Trends

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Running Head: Tell me who your friends are?!

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Abstract

Objective: To evaluate the relationship between onset age of cannabis use and cannabis abuse testing the mediating role of the number of friends using cannabis with a sample of Portuguese cannabis users. Comparing men and women regarding these relationships.

Method: A sample of 529 Portuguese cannabis users, composed of 276 men and 244 women, aged from 14 to 21 years, completed a sociodemographic questionnaire, the Cannabis Abuse Screening Test and four questions related to cannabis use. Data were analyzed using the PROCESS macro in SPSS version 26.0.

Results: The onset age of cannabis use was negatively related to the number of friends using cannabis, while the number of friends using cannabis showed a positive relationship with cannabis abuse. As predicted, the number of friends using cannabis seems to have a mediating role in the relationship between the onset age of cannabis use and cannabis abuse since the indirect effect was found to be significant. The pattern of the relationships among the variables observed was found to be similar both for the male and women' samples. However, males reported higher cannabis abuse than females.

Conclusion: Results highlight the mediating role of the friends' using cannabis in the relationship between the onset age of cannabis use and users' abuse. Results highlight the importance of early intervention to cannabis use. Particularly, the pattern of the relationships observed among the studied variables emphasized the need to monitor and peer training intervention or the promotion of social skills.

Keywords: Cannabis abuse, onset age, friends using cannabis, mediation.

Introduction

According to the World Health Organization,[1] cannabis is a psychoactive substance of natural origin, that exerts an action on the central nervous system and modifies one or more of its functions, perceptions, emotions, attitudes, and behaviours.[1] It is, actually, the most widely used illicit substance,[2] being estimated that 3.8% of the global population between 15 to 64 years used cannabis in the past year, an increase of about 30% between 1998 and 2017. Among Europeans aged from 15 to 34 estimated use is around 15%, rising to 19.2% among those aged 15 to 24.[3] Also in Portugal, estimated a prevalence of cannabis use of 9.7% between the ages of 15 and 74, with 4.5% reporting use in the past 12 months.[4] According to a survey of young people participating in the National Defense Day, aged 18 in 2019, the prevalence of cannabis use in the last year reaches 26.9%. Data that allow us to understand the extent of this public health problem. In fact, cannabis is the most used illicit substance, regardless of age, gender, and region of residence, with a prevalence of consumption the last year higher than the European average and still growing.[4]

Some factors have been associated with cannabis use. It tends to be higher in males,[5-8] related to parenting practices and parental cannabis use[9-12] as well as friends use.[13-15] Also, the ease of access,[8] in a culture of complacency or permissiveness,[16] being perceived as harmlessness [17-18] and even normalized,[19] contribute to its growing use in adolescence.

In a developmental period that is well-known for its challenges and changes,[20] where the peer group assumes itself as a source of identity and bonding, students desire to "fit in" and substances are used as a strategy to manage their anxiety, particularly regarding schoolwork, sense of academic failure and lack of social support.[21] Although some studies already explored the effect of friends in cannabis use [13-15] or onset age of cannabis use on

other psychopathological problems[22-23] and cannabis abuse or other harmful substance use behaviours,[7,24] there is a lack of evidence relating to the mediating role of the friends' use between the onset age of cannabis use and users' abuse of this substance. The present study explored the relationships among the onset age of cannabis use, the number of friends using cannabis, and cannabis abuse, particularly, testing the mediating role of the number of friends using cannabis. In addition, since previous studies suggest a moderating role of some demographic characteristics[5-8], such as when comparing men and women[5], the current study, explored the relationships among the onset age of cannabis use, the number of friends using cannabis, and cannabis abuse comparing men and women. Bearing in mind the conceptual model understudy, this work has the potential to contribute to the literature and practice. First, we explore the mediating role of the number of friends using cannabis by contributing to explain the relationship between the onset age of cannabis use and cannabis abuse. To the best of our knowledge, this is the first study testing a more complex model by including the number of friends using cannabis as an intervenient variable that contributes to explain the relationship between the onset age of cannabis use and cannabis abuse. Second, the current study inspects if there are differences in the relationships among the onset age of cannabis use, the number of friends using cannabis, and cannabis abuse depending on being man or woman. Furthermore, based on the results obtained, we expect to contribute to indicate a set of practices to be implemented in the psychotherapeutic process with cannabis users and peer training intervention or promotion of social skills focused on social groups with a substance use history.

The onset age of cannabis use and cannabis abuse

In literature, several studies point out the increasing cannabis use particularly since the end of the first decade of the millennium [6,25] with the largest percentage of cannabis' first experiment before the age of 20.[26] According to a systematic review of studies on the prevalence and risks of cannabis use disorder among users, performed by Leung et al.,[27] one in every eight individuals who use cannabis will develop cannabis dependence, with the greatest risks associated with early initiation and frequent use in the adolescent population. And similar evidence is found in the literature. Adolescents who started using cannabis before 15 years were at a higher risk of developing drug abuse symptoms by age 28.[24] This issue assumes particular importance once several studies associate higher risks of cannabis and other drug abuse when early-onset age.[7,26-28] A part of the subsequent adverse educational outcomes,[28-30] early, frequent and heavy cannabis use is strongly associated with cognitive and mental health problems in adulthood.[31] Also, evidence shows that impairment in the brain is higher in adolescents use when compared with adults.[32-34] Bearing in mind the literature, this study's first hypothesis was as follows:

Hypothesis 1: Onset age of cannabis use has a negative relationship with cannabis abuse.

Indirect effects: A proposal for the mediating role of the number of friends using cannabis

As previously noted, the literature suggests the onset age of cannabis use as being significantly related to cannabis abuse.[27] Going one step further, the current study suggests

that beyond this direct relationship, an indirect relationship can also occur through the number of friends using cannabis.

In the literature, most studies explore the relationship between the number of friends using cannabis and cannabis abuse. Some authors point out the role of socialization and identification with groups that they consider to be similar from the point of view of substance use.[35] Also, by social learning,[36] adolescents imitate their high-status peers, leading to involvement in cannabis use.[37] Particularly, with the increasing time children and adolescents spent at schools, this context assumes a determinant role for their behaviours. Authors as Fletcher et al.[21] explore how this context influence drug use and find three main motives: students who do not identify with indicators of success find in substance use a source of identity and connection, students who want to be included in schools that are considered unsafe and the use of drugs facilitating this process, but also substance use might be used as a coping strategy about schoolwork or unhappiness.[21] Despite the motives, there are several studies identifying friends using cannabis as a predictor of substance use.[15,38] Also, in a recent study,[14] with the European School Survey Project on Alcohol and other Drugs (ESPAD) of 2011,[39.] involving nearly 80.000 15-16-year-old students from 25 countries of the European Union plus Norway, verify the most important predictor of substance abuse, was the number of friends using substances. And youth tend to be very accurate in their perceptions of the frequency of their friend's substance use.[6,40] However, friends influence on cannabis use might play out in different ways.[41] Despite some contradictory evidence,[42] research exploring the influence of onset age of cannabis use in friendship selection is scarcer. However, some evidence highlights friends' selection based on similar lifetime and cannabis use.[43-44] Moreover, in a recent longitudinal study with

1030 boys, from 6 to 28 years old, Rioux et al.[24] found the effect of onset age of cannabis use in cannabis abuse with the indirect effect of affiliation with deviant friends. In this context, we assume that the number of friends using cannabis might have an important role, mediating the relationship between the onset age of cannabis use and cannabis abuse. Therefore, a mediating Hypothesis was derived as follows:

Hypothesis 2: The number of friends using cannabis has a mediating effect on the relationship between the onset age of cannabis use and cannabis abuse.

Comparing men and women regarding the studied relationships

In the literature, we find consistent data related to higher cannabis use in males than females.[5-8] This trend is similar in the overall substances and, according to the European Drug Report 2021, cannabis was used by approximately 47.5 million males comparing with the 30.9 million females in the European Region.[3] A trend that is naturally followed in Portugal, not only in cannabis use but also in moderate to high-risk use in men and women.[4] In a longitudinal study with male-female sibling pairs, with more than 20 years span, authors explored factors related to substance use disorders.[45] If males were at higher risk or early-onset of alcohol use, in cannabis the trend was the opposite. Females tend to be involved in cannabis use earlier than males. In the same line, authors find gender differences in the developmental trajectories of substance use progression between substances.[46] Not only the effect of onset age of cannabis use seems to be different between men and women,[47,48] as these differences have been exploited considering the role of group

membership, identity construction and relations with peers concerning the influence on the cannabis use patterns.[49] Bearing in mind the findings of the previous studies above-mentioned, it is possible to expect men and women to differ on the relationships analyzed in the present study. As such, this study's third hypothesis was as follows:

Hypothesis 3: The relationships among the onset age of cannabis use, the number of friends using cannabis, and cannabis abuse differ comparing the men and women sample.

Method

Procedure and Sample

The sampling procedure used was a non-probabilistic sample with a convenience sampling approach. The questionnaire was administered in the educational context, in regular and vocational schools in the north and centre of the country, in a paper and pencil format. The research team contacted secondary level institutions, presenting the aims and the methodology of the study. After the approval of the educative institutions and the informed consent of parents, teachers were contacted to operationalize the data collection process. Data was collected in the classroom, by a researcher, to every student that present the Informed Consent signed by parents or guardians. Anonymity, confidentiality, and the individuals' voluntary participation were guaranteed in the Informed Consent form that also presented the study's main goal. The present study was conducted in line with the Helsinki Declaration and the ethical aspects were taken into consideration for the development of this study. Additionally, the research was carried out in compliance with institutional and

national standards. More precisely, this study was approved and screened for the compliance of the ethical aspects by the board of the research centre of the Portuguese University where the current research was conducted. It consists of an independent board of researchers belonging to different research fields in the Humanities and Social Sciences field. Thus, this board ensures an impartial evaluation of the research, avoiding the existence of conflicts of interest and the respect for ethical standards.

From a total of 4122 participants, a sample of 529 Portuguese cannabis users was collected. They were selected based on their answers to European School Survey Project on Alcohol and Other Drugs questions.[39] We excluded those who answered that never used cannabis over life, in the last 12 months, 30 days and 7 days. The participants were aged between 14 and 21 years old (M = 16.90; SD = 1.26) and the participants majority were men (53.90%). Most participants had a father and mother with 9th year of education (34.2%; 25.8%; respectively) or 12th-year education (44.2%; 50.7%; respectively), and married parents (59.2%). Both men and women' participants have, approximately, the same age on average, as well as equivalent demographic characteristics regarding parents' education and parents' marital status. A description of the sample is reported in Table 1.

Table 1. Demographics of the sample.

	Total Sample (*n* = 529)	Men (*n* = 276)	Women (*n* = 244)
Age (Mean; *SD*)	Mean = 16.90; *SD* = 1.26	Mean = 17.01; *SD* = 1.26	Mean = 16.77; *SD* = 1.27
Father's Education (%)			
Illiterate	1.0%	1.6%	0.4%

9 years school	34.2%	34.7%	33.6%
12 years school	44.2%	45.1%	43.2%
University degree	14.3%	13.0%	15.9%
Non answered	6.2%	5.5%	7.0%
Mother's Education (%)			
Illiterate	0.5%	0.6%	0.4%
9 years school	25.8%	27.2%	24.3%
12 years school	50.7%	51.9%	49.3%
University degree	18.4%	15.2%	22.1%
Non answered	4.6%	5.1%	4.0%
Marital Status (%)			
Married	59.2%	60.3%	58.0%
Single	4.7%	6.2%	2.9%
Widow	4.7%	5.2%	4.0%
Divorced	28.1%	25.2%	31.5%
Other	3.3%	3.1%	3.6%

Measures

A sociodemographic questionnaire was used to collect information about the participants

and their backgrounds, as sex, age or parents' education and marital status.

Cannabis Abuse Screening Test (CAST),[50] is a measure with six items to evaluate

the risk associated with the individual's cannabis use pattern. Answered in a five-point

rating scale, from 0=never to 4=very often, this screening test developed based on DSM-IV

presented good level validity, with a bifactorial model, and high reliability ($\alpha = 0.81$) and is

compatible with DSM-V standards.[51] For the codification of the sum of the scale,[50] each item is recorded as zero and one, for a total score ranging from 0 to 6. If participants answer 0=never or 1=rarely their answer is recoded as 0; the remaining options, as 2=from time to time, 3=fairly often or 4=very often are recoded as one. According to participants responses, the higher responses meaning a higher risk of cannabis abuse, according to four levels: 0 - no risk, 1 to 2 - low risk, 3 - moderate risk, and 4 to 6 - high risk of cannabis abuse.

Four questions related to cannabis use, over life, in the last 12 months, 30 days and 7 days, onset age and friends use were collected from the European School Survey Project on Alcohol and Other Drugs.[39] They are answered on an ordinal scale, since 0; 1–2 times; 3–5 times; 6–9 times; 10–19 times; 20–39; 40 or more.

Data analysis

The analysis consisted of several steps. First, the descriptive statistics (mean and standard deviation) and intercorrelations among the variables in the study were calculated with the SPSS 26.0 program. Next, with the use of the SPSS 26.0 program, the linear regression model was applied, for the analysis of the direct relationship between the onset age of cannabis use and cannabis abuse. In addition, by performing the PROCESS macro in SPSS IBM Statistics 26.0 software, it was possible to complete regression analysis and analyze the existence of mediation effects. The model used for performing the PROCESS macro was Model 4,[52] which allows up to 10 mediators to operate in parallel. For testing the mediation hypothesis, we used 5000 bootstrap samples with a 95% bias-corrected bootstrap confidence interval for all indirect effects. Finally, to compare men and women

regarding the relationships among the studied variables (i.e., Hypothesis 3) Z-scores were calculated.

Results

Descriptive statistics

On average, the participants of the present study had 15-year-old (SD = 1.71) when used cannabis for the first time, and they had, approximately, three friends using cannabis (SD = 1.03). Regarding the score registered for cannabis abuse, the mean value obtained (M = 1.26; SD = 1.68) indicates that, on average, participants presented a low level of cannabis abuse. By comparing the men and women' samples, no significant differences were found concerning the onset age of cannabis use and the number of friends using cannabis [t (528) = 1.19, $n.s.$; t (528) = 1.79, $n.s.$]. However, men reported a higher level of cannabis abuse compared to women [M = 1.47, SD = 1.84; M = 0.96, SD = 1.38; respectively; t (528) = -3.88, p < .01].

In general, the observed pattern of correlations indicated that onset age of cannabis use correlates negatively to the number of friends using cannabis (r = -.20, p < .01) and cannabis abuse (r = -.38, p < .01). Furthermore, the number of friends using cannabis showed to be positively related to cannabis abuse (r = .34, p < .01).
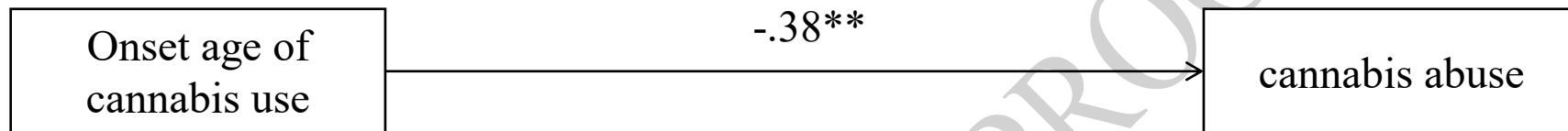
Hypothesis testing

Following the correlation results, it was possible to have a general idea of the pattern of the relationships among all the constructs. Thus, the next step in data analysis, before the

==mediating testing, consisted of establishing a model where only the direct relationship between the onset age of cannabis using and cannabis abuse was included== (see, Figure 1). This model was tested without adding the hypothesized mediating variable (i.e., number of friends using cannabis), and a negative relationship was observed for the total sample, and the men and women sample analyzed separately ($\beta = -.38$; $p < .01$; $\beta = -.42$; $p < .01$; $\beta = -.31$; $p < .01$; respectively). Thus, Hypothesis 1 was supported by the data.
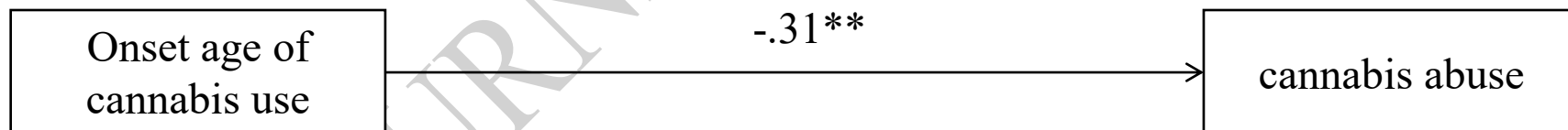
Total Sample (*n* = 529)


Men's Sample (*n* = 276)
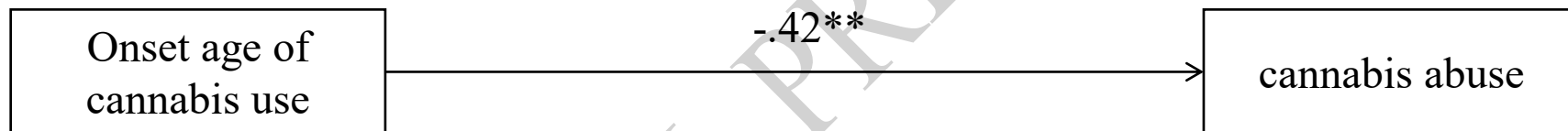
Women's Sample (*n* = 244)

Note: The figure includes the standardized estimates (*β*); ** *p* < .01; * *p* < .05.

Figure 1. Direct relationships models (before adding the proposed mediating variable).

Proceeding with the hypotheses testing, a new model was tested with the hypothesized

mediating variable (i.e., number of friends using cannabis) introduced. As can be seen in

Figure 2, regarding the relationship between onset age of cannabis use and the number of

friends using cannabis, a negative relationship was found for the total sample, and the men

and women sample analyzed separately ($\beta = -.20$; $p < .01$; $\beta = -.23$; $p < .01$; $\beta = -.17$; $p <$

.01; respectively). Concerning the relationship between the number of friends using

cannabis and cannabis abuse, a positive relationship was found for the total sample, and the

men and women sample analyzed separately ($\beta = .28$; $p < .01$; $\beta = .29$; $p < .01$; $\beta = .35$; $p <$

.01; respectively). Bearing in mind the results presented in Figure 1, regarding the direct

relationship between onset age of cannabis use and cannabis abuse, it is possible to observe

that this relationship was weakened when the mediator variable was included in the model

(see, Figure 2). Moreover, the indirect effect of the onset age of cannabis using on the

cannabis abuse through the number of friends using cannabis was found as being

significant for the total sample, and for the men and women sample analyzed separately

(Estimate = -.06, 95% CI [-.09, -.03]; Estimate = -.07, 95% CI [-.12, -.03]; Estimate = -.06,

95% CI [-.11, -.01]; respectively). Thus, the number of friends using cannabis seems to

have a mediating role by contributing to explain the relationship between onset age of

cannabis use and cannabis abuse supporting, thereby, Hypothesis 2.

Total Sample (*n* =

Men's Sample (*n* =

Women's Sample (*n* =
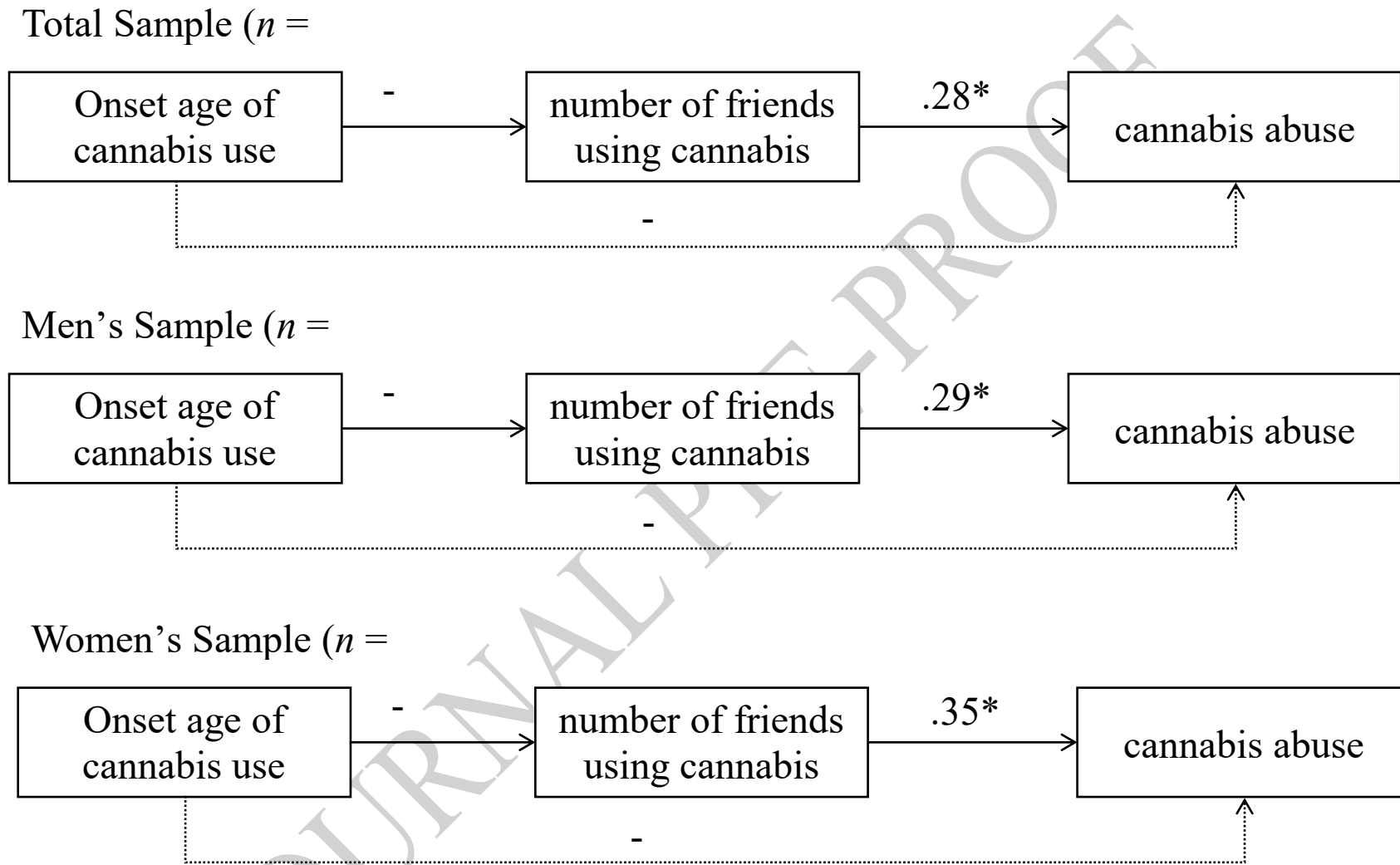
Note: The figure includes the standardized estimates (*β*); ** *p* < .01; * *p* < .05.

Figure 2. Mediated relationships models (with the proposed mediating variable added).

To test whether the relationships among the onset age of cannabis use, the number of friends using cannabis, and cannabis abuse differ comparing the men and women sample, Z-scores were calculated. Contrary to the expected, men and women not differed significantly concerned the relationship between the onset age of cannabis use and the number of friends using cannabis ($Z = 0.62$, *n.s.*), the relationship between the number of friends using cannabis and cannabis abuse ($Z = -0.08$, *n.s.*), and the relationship between onset age of cannabis use and cannabis abuse ($Z = 1.47$, *n.s.*). Therefore, hypothesis 3 was not supported.

Discussion

The main purpose of the present research was to study an unexplored mediating role of the number of friends using cannabis to explain the relationship between the onset age of cannabis use and users' abuse. In addition, this research aimed to compare men and women regarding the relationships among the studied variables. Starting with a descriptive study we tested two hypotheses: H1 - Onset age of cannabis use has a negative relationship with cannabis abuse; H2 - The number of friends using cannabis has a mediating effect on the relationship between the onset age of cannabis use and cannabis abuse. H3 - The relationships among the onset age of cannabis use, the number of friends using cannabis, and cannabis abuse differ comparing the men and women sample.

Following the existing literature, we found higher cannabis abuse from men,[5-8] and with the first experience with cannabis in the average age of 15-year-old. Despite differences in the literature,[32-33] this average onset-age of cannabis use tends to be assumed as early-onset age,[34] associated with higher risks at educational,[28-30] cognitive and mental

health problems.[31] A motive of deep concern that should be explored in further research and stress the need for preventive intervention. If we consider, as found by Rioux et al.,[24] that for each year delayed on cannabis use onset, a decrease of 31% of the probability of developing any drug abuse symptoms, we understand the urgency to continue studying and promoting adjusted intervention.

Previous studies have suggested that the onset age of cannabis use is negatively related to cannabis abuse,[24,26-27] and the current study confirms the predicted relationship. Thus, the later the individuals' onset age of cannabis use, the lower the level of cannabis abuse. In other words, individuals who started to use cannabis at an older age, seem to report a lower level of cannabis abuse. The pattern of this relationship was found as not differing by compared the men sample to the women sample. Also, the number of friends using cannabis was associated with cannabis abuse.[13-15] As part of the socialization or identification with peers with the same lifestyle,[35,37] these results highlight the need to promote early prevention strategies and not only at the individual level but in school and contexts of living.

More interestingly, our study found support for the role of the number of friends using cannabis in explaining the relationship between the onset age of cannabis use and users' abuse. However, we only found support for a partial mediation, which seem to indicate that may are other variables playing a mediating role in explaining the relationship between the onset age of cannabis use and users' abuse. Future studies should continue analyzing the mediating role of the number of friends using cannabis in explaining the relationship between the onset age of cannabis use and users' abuse but adding some other constructs as mediators, such as the conduct problems [42] or parental monitoring.[10]

Additionally, since in the present study, both the men' sample and women' sample seem to not differ in the mediated relationship observed, future studies should continue to analyzing the two samples separately to see if the pattern of the relationships observed remains.

Although not hypothesized it should be highlighted a significant difference found between the men and women samples concerning the levels of cannabis abuse. More precisely, males reported higher cannabis abuse than females. This result seems to be in line with what was already found in previous studies.[5-8] However, no significant differences were observed between males and females regarding the onset age of cannabis use and the average number of friends they have using cannabis.

Although this study has strengths some limitations should be noted. First, it is important to highlight that the sample evaluated in this study comprised individuals from only one country (Portugal), which may constrain the generalization of these results. Additionally, the current study has a cross-sectional design and the establishment of causal relationships among the studied variables should be compromised. It is therefore important that future research examine these relationships over time. However, as Spector noted,[53] *«there seems to be a universal condemnation of the cross-sectional design and at the same time acceptance of the superiority of the longitudinal design in allowing conclusions about temporal precedence and even causality. Often overlooked is that the cross-sectional design can tell us much that is of value and that the longitudinal design is not necessarily superior in providing evidence for causation»* (pp. 125). Also, the average score in the CAST suggests a low risk of cannabis abuse in the sample. This might be a limitation of the study, which does not represent a normal distribution, but might reflect the reality of the users in our context. In fact, according to the most recent epidemiological data in Portugal,

only 0.3% of the population presented a moderate risk of cannabis abuse and 0.4% an high risk.[4] Considering these issues, future work should also consider other methods of measurement beyond self-report; for example, drug tests including urine, saliva, blood, and perspiration. Despite the previous validity evidence of this measure, correlated with cannabis abuse disorders according to DSM-5[51], the comparison with clinical samples could add important data to clarify the mediating role of friends' use in cannabis abuse. Also, new studies considering functional magnetic resonance imaging (fMRI) may allow us to understand the dynamics between onset age and its effects on educational, health and social outcomes. Replicating these findings with other methods of measurement may be useful in validating the findings of the present study. However, to minimize this limitation, we followed the methodological recommendations of Podsakoff et al.,[54] namely, by guaranteeing the anonymity and confidentiality of the answers, and by indicating that there were no right or wrong answers.

Conclusion

The present study allows us to confirm the mediating role of the number of friends using cannabis in the relationship between the onset age of cannabis use and users' abuse. The mediational effect found is a very interesting finding, once it allows us to theorize and understand the effect of the variables, with implications for prevention and intervention programs.

In a context of increasing complacency or permissiveness, these findings allow us to understand the crucial role of early intervention, in educational contexts, preventing youth from early exposure to cannabis risk but also the need to monitor and peer training

intervention or promotion of social skills focused on social groups with substance use history. Selective programs might be important in this strategy to delay the onset age, decrease the level of cannabis abuse or motivate treatment. Given the trend of the increasing prevalence of cannabis use in European countries and the age of onset, efforts should be strengthened not only to avoid the escalating effect that is to be expected but also to postpone or prevent the experience of new users. Besides face-to-face interventions, new strategies using new technologies should also be implemented to address this public health problem.

References

1. World Health Organization The health and social effects of nonmedical cannabis use. Geneva: World Health Organization; 2016.

2. United Nations Office on Drugs and Crime. World Drug Report 2021. Viena: UNODOC; 2021 [cited 2021 Sept 20]. Available from: https://www.unodc.org/unodc/en/data-and-analysis/wdr2021.html

3. European Monitoring Center for Drugs and Drug Addiction. European Drug Report 2021: Trends and Developments. Lisbon: EMCDDA; 2021 [cited 2021 Sept 20]. Available from: https://www.emcdda.europa.eu/publications/edr/trends-developments/2021_en

4. Serviço de Intervenção nos Comportamentos Aditivos e nas Dependências. Relatório anual 2018 – A situação do país em matéria de drogas e toxicodependência Caracterização e Evolução da Situação. Lisboa: SICAD; 2019 [cited 2020 Dec 1]. Available from

http://www.sicad.pt/PT/Documents/2019/relatorio_2018/Relat%C3%B3rioAnual_2

018_ASitua%C3%A7%C3%A3oDoPa%C3%ADsEmMat%C3%A9riadeDrogasET

oxicodepend

5.Chapman C, Slade T, Swift W, Keyes K, Tonks Z, Teeson M. Evidence for sex

convergence in prevalence of cannabis use: a systematic review and meta-

regression. J Stud Alcohol Drugs. 2017;78(3):344-52.

6.Moor I, Winter K, Rathmann K, Ravens-Sieberer U, Richter M. Alcohol, tobacco and

cannabis use in adolescence - Cross-sectional results of the 2017/18 HBSC study. J

Health Monitoring. 2020;5(3).

7.Taylor M, Colling SM, Munafò MR, MacLeod J, Huckman M, Heron J. Patterns of

cannabis use during adolescence and their association with harmful substance use

behaviour: findings from a UK birth cohort. J Epidemiology Community Health.

2017;71:764-70.

8.Turel O. Perceived ease of access and age attenuate the association between marijuana ad

exposure and marijuana use in adolescents. Health Educ Behav. 2020;47(2):311-20.

9.Becoña E, Martínez U, Calafat A, Juan M, Hermida JR, Secades-Villa R. Parental styles

and drug use: A review. Drugs (Abingdon Engl). 2011;19(1):1-10.

10.Behnert KM, Anthony JC, Breslau N. Parental monitoring at age 11 and subsequent

onset of cannabis use up to age 17: Results from a prospective study. J Stud Alcohol

Drugs. 2012;73(2):173-7.

11.Lac A, Crano WD. Monitoring matters: Meta-analytic review reveals the reliable

linkage of parental monitoring with adolescent marijuana use. Perspect Psychol Sci.

2009;4(6):578-86.

12. Miller SM, Siegel JT, Crano WD. Parent's influence on children's cannabis use. In: Preedy VR, editor. Handbook of Cannabis and Related Pathologies: Biology, Pharmacology, Diagnosis, and Treatment. London: Elsevier; 2017. p. 215-22.

13. Glaser B, Shelton KH, van den Bree M. The moderating role of close friends in the relationship between conduct problems and adolescent substance use. J Adolesc Health. 2010;47(1):35-42.

14. Helmer SM, Burkhart G, Matias J, Buck C, Cardoso FE, Vicente J. "Tell me how much your friends consume" - personal, behavioral, social, and attitudinal factors associated with alcohol and cannabis use among European School Students. Int J Environ Res Public Health. 2021;18(4):1684.

15. Patrick ME, Kloska DD, Vasilenko SA, Lanza ST. Perceived friends' use as a risk factor for marijuana use across young adulthood. Psychol Addict Behav. 2016;30(8):904-14.

16. Keyhani S, Steigerwald S, Ishida J, Vali M, Cerdá M, Hasin D, et al. Risks and benefits of marijuana use: A national survey of U.S. Adults. Ann Intern Med. 2018;169(5):282-90.

17. Carliner H, Brown QL, Sarvet AL, Hasin DS. Cannabis use, attitudes, and legal status in the U.S.: A review. Prev Med. 2017;104:13-23.

18. Compton WM, Han B, Jones CM, Blanco C, Hughes A. Marijuana use and use disorders in adults in the USA, 2002-14: analysis of annual cross-sectional surveys. Lancet Psychiatry. 2016;3(10):954-64.

19. Friese B. "Is Marijuana even a drug?" A qualitative study of how teens view marijuana use and why they use it. J Psychoactive Drugs. 2017;49(3):209-16.

20. Hazen E, Schlozman SC, Beresin EV. Adolescent psychological development: A review. Pediatr Rev. 2008;29(5):161-7.

21. Fletcher A, Bonell C, Sorhaindo A, Strange V. How might schools influence young people's drug use? Development of theory from qualitative case-study research. J Adolesc Health. 2009;45(2):126-32.

22. Leadbeater BJ, Ames ME, Linden-Carmichael AN. Age-varying effects of cannabis use frequency and disorder on symptoms of psychosis, depression and anxiety in adolescents and adults. Addiction. 2019;114(2):278-93.

23. Moulin V, Alameda L, Framorando D, Baumann P-S, Gholam M, Gasser J, et al. Early onset of cannabis use and violent behavior in psychosis. Eur Psychiatry. 2020;63(1):e78.

24. Rioux C, Castellanos-Ryan N, Parent S, Vitaro F, Tremblay RE, Séguin JR. Age of cannabis use onset and adult drug abuse symptoms: A prospective study of common risk factors and indirect effects. Can J Psychiatry. 2018;63(7):457-64.

25. Mauro PM, Carliner H, Brown QL, Hasin DS, Shmulewitz D, Rahim-Juwel R, et al. Age differences in daily and nondaily cannabis use in the United States, 2002–2014. J Stud Alcohol Drugs. 2018;79(3):423-31.

26. Bergen-Cico D, Cico R. Age as a predictor of cannabis use. In: Preedy VR, editor. Handbook of Cannabis and Related Pathologies: Biology, Pharmacology, Diagnosis, and Treatment. London: Elsevier; 2017. p. 43-53.

27. Leung J, Chan GC, Hides L, Hall WD. What is the prevalence and risk of cannabis use disorders among people who use cannabis? A systematic review and meta-analysis. Addict Behav. 2020:106479.

28.Stiby AI, Hickman M, Munafò MR, Heron J, Yip VL, Macleod J. Adolescent cannabis and tobacco use and educational outcomes at age 16: A birth cohort study. Addiction. 2015;110:658-68.

29.Lynskey M, Hall W. The effects of adolescent cannabis use on educational attainment: A review. Addiction. 2000;95(11):1621-30.

30.Beverly HK, Castro Y, Opara I. Age of first marijuana use and its impact on education attainment and employment status. J Drug Issues. 2019;49(2):228-37.

31.Levine A, Clemenza K, Rynn M, Liberman J. Evidence for the risks and consequences of adolescent cannabis exposure. J Am Acad Child Adolesc Psychiatry. 2017;56(3):214-25.

32.Dhein S. Different effects of cannabis abuse on adolescent and adult brain. Pharmacology. 2020;105:609-17.

33.Gorey C, Kuhns L, Smaradgi E, Kroon E, Cousijn J. Age-related differences in the impact of cannabis use on the brain and cognition: a systematic review. Eur Arch Psychiatry Clin Neurosci. 2019;269(1):37-58.

34.Gruber SA, Dahlgren MK, Sagar KA, Gönenç A, Lukas SE. Worth the wait: effects of age of onset of marijuana use on white matter and impulsivity. Psychopharmacology. 2014;231:1455-65.

35.Andrews JA, Tildesley E, Hops H, Li F. The influence of peers on young adult substance use. Health Psychol. 2002;21(4):349-57.

36.Bandura A. Social learning theory. Vol. 1. Englewood Cliffs, NJ: Prentice-Hall; 1977.

37.Duan L, Chou CP, Andreeva VA, Pentz MA. Trajectories of peer social influences as long-term predictors of drug use from early through late adolescence. J Youth Adolesc. 2009;38:454-65.

38. Ali MM, Amialchuk A, Dwyer DS. The social contagion effect of marijuana use among adolescents. PLoS ONE. 2011;6(1):e16183.

39. European School Survey Project on Alcohol and Other Drugs – ESPAD. Estudo sobre os consumos de álcool, tabaco, drogas e outros comportamentos aditivos e dependências (ECATD-CAD) – Sumário executivo. Lisboa: SICAD/DMI/DEI; 2011 [cited 2020 dec 1]. Available from: http://www.espad.org/sites/espad.org/files/The_2011_ESPAD_Report_FULL_2012 _10_29.pdf

40. Mason MJ, Brown A, Moore M. The accuracy of young adult cannabis users' perceptions of friends' cannabis and alcohol use. Addict Behav. 2019;95:28-34.

41. Tucker J, Haye K, Kennedy DP, Green HD, Pollard MS. Peer influence on marijuana use in different types of friendships. J Adolesc Health. 2014; 54(1):67-73.

42. Defoe IN, Khurana A, Betancourt LM, Hurt H, Romer D. Disentangling longitudinal relations between youth cannabis use, peer cannabis use, and conduct problems: developmental cascading links to cannabis use disorder. Addiction. 2019;114(3):485-93.

43. Dishion TJ, Owen LD. A longitudinal analysis of friendships and substance use: Bidirectional influence from adolescence to adulthood. Dev Psychol. 2002;38(4):480-91.

44. Haye K, Green Jr HD, Kennedy DP, Pollard MS, Tucker JS. Selection and influence mechanisms associated with marijuana initiation and use in adolescent friendship networks. J Adolesc Res. 2013;23(3):474-86.

45. Buu A, Dabrowska A, Mygrants M, Puttler LI, Jester JM, Zucker RA. Gender differences in the developmental risk of onset of alcohol, nicotine, and marijuana use and the effects of nicotine and marijuana use on alcohol outcomes. J Stud Alcohol Drugs. 2014;75(5):850-8.

46. Buu A, Dabrowska A, Heinze JE, Hsieh HF, Zimmerman MA. Gender differences in the developmental trajectories of multiple substance use and the effect of nicotine and marijuana use on heavy drinking in a high-risk sample. Addict Behav. 2015;50:6-12.

47. Cuttler C, Mischley LK, Sexton M. Sex differences in cannabis use and effects: A cross-sectional survey of cannabis users. Cannabis Cannabinoid Res. 2016 1;1(1):166-175.

48. Crane NA, Schuster RM, Mermelstein RJ, Gonzalez R. Neuropsychological sex differences associated with age of initiated use among young adult cannabis users. J Clin Exp Neuropsychol. 2015;37(4):389-401.

49. Hemsing N, Greaves L. Gender norms, roles and relations and cannabis-use patterns: A scoping review. Int J Environ Res Public Health. 2020;17(3):947.

50. Legleye S, Karila L, Beck F, Reynaud M. Validation of the CAST, a general population Cannabis Abuse Screening Test. J Subst Use. 2007;12(4):233-42.

51. Legleye S. The Cannabis Abuse Screening Test and the DSM-5 in the general population: Optimal thresholds and underlying common structure using multiple factor analysis. Int J Methods Psychiatr Res. 2017;27(2):e1597.

52. Hayes AF. Methodology in the social sciences.Introduction to mediation, moderation, and conditional process analysis: A regression-based approach. New York: Guilford Press; 2013.

53. Spector PE. Do not cross me: Optimizing the use of cross-sectional designs. J Bus Psychol. 2019;34(2):125-37.

54. Podsakoff PM, MacKenzie SB., Lee J-Y, Podsakoff NP. Common method biases in behavioral research: A critical review of the literature and recommended remedies. Am J Appl Psychol. 2003;88(5):879-903.