Utrecht University

Cannabis use in Dutch adolescents: An evaluation of changes before and after the first lockdown.

Has the use of cannabis changed during the first COVID-19 lockdown in the Netherlands and are these changes different because of certain predictors?

Name: Arwin Fröberg (6286720)

Supervisor: Ina Koning

Second assessor: Tom ter Bogt

Master: Youth Studies

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Abstract

On March 17, 2020, the Netherlands went into the first COVID-19 lockdown, which had a major impact on the life of Dutch adolescents. Since then, several alarming reports came out, saying that Dutch adolescents were coping with more mental distress. Meanwhile, researchers noticed changes in substance use, possibly to cope with this distress. This current research aimed to investigate if cannabis use has changed during the first lockdown in Dutch middle schoolers, and if certain factors, e.g., level of self-control, time spend with friends, perceived parental monitoring, and perceived descriptive norms, at T1 (Jan-2020) were predictive of lifetime cannabis use at T2 (Jan-2022). The study is a two waved longitudinal study, with a sample size of 404 high schoolers aged 12-17 from a Dutch municipality. The study found that cannabis use increased during the first lockdown. Adolescents with a lower level of self-control or who spent more time with friends at T1 had an increased risk of lifetime cannabis use at T2. These results provide new insights into how prevention makers might reduce adolescent cannabis use through self-control, parental monitoring and supervised leisure activities. Importantly, it also emphasizes the importance to keep an eye on adolescents during times of crisis.

Abstract

Op 17 maart 2020 ging Nederland in de eerste COVID-19 lockdown, wat een grote impact had op het alledaagse leven van adolescenten. Sinds de lockdown kwamen er berichten over hoe Nederlandse adolescenten kampen met mentale problemen. Tegelijkertijd zagen onderzoekers een verandering in het middelengebruik, mogelijk als coping mechanisme. In dit huidige onderzoek wordt er onderzocht of cannabisgebruik is veranderd onder Nederlandse scholieren tijdens de eerste COVID-19 lockdown. Ook wordt onderzocht of de factoren zelfcontrole, vrijetijdsbesteding met vrienden, ervaren ouderlijke controle en waargenomen descriptieve normen toekomstig op T1 (Jan-2020) cannabisgebruik kunnen voorspellen op T2 (Jan-2022). Het onderzoek is een longitudinaal onderzoek met twee meetmomenten. De sample bestaat uit 404 adolescenten van 12-17 jaar uit een Nederlandse gemeente. Uit het onderzoek is gebleken dat cannabisgebruik is toegenomen tijdens de eerste lockdown. Adolescenten met een lagere zelfcontrole of die meer vrijetijd met vrienden besteden hebben een vergrote kans om in de toekomst cannabis te gaan gebruiken. De resultaten bieden handvatten voor preventiemakers om cannabisgebruik in adolescenten tegen te gaan via bijvoorbeeld het versterken van zelfcontrole en meer toezicht tijdens vrijetijdsbesteding. Daarnaast laat dit onderzoek het belang zien van aandacht voor adolescenten tijdens tijden van crisissen.

Introduction

On March 11, 2020, the WHO declared the COVID-19 outbreak as a global pandemic. Six days later, the Netherlands went into an "intelligent" lockdown. This had devastating effects on the social life of many adolescents, since they could attend school less and were more often alone, due to social distancing. Meanwhile, scientists in the Netherlands observed a trend during the lockdown where adolescents use cannabis more often and for varied reasons (Van Laar et al., 2020). Where it was for fun and socialization before the COVID-19 pandemic, now some are using it to cope with boredom, loneliness, and feelings of depression caused by the COVID-19 pandemic (Lundahl & Cannoy, 2021; Van Laar et al., 2020).

This change in motivation and frequency in the use of cannabis can have negative outcomes for adolescents, such as poor (mental)health effects and poor student academic attainment (Caldeira et al., 2008; Hall, 2009). On the opposite, research also demonstrated some benefits of cannabis use, such as helping to cope with psychological problems and treat chronic pains (Shakya et al., 2021). So, cannabis use can have positive and negative health effects on adolescents. In times of the COVID-19 pandemic, where adolescents' cannabis use may have changed, it is of importance to investigate how cannabis used changed during the first lockdown, and what factors might have contributed to this.

Previous studies are inconsistent about the changes of cannabis use among adolescents in times of COVID-19. That is, some studies found an increase (Dumas et al., 2020; Fedorova et al., 2021; Liébana-Presa et al., 2020), while another research has found a decrease in adolescent cannabis use (Rogés et al., 2021). When considering the change in motivations it is likely that an increase of cannabis use was found because adolescents experience more distress and loneliness during the lockdown caused by difficulty in coping with the introduced COVID-19 measurements (Jones et al., 2021; Loades et al., 2020; Weinberger et al., 2019). On the other hand, according to the motivational model (Cooper et al., 2016), the main reason for most adolescents to use cannabis is social and in the presence of peers (McCabe et al., 2014). For instance, Rogés and colleagues (2021) found a decrease in the frequency among active using adolescents, which according to them could be due to less time spend with friends and more time spend with family. On the other hand, Dumas and colleagues (2020) found that adolescent frequently use cannabis solitary, which could explain why they found an increase. Adding to this, Fedorova and colleagues (2021) found indications that boredom and unemployment because of COVID-19 played a significant role in the found increase of cannabis use. Overall, all studies demonstrate a change of cannabis use among adolescent due

to COVID-19. However, research is inconsistent in the direction of this change, which is likely to be related to the motivations for use.

According to the differential susceptibility theory, some individuals are more vulnerable to the negative effects of adverse environments or situations, such as a pandemic, because of certain predispositions (Belsky et al., 2007). The differential development of cannabis use before and after COVID-19 lockdown may be influenced by factors, such as the level of self-control, amount of time spent with friends, perceived parental monitoring, and individuals' perceived norms about smoking cannabis.

First, the level of self-control is associated with cannabis use. Self-control is the ability to regulate thoughts and actions when facing temptations or impulses (Delisi, 2014). The Self-Control Theory (Gottfredson & Hirschi, 1990) is used as a framework to explain the relation between self-control and substance use. The theory explains that a deficit in self-control can cause an increase in self-destructive behavior, including the use of illicit drugs (e.g., cannabis). This is supported by a meta-analysis by Ridder and colleagues (2012), which also showed a positive association between low self-control and substance use, including cannabis. Another study by Schnell and Krampe (2020) on self-control and mental distress caused by COVID-19 measures found that individuals with lower self-control experienced more mental distress. That is, adolescents who have a higher level of self-control experience lower general mental distress, which serves as a buffer during challenging times (Schnell & Krampe, 2020). This would indicate that adolescents with a higher level of self-control, are less likely to have increased their cannabis use due to COVID-19.

Second, in adolescence, parents remain important socialization agents, also in relation to adolescents' cannabis use. Particularly parents' knowledge of the whereabouts and activities of their children when they are not supervised by them (Dishion & McMahon, 1998) is relevant, i.e., active parental monitoring. Research has found that adolescents who experience a higher level of active parental monitoring are at a lower risk to engage with cannabis (Musci et al., 2015; Steinberg et al., 1994; Tornay et al., 2013). For example, parents who know their children's whereabouts and friends can prevent their children's cannabis use, by for example setting rules on with who and where they are allowed to hang out (Tornay et al., 2013). Therefore, it is expected that adolescents who had a higher level of perceived active parental monitoring at T1, were less likely to have increased their cannabis use due to COVID-19.

However, not only active parental monitoring plays a key role in predicting adolescent future cannabis use. Another important predictor of cannabis use in adolescents are peers.

Research has found that adolescents use cannabis mostly in social situations in the presence of their peers (Buckner et al., 2012). McCabe et al. (2014) found that over 75% of the cannabis consumptions in adolescents occurred only in a social situation. Therefore, it is likely that adolescent who spend more time with friends at T1, were more likely to have increased their cannabis use due to COVID-19.

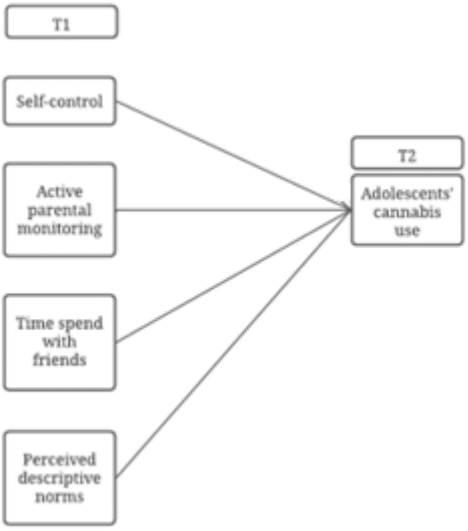
Lastly, adolescents perceived descriptive social norms are an important predictor of the level of cannabis use. Perceived descriptive norms are conceptualized as the anticipated frequency of others' cannabis use (Ecker & Buckner, 2014). Research has found that these norms impact adolescents' cannabis use positively (Dempsey et al., 2016; Pearson et al., 2018; Wolfson, 2000). Since perceived descriptive social norms on cannabis use are positively related to future cannabis use it is expected that adolescents who have less positive perceived descriptive social norms are less likely to have increased their cannabis use due to COVID-19.

The Current Study

The aims of the current study (LEF) was to investigate the change in cannabis use before and after the lockdown of 2020 among adolescents from a Dutch municipality, to expand current research and examine possible predictors. The predictors self-control, time spend with friends, perceived parental monitoring, and perceived descriptive norms will be considered to investigate differential change over time during the first COVID-19 lockdown in the Netherlands. It is hypothesized that the use of cannabis has differentially changed during the first lockdown, due to differences across relevant factors at the beginning of the pandemic. It is hypothesized that adolescents with a high level of self-control, who experience a higher amount of perceived parental monitoring, who spent less time with friends or who have less positive perceived social norms about cannabis use will be less likely to have increased their cannabis use because of COVID-19.

Figure 1

Hypothetical Model of Factors Contributing to Adolescents' cannabis use



Methods

Procedure and Participants

Data for the current study were part of a quantitative longitudinal study (LEF) conducted in a Dutch municipality. Originally this study is a quasi-experimental study where the effects of a community-based intervention is investigated. To avoid contamination of this intervention, only the municipality in the control condition is included in the current study. Adolescents attending the high school in this municipality participated in this study at two waves: January 2020 (T1) and January 2022(T2). Data were collected in class one through four, at prevocational education through pre-university secondary education, VMBO, HAVO and VWO, except for the graduate students. The data were collected using online anonymous questionnaires on a secured website. Prior to the data collection a passive consent form was send out to all the parents, with an option to refuse participation. The data collection protocol was accepted by the Ethical Commission Board of the faculty of Behavioral & Social Sciences of Utrecht university.

All students in class one through four were asked to fill out the online questionnaire. At T1 931 students participated, two years later at T2, of those 931 participants, 417 students participated and 507 students dropped out. This resulted in that 417 (44,79%) students were eligible for the analysis, as they participated at both T1 and T2. Dropouts were due to illness, absence, or refusal. Also, full classes dropped out because they left school or became graduate students. By looking at every respondent's answer, we found no evidence of unreliable

answers patterns or respondents, so no respondents were removed from the analysis because of this. From the 417 respondents, thirteen were removed because they had not finished the questionnaire, so 404 respondents were eventually eligible for the analysis. The age of this sample varied from 12- to 16-years, with a mean age of 13.90 (12.13 to 16.72, *SD*=0.83). More than half of the sample (53.50%). They were from one school with different educational tracks subdivided in 56.30% Vwo and Havo/Vwo students, 19.80% Havo students and 23.9% Havo / Vwmbo b/k/t students.

Loss to follow-up

With the use of independent t-tests and ANOVA tests attrition analyses were conducted. Participants who did not participate at T2 (N=507) differed as compared to those who did (N=417) on T1 characteristics. Non-response at follow-up reported a higher frequency of cannabis use (F = 6.22, p = <0.001), a lower level of perceived parental monitoring (t = -4.53, p = 0.049), a higher mean time spend with friends (T = 6.12, p = 0.014), a higher score on descriptive norms on cannabis use (t = 0.89, p = 0.015) and a higher age (t = 20.85, p = <0.001) No significant differences were found for the level of self-control (t= -4.56 p = 0.099), educational level (t = -4.32 , p = 0.192) and gender (F = 1.74, p = 0.187).

Table 1

Descriptive Statistics of Variables in the Analysis (Mean, minimum, maximum and Standard Deviation (SD)

	Mean	Min	Max	SD
Cannabis Use T1	0.027	.00	1.00	0.163
Cannabis Use T2	0.158	.00	1.00	0.366
Self-control	3.476	1.23	4.85	0.549
Active Parental Monitoring	3.945	1.00	5.00	0.921
Time Spend With Friends	3.428	1.00	6.00	0.998
Descriptive norms	1.460	1.00	5.00	0.691
Age	13.92	12.13	16.72	.834
Male	53.50%			
Educational level				

Vmbo b/k/t / Havo	23,90%
Havo	19.80%
Havo / Vwo	56.30%

Measures

Cannabis use

Cannabis use is assessed at T1 and T2 by asking the adolescent how many times (*Frequency*) the adolescent had ever used cannabis or hashish in its entire life (Elek, Miller-day & Hecht, 2006). Response options range from 0 (*Never*) to 6 (*30 times or more*). A higher score indicates more frequent cannabis use. Due to a skewed distribution, the items were dichotomized into 0 = never used cannabis in lifetime and 1 = has ever used cannabis in lifetime.

Self-control

Adolescents' self-control refers to the ability to regulate thoughts and actions when facing temptations or impulses and was measured at T1. The scale consisted of thirteen items with response options ranging from 0 (*Never*) to 4 (*Very often*). An example item is: "I say things that I am not supposed to say" (Tangney, Baumeister & Boone, 2004). Reversed items were recoded so that a higher mean score indicate a higher level of self-control. Cronbach's alpha was .761. The scale is found to be unidimensional and the items uncorrelated by conducting a factor analysis with determinants scores of .040.

Perceived parental monitoring

Perceived parental monitoring refers to an adolescents' perception of parents' knowledge of the whereabouts of their children which was measured at T1 consisting of five questions. Response categories ranged from 1 (*Never*) to 5 (*Always*), with an example item "Do you need parental permission to go out for an evening on a weekday?" (Kerr, Stattin & Ozdemir, 2012). A mean score is calculated where a higher score indicates a higher level of perceived parental monitoring, with a confidentiality rate of .861. The scale is found to be unidimensional and the items uncorrelated by conducting a factor analysis, with determinants scores of .115.

Time spend with friends

Time spend with friends refers to the amount of free time spend with friends, which was measured at T1 consisting of four questions. An example item is : "How often are you at a friend's house?''(Simpson & McBride, 1992). Response categories ranged from 1 (*Never*)

to 6 (*Very often*). A mean score of all items was computed, where a higher score indicates a higher level of time spend with friends. In this sample, the scale had a confidentiality rate of .848. The scale is found to be unidimensional and the items uncorrelated by conducting a factor analysis with determinants scores of .110.

Perceived descriptive norms

Perceived descriptive norms refers to the anticipated frequency of others' cannabis use, which was measured at T1 by asking how many peers are using cannabis/hashish according to the adolescent. Response categories ranged from 1 (*No-one*) to 5 (*Everyone*) The question was extracted from a scale about perceived descriptive norms on substances (Elek, Miller-day & Hech, 2006). A higher score indicates a more positive perceived descriptive norm.

Data analysis

Before the data-analysis, the data was checked for unreliable respondents. First, descriptive statistics were presented. Descriptive analyses, including spearman correlation tests, of all variables of interest were conducted across gender, age, level of education and wave. After, a one-way ANOVA was conducted to analyze if cannabis use among adolescents changed from T1 to T2. After that, to investigate the extent to which self-control, level of perceived parental monitoring, level of time spend with friends and level of perceived descriptive norms at T1 predicted cannabis use at T2, a binominal logistic regression was conducted. In these analyses we controlled for age, gender, and educational level. In the first step cannabis use at T1 and all control variables were added to the model, in the second step all predictors (Self-control, perceived parental monitoring, time spend with friends and perceived descriptive norms) were added to the model. All the analyses were conducted with the use of IBM SPSS Statistics 28.

Results

Correlations

Table 2 shows the correlations between all variables. Overall, all predictors were related with cannabis use at T1. A higher prevalence of lifetime cannabis use at T1 was significantly associated with a higher chance of lifetime cannabis use at T2, lower level of self-control, a lower level of perceived parental monitoring, a higher level of time spend with friends, more positive descriptive norms, and a higher age.

Table 2

Spearman Correlation with Cannabis Use Among All Variables of Interest

		1.	2.	3.	4.	5.	6.	7.	8.
1.	Cannabis use T1								
2.	Cannabis Use T2	.219***							
3.	Self-Control T1	-.138**	-.255***						
4.	Perceived Parental Monitoring T1	-.111*	-.042	.118*					
5.	Time Spend With Friends T1	.123*	.228***	-.028	.020				
6.	Descriptive Norms T1	.158***	.101*	-.045	-.038	.080			
7.	Age T1	.137**	.239***	-.069	-.051	.074	.278***		
8.	Gender T1	-.095	.003	.062	.252***	.084	.008	.026	
9.	Educational level T1	-.057	-.003	.123*	.089	-.100*	.117	.293	.079***

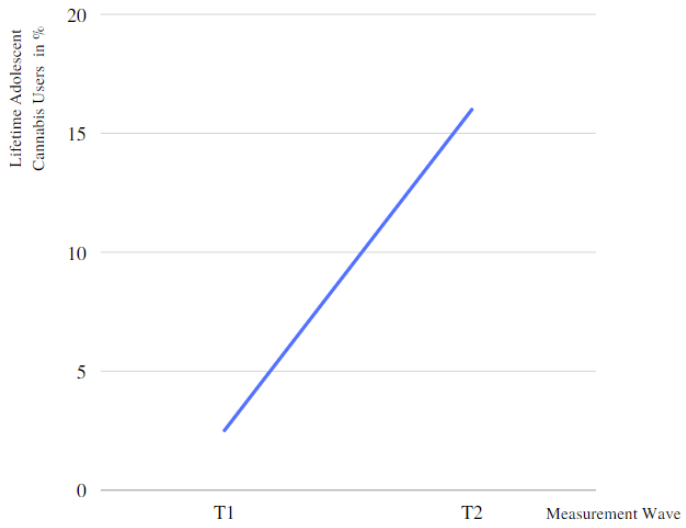
**** p<.001, ** p<.01, * p<.05 (two-tailed).*

Changes in Cannabis Use Between T1 and T2

First, ANOVA showed that cannabis use in adolescents changed significantly between T1, pre-COVID-19, and T2, post-COVID-19; $F(404)=20.25$, $p<.001$. It was found that more adolescents have ever smoked cannabis in their life post-COVID-19 (15.8%) compared to pre-COVID-19 (2.7%), as visualized in Figure 2.

Figure 2

Percentage of Adolescent Cannabis Users at T1 and T2



Logistic regression

A binominal logistic regression was conducted in order to investigate the effects of self-control, perceived parental monitoring, time spend with friends and perceived descriptive norms at T1 on the probability of lifetime cannabis use at T2, which is presented in Model 2. Linearity of the continuous variables with the dependent variable (cannabis use at T2) was assessed via the Box-Tidwell (1962) procedure. Due to violation of the assumption of linearity for the variable time spend with friends, a Bonferroni correction was conducted on all terms in the model. This resulted in that all variables were insignificant with $p < 0.00625$ (Tabachnick & Fidell, 2014), therefore the assumption of non-linearity for all variables is met. There were some standardized residuals greater than the recommended cut-off of two, but the amount did not exceed 5% of the total cases in the sample, so according to Field (2013) this is not regarded as problematic and so the cases were kept in the analysis. The area under the ROC curve was .787 (95% CI .723 to .850), which is acceptable level of discrimination and therefore a cut value of 0.5 is sufficient and the made predictions are not based on luck (Hosmer et al. 2013).

The overall model was statistically significant, $\chi 2$ (df= 6, N = 404) = 68.26, $p < .001$, Cox and Snell R^2= .0.155, Nagelkerke R^2 = 0.267. According to the classification table, 18,80% percent of the cases were correctly predicted to be in the group that has ever smoked cannabis and 81,20% of the cases were incorrectly predicted. Out of the 340 respondents who have

never smoked cannabis, 97.90% of the cases were predicted correctly and 2.10% of the cases were predicted incorrectly. Resulting from this, 85,40% of the cases were predicted correctly, which indicates a good predictive capacity of the final model. According to Hosmer and Lemeshow test, the final model was a good fit for the data $X^2(df = 8, N = 404) = 8.52$, p = 0.384.

As demonstrated in Table 4, Model 2, self-control, and time spend with friends at T1 significantly predicted lifetime cannabis use at T2. That is, a higher level of self-control at T1 predicted a lower likelihood of having used cannabis at T2 (OR=0.274, *p*=<0.001). Also, more time spend with friends at T1 increases the probability of lifetime cannabis use at T2 (OR =1.844, *p*=<0.001). Perceived parental monitoring and descriptive norms at T1 did not significantly predict cannabis use at T2.

Table 4 *Logistic Regression of Cannabis use on Self-Control, Perceived Parental Monitoring, Time Spend With Friends and Perceived Descriptive Norms.*

Note. **p< 0.01 *p< 0.05 CI = Confidence Interval

Variable	Model 1					Model 2				
	b	SE (b)	P	OR	95% CI	b	SE (b)	P	OR	95% CI
Age	0.763	0.178	< 0.001	2.145 **	[1.513, 3.042]	0.759	0.199	<0.001	2.136**	[1.445, 3.156]
Gender	0.116	0.292	0.691	1.123	[0.634, 1.990]	0.009	0.319	0.977	1.009	[0.540, 1.886]
Educational level	-0.088	0.101	.383	0.916	[0.751, 1.116]	-0.009	0.111	0.937	0.991	[0.798. 1.231]
Cannabis use at T1	1.836	0.693	0.008	6.271 **	[1.612, 24.391]	1.119	0.785	0.154	3.061	[0.657, 14.253]
Self-Control						-1.294	0.303	<0.001	0.274**	[0.151, 0.497]
Perceived parental monitoring						0.058	0.186	0.754	1.060	[0.736, 1.526]
Time spend with friends						0.612	0.168	<0.001	1.844**	[1.326, 2.565]
Perceived Descriptive norms						-0.035	0.214	0.871	0.966	[0.635, 1.469]
Nagelkerke				0.134					0.267	
N				404					404	

Discussion

This study investigated the change in cannabis use among adolescents before and after the COVID-19 pandemic and the extent to which level of self-control, parental monitoring, amount of time spend with friends and descriptive norms on cannabis use impacted this change. The results showed that cannabis use had increased during the first COVID-19 lockdown in the Netherlands. Additionally, adolescents with a lower level of self-control or those who spend more time with friends at T1 had a higher chance of lifetime cannabis use in T2. The level of perceived parental monitoring and perceived descriptive norms on cannabis use were not relevant for the chance of lifetime cannabis use.

This study showed that cannabis use in Dutch adolescents had increased during the first COVID-19 lockdown. Some previous studies have also demonstrated an increase in cannabis use during the COVID-19 pandemic. They found that adolescents experience more distress during a lockdown, caused by difficulty in coping with the introduced COVID-19 measurements (Jones et al., 2021; Loades et al., 2020; Weinberger et al., 2019). This increase is a reason for concern since (early)cannabis use is connected to poor (mental)health effects and poor student academic attainment in adolescents (Caldeira et al., 2008; Hall, 2009). Therefore, these results indicate that it is of importance that intervention makers and for example youth workers keep in mind that although all adolescents experience the same situation, the way they deal with the situation may differ and some may be at more risk than others. This is in line with the differential susceptibility theory, which states that some individuals are more vulnerable to the negative effects of adverse situations, e.g., a nationwide lockdown, because of certain predispositions and different reactions to this (Belsky et al., 2007). That is, adolescents with a lower level of self-control and adolescents spending more time with friend prior to the lock-down were more likely to start using cannabis after the lockdown. In line with the Self-Control Theory (Gottfredson & Hirschi, 1990) and previous research (Schnell & Krampe, 2020), adolescents with a lower level of self-control were at higher risk to have used cannabis. This could be because a lot of adolescents experienced mental distress such as loneliness, boredom, and anxiety due to restricting measures introduced by the Dutch government during this first lockdown (Samji et al., 2022). To cope with these mental distresses, it is likely that the adolescents with a lower level of self-control are more at risk to use cannabis, to suppress or cope with these feelings (Lundahl & Cannoy, 2021; Van Laar et al., 2020). This is especially applicable in light of the circumstances at the time of this research, namely a COVID-19 lockdown. This gives indications for future

interventions, namely, more focus on increasing an adolescent's level of self-control could subsequently decrease the chance of lifetime cannabis use, especially in times of COVID-19 or other stressful periods.

Adolescents who spent more time with friends were more likely to start using cannabis during the COVID-19 pandemic This finding is in support of previous studies that demonstrated that adolescents mostly use cannabis in the presence of peers (McCabe et al., 2014). This could indicate that adolescents who spend more time with their peers prior to the pandemic, are also the ones spending more time in the context of peers while formal contexts (e.g., sports clubs, schools) were closed due to COVID-19 measures. We know that adolescents spending more time in unstructured contexts, such as on the streets or in parks, are more likely to use substance (Albertos et al., 2021; Kiesner et al., 2010). Also, the unstructured contexts are characterized by a lack of adult supervision, i.e., parental monitoring (Kiesner et al., 2010). Though in the current study perceived parental monitoring was in conjunction with these factors not a relevant factor for adolescents' cannabis use, in itself there is sufficient and consistent evidence that it is an important protective factor for adolescents' substance use (Musci et al., 2015; Steinberg et al., 1994; Tornay et al., 2013). So, it is possible that perceived parental monitoring may be an important predictor on its own but in combination with other, stronger, predictors such as self-control and time spend with friends it is insignificant. Additionally, the combination of more time spend with friends and a lower level of self-control could have detrimental effects on adolescent cannabis use, especially in times of COVID-19. Namely, as the time spent with friends is unsupervised and adolescents with a low level of self-control could experience more psychological distress, this could lead to an even more increased risk of using cannabis. Therefore, in future lockdowns more focus on keeping adolescents monitored is needed, for example through more structured free time with supervision, or through encouraging parents to monitor their children more actively.

A way for parents to monitor their children more actively could be through a "parental prowl" in neighborhoods. A "parental prowl" is a meeting of parents where they walk around together in the neighborhood while actively monitoring what their and other children are doing on the streets (Sigfúsdóttir et al., 2009). This can for example give parents more insight into how their children are spending time with their friends. The parental prowl was implemented in Iceland, together with many other community-based interventions. The intervention was found to strengthen social local ties, generate a more positive parent-adolescent network, and increase parental involvement in school and neighborhood

(Sigfúsdóttir et al., 2009; Thorlindsson et al., 2007). Additionally, they found indications that this intervention contributed to the reduction and prevention of substance use in Icelandic adolescents. Therefore, such an intervention might also be successful in reducing cannabis use in Dutch adolescents.

In addition to perceived parental monitoring, descriptive norms about cannabis were also not predictive of cannabis use at follow-up. This is not in line with the literature as previous research has found that the norms about cannabis impact adolescents' cannabis use positively (Dempsey et al., 2016; Pearson et al., 2018; Wolfson, 2000). As we argued with respect to perceived parental monitoring, it is possible that also the role of descriptive norms is inferior to the level of self-control and time spend with friends in this specific situation of a COVID-19 pandemic. This further emphasizes the importance of a continuous offering of structured and supervised activities for adolescents, especially during challenging times such as a pandemic, since time spend with friends and level of self-control seems to be the most influential predictors of future lifetime cannabis use during these challenging times.

Methodological limitations and strengths

While we believe this longitudinal study makes an imperative contribution to existing knowledge about relevant predictors of cannabis use, particularly in times of a pandemic, it has some limitations. First, since the distribution of cannabis use was skewed, a dichotomous approach was used, which makes it impossible to draw conclusions about the frequency of cannabis use in already-using adolescents prior to the lock-down. Another limitation was that some factors were not investigated in this study, such as mental health factors or boredom, which in the literature were found to be good predictors of future cannabis use as well as the COVID-19 restrictions. Also, the study was conducted in one municipality which subsequently limits the level of generalizability. Although the findings do provide insight into changes in cannabis use due to COVID-19 and can inform the development of local interventions and policies, a larger sample would further strengthen our conclusions. Considering the limitations, the current study is, to our knowledge, the first one to demonstrate in a longitudinal design the role of self-control and time spent with friends in times of a COVID-19 lockdown.

Conclusion and future implications

This research has found that Dutch adolescents using cannabis has increased during the first COVID-19 lockdown. Adolescents with a lower level of self-control or who spend more time with friends are at higher risk of future cannabis use in times of COVID-related

restrictions. This points at the importance to redirect unsupervised time spend with friends to a safer and supervised environment, where adolescents can socialize safely, without (ab)using cannabis and other substances. In the unfortunate event of a new lockdown, or other crisis, it is of significant importance to (also) focus on adolescents, as they may be prone to cope with stress in an unhealthy way, by for example smoking cannabis. To prevent adolescents from smoking cannabis and help them cope in a healthy way, there must be a continuous offering of structured and supervised activities for adolescents. Additionally, we advise parents to monitor the whereabouts of their children, for example through a parental prowl, since this could prevent (problematic) cannabis use.

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Appendix 1

Mini essay on interdisciplinarity

The research question "Has the use of cannabis changed during the first COVID-19 lockdown in the Netherlands and are these changes different due to personal and environmental factors?" is interdisciplinary. According to Sameroff's model of development (2009), psychological and social phenomena are explained in different contexts, namely personal, family, group, and society and cultural contexts. These contexts are grounded with theories from different scientific disciplines, such as psychology, pedagogy, and sociology. To explain the current research question, several scientific disciplines and their theories need to be addressed. That is, because if the problem is solely explained through one discipline important aspects of the problem are ignored.

Within this research, several scientific disciplines are used in order to try explaining the investigated phenomena. First of all, a theory from psychology are used. That is, the self-control theory by Gottfredson & Hirshi (1990) in order to explain why there could be differences between individuals due to differential susceptibility (Belsky et al., 2007). This is a predisposed personal characteristic and therefore is personal in Sameroff's model.

Next, theories derived from pedagogy are used. An important theory in pedagogy is Bronfenbrenner's ecological systems theory (1992), in this theory several systems are mentioned that influence adolescents' behavior, including the meso- and the exosystem. Derived from this model, theories about the influence of parents and of are used in order to explain changes in adolescents' cannabis use. These are family and group characteristics according to Sameroff's model.

Additionally, a theory derived from psychology and sociology is used, namely the theory of perceived social norms (Ecker & Buckner, 2014). That is, personal believes about others cannabis use and acceptance can change due to social changes, such as the COVID-19 crisis, which has introduced large societal changes. In Sameroff's model this is the society and cultural characteristic.

Overall, this model can be seen as an interdisciplinary model because the factors that are used to explain the social phenomena are derived from all levels of Sameroff's model and involve multiple scientific disciplines. This is useful, as it sheds a light on various aspects the phenomena and therefore provides a holistic view.

Appendix 2

Literature mini essay

Belsky, J., Bakermans-Kranenburg, M. J., & Van IJzendoorn, M. H. (2007). For better and for worse: Differential susceptibility to environmental influences. *Current directions in psychological science*, 16(6), 300-304. https://doi.org/10.1111%2Fj.1467-8721.2007.00525.

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Appendix 3

Igitur form

Information about your thesis

Please save this form, modify it and e-mail it to your supervisor together with the digital final version of your thesis. For further questions see: http://studion.fss.uu.nl/helpdesk/student/scrol

Student nummer:	6286720
Initials & prefixes:	A.
Family name:	Fröberg
Master:	Youth Studies

Begeleider

Name supervisor/assesor: *	Ina Koning
Name 2th assesor:	Tom ter Bogt

Scriptie

Title thesis: *	Cannabis use in Dutch adolescents: An evaluation of changes before and after the first lockdown.
Language thesis: *	English
Abstract:	On March 17, 2020, the Netherlands went into the first COVID-19 lockdown, which had a major impact on the life of Dutch adolescents. Since then, several alarming reports came out, saying that Dutch adolescents were coping with more mental distress. Meanwhile, researchers noticed changes in substance use, possibly to cope with this distress. This current research aimed to investigate if cannabis use has changed during the first lockdown in Dutch middle schoolers, and if certain factors, e.g., level of self-control, time spend with friends, perceived parental monitoring, and perceived descriptive norms, at T1 (Jan-2020) were predictive of lifetime cannabis use at T2 (Jan-2022). The study is a two waved longitudinal study, with a sample size of 404 high schoolers aged 12-17 from a Dutch municipality. The study found that cannabis use increased during the first lockdown. Adolescents with a lower level of self-control or who spent more time with friends at T1 had an increased risk of lifetime cannabis use at T2. These results provide new insights into how prevention makers might reduce adolescent cannabis use through self-control, parental monitoring and supervised leisure activities. Importantly, it also emphasizes the importance to keep an eye on adolescents during times of crisis.
Key words: (seperated by ;)	Cannabis; Substance; COVID-19; Adolescence; Self-Control; Leisure Time; Dutch
Make public: *	No
Make public after date:	

Filled in on: * 07 june 2022
Name: * Arwin Fröberg

* = Obliged to fill in

Appendix 4 Syntax SPSS

```
* Encoding: UTF-8.

**Arwin Froberg master thesis .

get file= "U:\Masterthesis\Data-set\Project LEF - Jongeren T3 + T5 - nieuwe koppeling RUW.sav" .

Set tnumbers=both onumbers=both ovars=both tvars=both .

*** Descriptives bekijken over alle data in de dataset .

FREQUENCIES VARIABLES=V_age V4 V5
  /STATISTICS=MINIMUM MAXIMUM MEAN
  /ORDER=ANALYSIS.

*** N=1918 Missing = 930, RSG enkhuizen = 931, don bosco= 987 missing = 930 .

*** Alle data eruit halen die niet gaan over RSG Enkhuizen .

 FILTER OFF.

USE ALL.

SELECT IF (V5 = 2).

EXECUTE.

*** Data bekijken van alleen RSG Enkhuizen .

FREQUENCIES VARIABLES=V_age V4 V5
  /STATISTICS=MINIMUM MAXIMUM MEAN
  /ORDER=ANALYSIS.

*** n=931 Missing = 0, dus het alleen selecteren van RSG enkhuizen is goed gegaan! .

*** Bekijken hoeveel respondenten hebben meegedaan in t3 en hoeveel in t5 .

FREQUENCIES VARIABLES=T3 T5
  /STATISTICS=MINIMUM MAXIMUM MEAN
  /ORDER=ANALYSIS.

*** T3: 1 = 931, dus dat klopt. T5: 1=514 0=417, dus 417 respondenten hebben meegedaan aan beide waves.

*** Syntax helemaal opnieuw runnen, maar niet de respondenten eruit gehaald welke niet hebben meegedaan aan beide waves, zodat ik nieuwe variabelen wel heb en attrtion analyses kan doen . dus bovenstaande regels overslaan) .

*** T-test en anova doen om naar de verschillen te kijken tussen de groepen .

T-TEST GROUPS=T5(0 1)
  /MISSING=ANALYSIS
  /VARIABLES=Dicho_V30_1 MeanActivMoni MeanVZelfcontrole MEANV49 D.V54_4 V6
```

```
  /ES DISPLAY(FALSE)

  /CRITERIA=CI(.95).

ONEWAY  V4 Dicho_V30_1 BY T5

  /ES=OVERALL

  /MISSING ANALYSIS

  /CRITERIA=CILEVEL(0.95).
```

** Gelukt, nu kan ik de respondenten die niet hebben meegedaan aan beide waves eruit halen.

*** Respondenten die niet hebben meegedaan aan beide waves eruit halen, moeten er 417 overblijven .

```
USE ALL.

COMPUTE filter_$=(V5 = 2  &  T3 = 1  & T5 = 1).

VARIABLE LABELS filter_$ 'V5 = 2  &  T3 = 1  & T5 = 1 (FILTER)'.

VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.

FORMATS filter_$ (f1.0).

FILTER BY filter_$.

EXECUTE.
```

*** Descriptives bekijken om te kijken of het klopt wat ik gedaan heb .

```
FREQUENCIES VARIABLES=V_age V4

  /STATISTICS=MINIMUM MAXIMUM MEAN

  /ORDER=ANALYSIS.
```

*** n=417, dat klopt, dus ik heb succesvol alle respondenten geselecteerd die op RSG Enkhuizen EN aan beide waves hebben deelgenomen .

*** nu respondenten met missing eruit halen

```
USE ALL.

COMPUTE
filter_$=(NMISS(V30_1,V37_1,V37_2,V37_3,V37_4,V37_5,V44_1,V44_2,V44_3,V44_4,V44_5,V4
4_6,


V44_7,V44_8,V44_9,V44_10,V44_11,V44_12,V44_13,V49_1,V49_2,V49_3,V49_4,V54_4,D.V30_
1) < 1).

VARIABLE LABELS filter_$
'NMISS(V30_1,V37_1,V37_2,V37_3,V37_4,V37_5,V44_1,V44_2,V44_3,V44_4,'+


'V44_5,V44_6,V44_7,V44_8,V44_9,V44_10,V44_11,V44_12,V44_13,V49_1,V49_2,V49_3,V49_4,
V54_4,'+

    'D.V30_1) < 1 (FILTER)'.
```

```
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.

FORMATS filter_$ (f1.0).

FILTER BY filter_$.

EXECUTE.
```

*** N 404 .

*** Descriptives opvragen van participanten voor methode sectie .

```
FREQUENCIES VARIABLES=V_age V4 V6 V7

  /STATISTICS=STDDEV MEAN

  /ORDER=ANALYSIS.
```

*** Descriptives alle variabelen in model ophalen voor methode sectie .

```
DESCRIPTIVES VARIABLES=Dicho_V30_1 Dicho_DV30_1 MeanVZelfcontrole MEANV49
MeanActivMoni V54_4 V_age

    V4 V6

  /STATISTICS=MEAN STDDEV MIN MAX.
```

***---------- SAMPLE geselcteerd, nu variabelen ----------

*** Variabele descriptives bekijken van V30_1, cannabis gebruik .

```
FREQUENCIES VARIABLES=V30_1

  /STATISTICS=MINIMUM MAXIMUM MEAN

  /ORDER=ANALYSIS.
```

*** 1 staat gelijk aan nooit, 7 aan 30 keer of vaker, dus hoef hem niet om te zetten of een schaal van te maken .

*** Nu tweede meting van V30_1 bekijken genaamd Dv30_1 .

```
FREQUENCIES VARIABLES=D.V30_1

  /STATISTICS=STDDEV MEAN MEDIAN MODE SUM

  /ORDER=ANALYSIS.
```

*** n=404 missing = 0, dus dat klopt

* Erg scheef verdeeld. Na overleg Ina besloten om te dichotomiseren, zodat analyses meer zeggen. Nu variable van cannabis dichotomiseren. zodat hij gebruikt kan worden voor een logische regressie.

    * hier wordt iedereen die nooit cannabis heeft gerookt 0, en die wel ooit cannabis heeft gerookt 1 .

```
RECODE V30_1 (1=0) (2 thru 7=1) INTO Dicho_V30_1.

VARIABLE LABELS  Dicho_V30_1 'Dichotomisering van v30_1'.
```

EXECUTE.

*** Kijken of het goed is gegaan .

FREQUENCIES VARIABLES=Dicho_V30_1

/STATISTICS=STDDEV MEAN MEDIAN MODE SUM

/ORDER=ANALYSIS.

*** Nu voor tweede meting cannabis hetzelfde doen .

RECODE D.V30_1 (1=0) (2 thru 7=1) INTO Dicho_DV30_1.

VARIABLE LABELS Dicho_DV30_1 'Dichotomisering voor DV30_1'.

EXECUTE.

*** Kijken of het goed is gegaan

FREQUENCIES VARIABLES=Dicho_DV30_1

/STATISTICS=STDDEV MEAN MEDIAN MODE SUM

/ORDER=ANALYSIS.

** klopt, dat betekent dat beide variabelen succesvol zijn gedichotimiseerd .

* ---------- .

*** Nu ga ik voor V_37 een schaal aanmaken, zodat deze gebruikt kan worden in de analyses, maar eerst freq bekijken .

FREQUENCIES VARIABLES=V37_1 V37_2 V37_3 V37_4 V37_5

/STATISTICS=STDDEV MEAN MEDIAN MODE SUM

/ORDER=ANALYSIS.

*** Alle items zijn hetzeflde geformuleerd en de codes zijn allemaal hetzelfde van 1. nooit naar 5 altijd . Eerst een reliability test uitvoeren om te kijken of de schaal kan worden gemaakt .

RELIABILITY

/VARIABLES=V37_1 V37_2 V37_3 V37_4 V37_5

/SCALE('ALL VARIABLES') ALL

/MODEL=ALPHA

/STATISTICS=DESCRIPTIVE SCALE CORR

/SUMMARY=TOTAL.

*** Cronbachs alpha is hoog, en if item deleted is allemaal lager, dus schaal kan worden gemaakt, maar eerst factor analyse doen voor V37 om te kijken of de items undimensional zijn .

FACTOR

/VARIABLES V37_1 V37_2 V37_3 V37_4 V37_5

/MISSING PAIRWISE

/ANALYSIS V37_1 V37_2 V37_3 V37_4 V37_5

/PRINT INITIAL CORRELATION SIG DET KMO EXTRACTION ROTATION

/PLOT EIGEN

/CRITERIA MINEIGEN(1) ITERATE(25)

/EXTRACTION PC

/CRITERIA ITERATE(25)

/ROTATION VARIMAX

/METHOD=CORRELATION.

** undemensional want determinant score van 0.115 dus dat is goed . . KMO van .841, Barletts test <0,001 , 64% of variance explained, kunnen de schaal dus gebruiken .

*** Nu een schaal aanmaken van de 5 items naar mean voor actieve monitoring .

COMPUTE MeanActivMoni=MEAN.5(V37_1,V37_2,V37_3,V37_4,V37_5).

VARIABLE LABELS MeanActivMoni 'Meanscore van actieive monitoring in wave 1 '.

EXECUTE.

**** Checken of het goed is gegaan .

FREQUENCIES VARIABLES=MeanActivMoni

/FORMAT=NOTABLE

/STATISTICS=STDDEV MINIMUM MAXIMUM MEAN

/ORDER=ANALYSIS.

*** klopt en is goed gegaan .

*** ---------- .

*** Nu dooor naar volgende variabele V44, descriptives bekijken

FREQUENCIES VARIABLES=V44_1 V44_2 V44_3 V44_4 V44_5 V44_6 V44_7 V44_8 V44_9 V44_10 V44_11 V44_12

V44_13

/STATISTICS=STDDEV RANGE MINIMUM MAXIMUM MEAN

/ORDER=ANALYSIS .

** n=404 missings = 0, vraag 1, 2 , 5 , 6 7 8 9 11 12 moeten worden omgepoold voor reliability kan worden gechekt en een schaal kan worden gemaakt .

RECODE V44_1 V44_2 V44_5 V44_6 V44_7 V44_8 V44_9 V44_11 V44_12 (1=5) (2=4) (3=3) (4=2) (5=1) INTO

RV44_1 RV44_2 RV44_5 RV44_6 RV44_7 RV44_8 RV44_9 RV44_11 RV44_12. .

EXECUTE .

** Staan in de variable view, dus is gelukt, nu kijken naar reliability .

*** nu reliability analysis .

```
RELIABILITY
  /VARIABLES= RV44_1 RV44_2 RV44_5 RV44_6 RV44_7 RV44_8 RV44_9 RV44_11 RV44_12.
V44_3 V44_4
    V44_10 V44_13
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL.
```

** Cronachs Alpha is .761, wat goed is, hier niks aan veranderen verder .Nu factor analyse om te cheken op undemensionality .

```
FACTOR
  /VARIABLES RV44_1 RV44_2 RV44_5 RV44_6 RV44_7 RV44_8 RV44_9 RV44_11 RV44_12.
V44_3 V44_4
    V44_10 V44_13
  /MISSING PAIRWISE
  /ANALYSIS RV44_1 RV44_2 RV44_5 RV44_6 RV44_7 RV44_8 RV44_9 RV44_11 RV44_12.
V44_3 V44_4
    V44_10 V44_13
  /PRINT INITIAL CORRELATION SIG DET KMO EXTRACTION ROTATION
  /PLOT EIGEN
  /CRITERIA MINEIGEN(1) ITERATE(25)
  /EXTRACTION PC
  /CRITERIA ITERATE(25)
  /ROTATION VARIMAX
  /METHOD=CORRELATIO .
```

*** undemensional want determinant score van 0.04 dus dat is goed . . KMO van .808, Barletts test <0,001 , 53% of variance explained, kunnen de schaal dus gebruiken

** Nu de schaal aanmaken .

```
COMPUTE MeanVZelfcontrole=MEAN(V44_3,V44_4, V44_10, V44_13, RV44_1, RV44_2,
RV44_5, RV44_6, RV44_7,
    RV44_8, RV44_9, RV44_11, RV44_12.).
VARIABLE LABELS  MeanVZelfcontrole 'meanscore van V Zelfcontrole '.
```

EXECUTE.

FREQUENCIES VARIABLES=MeanVZelfcontrole

/ORDER=ANALYSIS.

** n=413 en 4 missings dus dat is goed gegaan.

* * ---------- .

*** Nu V 49 .

FREQUENCIES VARIABLES=V49_1 V49_2 V49_3 V49_4

/ORDER=ANALYSIS.

** Geen gekke dingen, n=404.

*** Niks hercoderen, dus kan meteen reliability checken en daarna de schaal aanmaken

RELIABILITY

/VARIABLES=V49_1 V49_2 V49_3 V49_4

/SCALE('ALL VARIABLES') ALL

/MODEL=ALPHA

/STATISTICS=DESCRIPTIVE SCALE CORR

/SUMMARY=TOTAL.

** Cronbachs alpha is .848, met 1 item weg wordt ie hoger, maar besloten om dit niet te doen door lage item aantal en toch al hoge reliability.

*** Nu factor analyse voor undemensionality .

FACTOR

/VARIABLES V49_1 V49_2 V49_3 V49_4

/MISSING PAIRWISE

/ANALYSIS V49_1 V49_2 V49_3 V49_4

/PRINT INITIAL CORRELATION SIG DET KMO EXTRACTION ROTATION

/PLOT EIGEN

/CRITERIA MINEIGEN(1) ITERATE(25)

/EXTRACTION PC

/CRITERIA ITERATE(25)

/ROTATION VARIMAX

/METHOD=CORRELATIO .

*** determinant score van 0.110 dus dat is goed, betekent undemensional . . KMO van .772, Barletts test <0,001 , 69% of variance explained, kunnen de schaal dus gebruiken.

```
COMPUTE MEANV49=MEAN(V49_1,V49_2, V49_3, V49_4).
VARIABLE LABELS  MeanV49 'mean freq vrijetijdsbesteding vrienden '.
EXECUTE.
FREQUENCIES VARIABLES=MEANV49
  /ORDER=ANALYSIS.
```

*** n=404 missing= 0 geen rare dingen, dus klopt.

* * * ---------- .

** Nu V54_4 .

```
FREQUENCIES VARIABLES=V54_4
  /ORDER=ANALYSIS.
```

*** n=404 verder geen rare dingen .

*** Nu DV54_4 .

```
FREQUENCIES VARIABLES=D.V54_4
  /ORDER=ANALYSIS.
```

** n= 404 missing = 0, verder geen bijzonderheden, niemand heeft 5 gescoord, wel uitgevraagd.

*** ----------.

** Nu de assumptuies van een binary logistic regression controleren.

*** Eerst checken op belangrijke outliers via cooks distance .

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT Dicho_DV30_1
  /METHOD=ENTER MeanActivMoni MeanVZelfcontrole MEANV49 V54_4 V_age V4
  /SAVE COOK.
```

*** Geen gevallen met cook's >1 dus geen reden tot zorgen.

*** nu checken op multicolinearity .

```
REGRESSION
  /DESCRIPTIVES MEAN STDDEV CORR SIG N
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA COLLIN TOL
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT Dicho_DV30_1
  /METHOD=ENTER MeanActivMoni MeanVZelfcontrole MEANV49 V54_4 V_age V4
  /SAVE COOK.
```

** Geen VIF waardes van >5 >10, en geen tolerance scores van <.1 of <.2, dus geen zorgen voor multicolinearity .

*** Checken op assumptie voor linearity, eerst nutral logarithm variabelen aanmaken voor alle continue independent variables.

```
COMPUTE LnZelfControle=LN(MeanVZelfcontrole).
EXECUTE.
COMPUTE LnActivMonitor=LN(MeanActivMoni).
EXECUTE.
COMPUTE LnVrijetijd=LN(MEANV49).
EXECUTE.
COMPUTE LnDescriptieve=LN(V54_4).
EXECUTE.
COMPUTE LnLeeftijd=LN(V_age).
EXECUTE.
LOGISTIC REGRESSION VARIABLES Dicho_DV30_1
  /METHOD=ENTER V4 V_age LnLeeftijd*V_age MeanActivMoni
LnActivMonitor*MeanActivMoni
    MeanVZelfcontrole LnZelfControle*MeanVZelfcontrole LnVrijetijd*MEANV49 MEANV49
V54_4 LnDescriptieve*V54_4
  /CONTRAST (V4)=Indicator(1)
  /SAVE=PRED RESID ZRESID
  /CLASSPLOT
  /CASEWISE OUTLIER(2)
  /PRINT=GOODFIT CI(95)
```

/CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).

** Uit deze analyse blijkt dat time sepnd with friends non lineair is, dus hier moet een oplossing voor komen . Maar kijkend naar bonferroni corrected, laat zien at hij niet meer signifiant is, dus geen non lineairiteit .

** Ik ga dit via de Box-Tidwell manier doen, omdat ik niet weet waar het lineairieits probleem vandaan komt.

*** eerst variables in equation bekijken .

LOGISTIC REGRESSION VARIABLES Dicho_DV30_1

/METHOD=ENTER V_age V4 MeanActivMoni MeanVZelfcontrole MEANV49 V54_4

/CRITERIA=PIN(.05) POUT(.10) ITERATE(20) CUT(.5).

*** Vrijtijdsbesteding heeft een B score van .623,, die is nodig voor de power transformation .

** Nu Gamma op schrijven, dat is time spend x time spend , deze heb ik al eerder uitgevoerd en is .256 .

LOGISTIC REGRESSION VARIABLES Dicho_DV30_1

/METHOD=ENTER V4 V_age LnLeeftijd*V_age MeanActivMoni LnActivMonitor*MeanActivMoni

MeanVZelfcontrole LnZelfControle*MeanVZelfcontrole LnVrijetijd*MEANV49 MEANV49 V54_4 LnDescriptieve*V54_4

/CONTRAST (V4)=Indicator(1)

/SAVE=PRED RESID ZRESID

/CLASSPLOT

/CASEWISE OUTLIER(2)

/PRINT=GOODFIT CI(95)

/CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).

*** formule is 1 + (b:gamma) dus 1 + (0.623:0,256) = 3,433, uit de Lambda tabel, blijkt dat ik daarom X cubed moet gebruiken. (Collet, 2003, Menard, 2010) .

COMPUTE CubeTimeSpendWithFriends=MEANV49 ** 3.

EXECUTE.

** Nu kijken of ze wel een lineair verband hebben met elkaar .

** natural log transformation aanmaken van cube timespendwithfriends .

COMPUTE LNCubeTimeSpend=LN(CubeTimeSpendWithFriends).

EXECUTE.

** Box Tidwell analyse opnieuw uitvoeren .

LOGISTIC REGRESSION VARIABLES Dicho_DV30_1

/METHOD=ENTER V4 V_age LnLeeftijd*V_age MeanActivMoni LnActivMonitor*MeanActivMoni

MeanVZelfcontrole LnZelfControle*MeanVZelfcontrole CubeTimeSpendWithFriends CubeTimeSpendWithFriends*LNCubeTimeSpend V54_4 LnDescriptieve*V54_4

/CONTRAST (V4)=Indicator(1)

/SAVE=PRED RESID ZRESID

/CLASSPLOT

/CASEWISE OUTLIER(2)

/PRINT=GOODFIT CI(95)

/CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).

** Nu is de p groter van Time spend with friends x time spend with friends > .00625, dus is hij wel lineair en kunnen we nu verder :) .

*** nu testen op outliers met binaire logistische regressie.

LOGISTIC REGRESSION VARIABLES Dicho_DV30_1

/METHOD=ENTER MeanActivMoni MeanVZelfcontrole V54_4 MEANV49 V_age V4

/SAVE=PRED

/CLASSPLOT

/CASEWISE OUTLIER(2)

/PRINT=GOODFIT CI(95)

/CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).

*** Er zijn 12 outliers, maar dit bedraagt niet meer dan 5% (20) van de totale cases (404) , dus niet problematisch (Field, 2013) .

*** Nu analyse uitvoeren met aleen de predictors .

LOGISTIC REGRESSION VARIABLES Dicho_DV30_1

/METHOD=ENTER MeanActivMoni MeanVZelfcontrole V54_4 MEANV49

/SAVE=PRED

/CLASSPLOT

/CASEWISE OUTLIER(2)

/PRINT=GOODFIT CI(95)

/CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).

*** Nu analyse uitvoeren. eerst alleen control variabelen, daarna de predictors erbij met alleen controle variabelen, dus leeftijd en geslacht .

LOGISTIC REGRESSION VARIABLES Dicho_DV30_1

/METHOD=ENTER V_age V4

/SAVE=PRED

/CLASSPLOT

/CASEWISE OUTLIER(2)

/PRINT=GOODFIT CI(95)

/CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).

** Nu analyse uitvoeren met controle variabelen en predictors samen .

LOGISTIC REGRESSION VARIABLES Dicho_DV30_1

/METHOD=ENTER V_age V4 Dicho_V30_1 V6

/METHOD=ENTER MeanActivMoni MeanVZelfcontrole MEANV49 V54_4

/PRINT=GOODFIT CI(95)

/CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).

** Hieruit blijkt dat leeftijd significant is, en ook zelf controle en time spend with friends, ik ga nu de final model maken, met alleen de controle variabelen self control en time spend with friends .

LOGISTIC REGRESSION VARIABLES Dicho_DV30_1

/METHOD=ENTER V_age V4 Dicho_V30_1 V6

/METHOD=ENTER MeanVZelfcontrole MEANV49

/PRINT=GOODFIT CI(95)

/CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).

*** Nu wil ik uitzoeken wat de betse cut-off point is voor dit model middels de ROC curve .

ROC PRE_1 BY Dicho_DV30_1 (1)

/PLOT=CURVE(REFERENCE)

/PRINT=SE

/CRITERIA=CUTOFF(INCLUDE) TESTPOS(LARGE) DISTRIBUTION(FREE) CI(95)

/MISSING=EXCLUDE.

*** Spearman correlation uitvoeren voor de methode sectie, gekozen voor spearman doordat het een logistische regressie is.

NONPAR CORR

/VARIABLES=Dicho_V30_1 Dicho_DV30_1 MeanVZelfcontrole MeanActivMoni MEANV49 V54_4 V_age V4 V6

/PRINT=SPEARMAN TWOTAIL NOSIG LOWER

/MISSING=PAIRWISE.

** toename significantie t1 en t2 cannabis gebruik checken met anova

```
ONEWAY Dicho_V30_1 BY Dicho_DV30_1
  /ES=OVERALL
  /STATISTICS DESCRIPTIVES
  /PLOT MEANS
  /MISSING ANALYSIS
  /CRITERIA=CILEVEL(0.95).
```

*** ---------- Einde transcript ----------
----------.

Appendix 5: Research activities TED

Registration Form: Research Activities for TED-students (in total 60 hrs)

Arwin Fröberg

6286720

Research Activities	Total number of hours	Signature YS staff
Helping conducting questionnaires for LEF in Volendam 26/27/28 January	30 hours	
Moderator during master open day 11 February	2 hours	
Transcribing 2.5 interviews Anneloes on alcohol norms and rules	15 hours	
Developing a factsheet for Enkhuizen on Thesis results of Anneloes and me	13 hours	
Total	60 hours	