Syntax**

```
FREQUENCIES VARIABLES=opleid Leeftijd gesl woonsituatie2  
/STATISTICS=STDDEV MINIMUM MAXIMUM MEAN  
/ORDER=ANALYSIS.
```

```
FREQUENCIES VARIABLES=MHI5_score  
/STATISTICS=STDDEV MINIMUM MAXIMUM MEAN  
/ORDER=ANALYSIS.
```

```
FREQUENCIES VARIABLES=MHI5 MHI5_matig_ernstig MHI5_ernstig  
/STATISTICS=STDDEV MINIMUM MAXIMUM MEAN  
/ORDER=ANALYSIS.
```

```
FREQUENCIES VARIABLES=harddrugs4wkn  
/STATISTICS=STDDEV MINIMUM MAXIMUM MEAN  
/ORDER=ANALYSIS.
```

```
COMPUTE wiet4wkn_binair=wiet4wkn.  
VARIABLE LABELS wiet4wkn_binair 'Heb je de afgelopen 4 weken wiet gebruikt?'.  
EXECUTE.
```

```
RECODE wiet4wkn_binair (1=0) (2=1) (3=1) (4=1) (5=1) (6=1).  
EXECUTE.
```

```
FREQUENCIES VARIABLES=wiet4wkn_binair  
/STATISTICS=STDDEV MINIMUM MAXIMUM MEAN  
/ORDER=ANALYSIS.
```

```
RECODE binge (1=0) (2=1) (3=1) (4=1) (5=1) (6=1) (7=1) INTO binge_janee.  
EXECUTE.
```

```
FREQUENCIES VARIABLES=binge_janee  
/STATISTICS=STDDEV MINIMUM MAXIMUM MEAN  
/ORDER=ANALYSIS.
```

```
RECODE prestatiedruk (5=1) (4=2) (3=3) (2=4) (1=5) INTO prestatie_RC  
EXECUTE.
```

```
FREQUENCIES VARIABLES=vrienden  
/STATISTICS=STDDEV MINIMUM MAXIMUM MEAN MEDIAN  
/ORDER=ANALYSIS.
```

```
FREQUENCIES VARIABLES=relatieoud  
/STATISTICS=STDDEV MINIMUM MAXIMUM MEAN MEDIAN  
/ORDER=ANALYSIS.
```

```
FREQUENCIES VARIABLES=prestatie_RC  
/STATISTICS=STDDEV MINIMUM MAXIMUM MEAN MEDIAN
```

```
/ORDER=ANALYSIS.
```

```
* Chart Builder.
```

```
GGRAPH
```

```
/GRAPHDATASET NAME="graphdataset" VARIABLES=MHI5_score
```

```
MISSING=LISTWISE REPORTMISSING=NO
```

```
/GRAPHSPEC SOURCE=INLINE.
```

```
BEGIN GPL
```

```
SOURCE: s=userSource(id("graphdataset"))
```

```
DATA: MHI5_score=col(source(s), name("MHI5_score"))
```

```
GUIDE: axis(dim(1), label("totaalscore 5 items MHI-5"))
```

```
GUIDE: axis(dim(2), label("Frequency"))
```

```
GUIDE: text.title(label("Simple Bar of totaalscore 5 items MHI-5"))
```

```
ELEMENT: interval(position(summary.count(bin.rect(MHI5_score))),
```

```
shape.interior(shape.square))
```

```
END GPL.
```

```
EXAMINE VARIABLES=MHI5_score
```

```
/PLOT BOXPLOT STEMLEAF NPLOT
```

```
/COMPARE GROUPS
```

```
/STATISTICS NONE
```

```
/CINTERVAL 95
```

```
/MISSING PAIRWISE
```

```
/NOTOTAL.
```

```
* Chart Builder.
```

```
GGRAPH
```

```
/GRAPHDATASET NAME="graphdataset" VARIABLES=MHI5_score
```

```
MISSING=LISTWISE REPORTMISSING=NO
```

```
/GRAPHSPEC SOURCE=INLINE.
```

```
BEGIN GPL
```

```
SOURCE: s=userSource(id("graphdataset"))
```

```
DATA: MHI5_score=col(source(s), name("MHI5_score"))
```

```
DATA: id=col(source(s), name("$CASENUM"), unit.category())
```

```
GUIDE: axis(dim(2), label("totaalscore 5 items MHI-5"))
```

```
GUIDE: text.title(label("Simple Boxplot of totaalscore 5 items MHI-5"))
```

```
ELEMENT: schema(position(bin.quantile.letter(1*MHI5_score)), label(id))
```

```
END GPL
```

```
DO IF (1 - MISSING(MHI5_score)).
```

```
RECODE woonsituatie2 (2=1) (ELSE=0) INTO Zelfstandig.
```

```
END IF.
```

```
VARIABLE LABELS Zelfstandig 'Ouders vs. zelfstandig'.
```

```
EXECUTE.
```

```
DO IF (1 - MISSING(MHI5_score)).
```

```
RECODE woonsituatie2 (3=1) (ELSE=0) INTO Anders.
```

```
END IF.
```

```
VARIABLE LABELS Anders 'Ouders vs. anders'.
```

```
EXECUTE.
```

```
DO IF (1 - MISSING(MHI5_score)).
RECODE Leeftijd (2=1) (ELSE=0) INTO Age_19tm21.
END IF.
VARIABLE LABELS Age_19tm21 '16tm18 vs. 19tm21'.
EXECUTE.
```

```
DO IF (1 - MISSING(MHI5_score)).
RECODE Leeftijd (3=1) (ELSE=0) INTO Age_22tm25.
END IF.
VARIABLE LABELS Age_22tm25 '16tm18 vs. 22tm25'.
EXECUTE.
```

```
DO IF (1 - MISSING(MHI5_score)).
RECODE gesl (2=1) (ELSE=0) INTO Geslacht_Vrouw.
END IF.
VARIABLE LABELS Geslacht_Vrouw 'Man vs. vrouw'.
EXECUTE.
```

```
DO IF (1 - MISSING(MHI5_score)).
RECODE opleid (2=1) (ELSE=0) INTO Havohbo.
END IF.
VARIABLE LABELS Havohbo 'Vmbo/mbo vs. havo/hbo'.
EXECUTE.
```

```
DO IF (1 - MISSING(MHI5_score)).
RECODE opleid (3=1) (ELSE=0) INTO Vwouni.
END IF.
VARIABLE LABELS Vwouni 'Vmbo/mbo vs. vwo/uni'.
EXECUTE.
```

```
REGRESSION
/MISSING LISTWISE
/STATISTICS COEFF OUTS CI(95) R ANOVA CHANGE
/CRITERIA=PIN(.05) POUT(.10)
/NOORIGIN
/DEPENDENT MHI5_score
/METHOD=ENTER binge_janee
/METHOD=ENTER Zelfstandig Anders Age_19tm21 Age_22tm25 Geslacht_Vrouw
Havohbo Vwouni.
```

```
MEANS TABLES=MHI5_score BY binge_janee
/CELLS=MEAN COUNT STDDEV.
```

```
REGRESSION
/MISSING LISTWISE
/STATISTICS COEFF OUTS CI(95) R ANOVA CHANGE
/CRITERIA=PIN(.05) POUT(.10)
/NOORIGIN
/DEPENDENT MHI5_score
/METHOD=ENTER wiet4wkn_binair
```

```
/METHOD=ENTER Geslacht_Vrouw Zelfstandig Anders Age_19tm21 Age_22tm25  
Havohbo Vwouni.
```

```
MEANS TABLES=MHI5_score BY wiet4wkn_binair  
/CELLS=MEAN COUNT STDDEV.
```

REGRESSION

```
/MISSING LISTWISE  
/STATISTICS COEFF OUTS CI(95) R ANOVA CHANGE  
/CRITERIA=PIN(.05) POUT(.10)  
/NOORIGIN  
/DEPENDENT MHI5_score  
/METHOD=ENTER harddrugs4wkn  
/METHOD=ENTER Geslacht_Vrouw Zelfstandig Anders Age_19tm21 Age_22tm25  
Havohbo Vwouni.
```

```
MEANS TABLES=MHI5_score BY harddrugs4wkn  
/CELLS=MEAN COUNT STDDEV.
```

CORRELATIONS

```
/VARIABLES=MHI5_score relatieoud  
/PRINT=TWOTAIL NOSIG  
/MISSING=PAIRWISE.
```

CORRELATIONS

```
/VARIABLES=MHI5_score vrienden  
/PRINT=TWOTAIL NOSIG  
/MISSING=PAIRWISE.
```

CORRELATIONS

```
/VARIABLES=MHI5_score prestatie_RC  
/PRINT=TWOTAIL NOSIG  
/MISSING=PAIRWISE.
```

```
T-TEST GROUPS=binge_janee(0 1)
```

```
/MISSING=ANALYSIS  
/VARIABLES=prestatie_RC  
/CRITERIA=CI(.95).
```

```
T-TEST GROUPS=binge_janee(0 1)
```

```
/MISSING=ANALYSIS  
/VARIABLES=relatieoud  
/CRITERIA=CI(.95).
```

```
T-TEST GROUPS=binge_janee(0 1)
```

```
/MISSING=ANALYSIS  
/VARIABLES=vrienden  
/CRITERIA=CI(.95).
```

```
T-TEST GROUPS=wiet4wkn_binair(0 1)
```

```
/MISSING=ANALYSIS
```



```
/VARIABLES=prestatie_RC  
/CRITERIA=CI(.95).
```

```
T-TEST GROUPS=wiet4wkn_binair(0 1)  
/MISSING=ANALYSIS  
/VARIABLES=relatieoud  
/CRITERIA=CI(.95).
```

```
T-TEST GROUPS=wiet4wkn_binair(0 1)  
/MISSING=ANALYSIS  
/VARIABLES=vrienden  
/CRITERIA=CI(.95).
```

```
T-TEST GROUPS=harddrugs4wkn(0 1)  
/MISSING=ANALYSIS  
/VARIABLES=prestatie_RC  
/CRITERIA=CI(.95).
```

```
T-TEST GROUPS=harddrugs4wkn(0 1)  
/MISSING=ANALYSIS  
/VARIABLES=relatieoud  
/CRITERIA=CI(.95).
```

```
T-TEST GROUPS=harddrugs4wkn(0 1)  
/MISSING=ANALYSIS  
/VARIABLES=vrienden  
/CRITERIA=CI(.95).
```

```
COMPUTE RelaOuder_C=relatieoud - 8.5842.  
EXECUTE.
```

```
COMPUTE RelaVriend_C=vrienden - 8.2993.  
EXECUTE.
```

```
COMPUTE Prestatiedruk_C=prestatie_RC - 2.19.  
EXECUTE.
```

```
COMPUTE Binge1XRelavriend=binge_janee * RelaVriend_C.  
EXECUTE.
```

REGRESSION

```
/MISSING LISTWISE  
/STATISTICS COEFF OUTS CI(95) R ANOVA CHANGE  
/CRITERIA=PIN(.05) POUT(.10)  
/NOORIGIN  
/DEPENDENT MHI5_score  
/METHOD=ENTER binge_janee RelaVriend_C Binge1XRelavriend  
/METHOD=ENTER Zelfstandig Anders Age_19tm21 Age_22tm25 Geslacht_Vrouw  
Havohbo Vwouni.
```

```
COMPUTE Binge2XRelaoud=binge_2 * RelaOuder_C.  
EXECUTE.
```

```
COMPUTE Binge1XRelaoud=binge_janee * RelaOuder_C.  
EXECUTE.
```

REGRESSION

```
/MISSING LISTWISE  
/STATISTICS COEFF OUTS CI(95) R ANOVA CHANGE  
/CRITERIA=PIN(.05) POUT(.10)  
/NOORIGIN  
/DEPENDENT MHI5_score  
/METHOD=ENTER binge_janee RelaOuder_C Binge1XRelaoud  
/METHOD=ENTER Zelfstandig Anders Age_19tm21 Age_22tm25 Geslacht_Vrouw  
Havohbo Vwouni.
```

```
COMPUTE Binge1XPrestatie=binge_janee * Prestatiedruk_C.  
EXECUTE.
```

REGRESSION

```
/MISSING LISTWISE  
/STATISTICS COEFF OUTS CI(95) R ANOVA CHANGE  
/CRITERIA=PIN(.05) POUT(.10)  
/NOORIGIN  
/DEPENDENT MHI5_score  
/METHOD=ENTER binge_janee Binge1XPrestatie Prestatiedruk_C  
/METHOD=ENTER Zelfstandig Anders Age_19tm21 Age_22tm25 Geslacht_Vrouw  
Havohbo Vwouni.
```

```
COMPUTE RelaOuder_CxCannabis=RelaOuder_C * wiet4wkn_binair.  
EXECUTE.
```

REGRESSION

```
/DESCRIPTIVES MEAN STDDEV CORR SIG N  
/MISSING LISTWISE  
/STATISTICS COEFF OUTS R ANOVA COLLIN TOL CHANGE ZPP  
/CRITERIA=PIN(.05) POUT(.10)  
/NOORIGIN  
/DEPENDENT MHI5_score  
/METHOD=ENTER wiet4wkn_binair RelaOuder_C RelaOuder_CxCannabis  
/METHOD=ENTER Zelfstandig Anders Geslacht_Vrouw Havohbo Vwouni Age_19tm21  
Age_22tm25  
/RESIDUALS DURBIN.
```

```
COMPUTE RelaVriend_CxCannabis=RelaVriend_C * wiet4wkn_binair.  
EXECUTE.
```

REGRESSION

```
/DESCRIPTIVES MEAN STDDEV CORR SIG N  
/MISSING LISTWISE  
/STATISTICS COEFF OUTS R ANOVA COLLIN TOL CHANGE ZPP  
/CRITERIA=PIN(.05) POUT(.10)  
/NOORIGIN
```

```
/DEPENDENT MHI5_score  
/METHOD=ENTER wiet4wkn_binair RelaVriend_C RelaVriend_CxCannabis  
/METHOD=ENTER Zelfstandig Anders Geslacht_Vrouw Havohbo Vwouni Age_19tm21  
Age_22tm25  
/RESIDUALS DURBIN.
```

```
COMPUTE Prestatie_CxCannabis=Prestatiedruk_C * wiet4wkn_binair.  
EXECUTE.
```

REGRESSION

```
/DESCRIPTIVES MEAN STDDEV CORR SIG N  
/MISSING LISTWISE  
/STATISTICS COEFF OUTS R ANOVA COLLIN TOL CHANGE ZPP  
/CRITERIA=PIN(.05) POUT(.10)  
/NOORIGIN  
/DEPENDENT MHI5_score  
/METHOD=ENTER wiet4wkn_binair Prestatiedruk_C Prestatie_CxCannabis  
/METHOD=ENTER Zelfstandig Anders Geslacht_Vrouw Havohbo Vwouni Age_19tm21  
Age_22tm25  
/RESIDUALS DURBIN.
```

```
COMPUTE RelaVriend_CxHD=RelaVriend_C * harddrugs4wkn.  
EXECUTE.
```

REGRESSION

```
/DESCRIPTIVES MEAN STDDEV CORR SIG N  
/MISSING LISTWISE  
/STATISTICS COEFF OUTS R ANOVA COLLIN TOL CHANGE ZPP  
/CRITERIA=PIN(.05) POUT(.10)  
/NOORIGIN  
/DEPENDENT MHI5_score  
/METHOD=ENTER harddrugs4wkn RelaVriend_C RelaVriend_CxHD  
/METHOD=ENTER Zelfstandig Anders Geslacht_Vrouw Havohbo Vwouni Age_19tm21  
Age_22tm25  
/RESIDUALS DURBIN.
```

```
COMPUTE RelaOud_CxHD=RelaOuder_C * harddrugs4wkn.  
EXECUTE.
```

REGRESSION

```
/DESCRIPTIVES MEAN STDDEV CORR SIG N  
/MISSING LISTWISE  
/STATISTICS COEFF OUTS R ANOVA COLLIN TOL CHANGE ZPP  
/CRITERIA=PIN(.05) POUT(.10)  
/NOORIGIN  
/DEPENDENT MHI5_score  
/METHOD=ENTER harddrugs4wkn RelaOuder_C RelaOud_CxHD  
/METHOD=ENTER Zelfstandig Anders Geslacht_Vrouw Havohbo Vwouni Age_19tm21  
Age_22tm25  
/RESIDUALS DURBIN.
```

COMPUTE Prestatie_CxHD=Prestatiedruk_C * harddrugs4wkn.
EXECUTE.

REGRESSION

/DESCRIPTIVES MEAN STDDEV CORR SIG N
/MISSING LISTWISE
/STATISTICS COEFF OUTS R ANOVA COLLIN TOL CHANGE ZPP
/CRITERIA=PIN(.05) POUT(.10)
/NOORIGIN
/DEPENDENT MHI5_score
/METHOD=ENTER harddrugs4wkn Prestatiedruk_C Prestatie_CxHD
/METHOD=ENTER Zelfstandig Anders Geslacht_Vrouw Havohbo Vwouni Age_19tm21
Age_22tm25
/RESIDUALS DURBIN.

Run MATRIX procedure:

***** PROCESS Procedure for SPSS Version 4.2 beta *****

Written by Andrew F. Hayes, Ph.D. www.afhayes.com
Documentation available in Hayes (2022). www.guilford.com/p/hayes3

Model : 1

Y : MHI5
X : binge_ja
W : prestatie

Covariates:

Zelfstan Anders Age_19tm Age_22tm Geslacht Havohbo Vwouni

DATA LIST FREE/

binge_ja prestatie MHI5.

BEGIN DATA.

,0000	2,9574	62,4810
1,0000	2,9574	61,6756
,0000	3,8101	56,1063
1,0000	3,8101	57,2349
,0000	4,6628	49,7316
1,0000	4,6628	52,7943

END DATA.

GRAPH/SCATTERPLOT=

prestatie WITH MHI5 BY binge_ja .

Run MATRIX procedure:

***** PROCESS Procedure for SPSS Version 4.2 beta *****

Written by Andrew F. Hayes, Ph.D. www.afhayes.com
Documentation available in Hayes (2022). www.guilford.com/p/hayes3

Model : 1

Y : MHI5

X : harddrugs

W : prestatie

Covariates:

Zelfstan Anders Age_19tm Age_22tm Geslacht Havohbo Vwouni

DATA LIST FREE/

harddrugs prestatie MHI5.

BEGIN DATA.

,0000 2,9597 63,0567

1,0000 2,9597 57,2040

,0000 3,8116 57,1985

1,0000 3,8116 55,3958

,0000 4,6636 51,3403

1,0000 4,6636 53,5875

END DATA.

GRAPH/SCATTERPLOT=

prestatie WITH MHI5 BY harddrugs.