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Motivational Factors and Cannabis Use Intention among Juvenile Offenders: Direct, Mediating, and Moderating Effects

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ABSTRACT

Background/Aim: Ensuring that juvenile offenders (JOs) who stop consume cannabis during their detention remain abstinence after their sentence has been served is a fundamental preventive measure. The present study explores whether the variables of the motivational phase of the Health Action Process Approach (HAPA) predicted the intention not to use cannabis after the end of the detention period among JOs. It also analyzes the mediating effect of past behavior and the moderating effect of gender. **Method:** A cross-sectional study was conducted with 103 JOs in detention centers in southern Spain (mean age = 16.33 years, 70.6% male). **Results:** A multiple linear regression analysis confirmed the joint effect of motivational variables (risk perceptions, positive and negative outcome expectancies, and action self-efficacy) on intention. Except for positive outcome expectancies, all motivational variables were found to mediate the effect of age at onset on intention. Moderation analysis revealed that when risk perceptions and action self-efficacy were high, female JOs expressed a stronger intention not to use cannabis than their male counterparts. **Conclusions:** The results confirm the effectiveness of the HAPA for predicting the intention not to use cannabis among JOs after the end of their detention period. The present study lays the groundwork for future research, which should broaden the analysis to include the volitional stage of change and JOs serving other sentences involving less supervision and greater opportunities to use. The results presented here will help inform the design of preventive programs, with a gender perspective.

Factores motivacionales e intención de consumir cannabis en los delincuentes juveniles: efectos directos, de mediación y moderación

RESUMEN

Antecedentes/Objetivo: Garantizar que los menores infractores (MI) que dejan de consumir cannabis durante su detención mantengan la abstinencia una vez cumplida su sentencia es una medida preventiva fundamental. Este estudio explora si las variables de la fase motivacional del Modelo del Proceso de Acción en Salud predicen la intención de no consumir cannabis una vez finalizado el período de internamiento entre los MI. Además, se analizó el efecto mediador del comportamiento pasado y el efecto moderador del género. **Método:** Se realizó un estudio transversal con 103 MI de centros de internamiento del sur de España (edad media = 16.33 años, 70.6% hombres). **Resultados:** Un análisis de regresión lineal múltiple confirmó el efecto conjunto de las variables motivacionales (percepciones de riesgo, expectativas de resultados positivos y negativos, y autoeficacia en la acción) sobre la intención. Con excepción de las expectativas de resultados positivas, se encontró que todas las variables motivacionales mediaban el efecto de la edad de inicio sobre la intención. El análisis de moderación reveló que cuando las percepciones de riesgo y la autoeficacia en la acción eran altas, las MI mujeres expresaban una intención de no consumir cannabis más fuerte que sus contrapartes hombres. **Conclusiones:** Los resultados confirman la efectividad del EPAS para predecir la intención de no consumir cannabis entre los MI después de que finalice su período de internamiento. El presente estudio establece las bases para futuras investigaciones, que deberían ampliar el análisis para incluir la etapa volitiva del cambio y a los MI que cumplen otras penas con menos supervisión y mayores oportunidades de consumo. Los resultados aquí presentados contribuirán al diseño de programas preventivos con perspectiva de género.

Palabras clave:

Percepciones de riesgo

Expectativas de resultado

Autoeficacia para la acción

Consumo de Cannabis

Modelo del Proceso de Acción en Salud

Menores de reforma

Cannabis is the illegal psychoactive substance most frequently consumed by adolescents in Spain today ([Observatorio Español de las Drogas y las Adicciones, 2022](#)). This raises significant concerns about the health of these young individuals, particularly juvenile

offenders (JOs) and those involved in legal conflicts. Cannabis is also one of the most frequently used illicit substances among this specific population ([Buil-Legaz et al., 2019](#); [Contreras et al., 2012](#)), where it poses more problematic issues than among young people who do not

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have a conflict of law, since it tends to be initiated at an earlier age and poses greater risks. Consequently, this increases the likelihood of developing substance use disorders (Duke et al., 2020; Olagunju et al., 2021; Ribas-Siñol et al., 2015; Tolou-Shams et al., 2021).

In this context, an association has been observed between substance use and delinquent behavior (Chassin et al., 2016; Sales et al., 2018). However, it is essential to emphasize not only the search for causal associations but also the coexistence of these two variables and the reciprocal relationship that is often established between them. Both behaviors share common risk factors, such as a history of parental use and/or delinquent behavior, contact with problematic peers, impulsivity and sensation seeking, as well as engagement in other problematic externalizing behaviors (Chassin et al., 2016).

Youngsters who commit an offense and have substance use problems usually receive sentences that are adapted to each individual case. Depending on the seriousness of the offense and associated drug problem, these sentences may be as follows: 1) therapeutic detention in a closed, semi-open, or open center, where specialized education and treatment are provided or 2) outpatient treatment without detention, with youngsters being treated in their family environment, provided the situation is not too problematic. These measures aim to foster positive change and provide JOs with the necessary resources to prevent relapse and avoid returning to substance use. Interventions carried out in these contexts may include functional family therapy, multisystemic therapy, and intensive protective supervision (Dauria et al., 2018; Greenwood, 2008).

When JOs who use illegal substances are serving their sentence in Juvenile Detention Centers (JDCs), they find themselves in an environment that offers both opportunities and challenges for harmful drug use. Although these centers have the necessary resources and offer appropriate treatment programs, they still represent a disciplinary measure in which abstinence is imposed. Studies examining the impact of these supervised environments on sustained abstinence among young people report contradictory findings. Some studies suggest that JDCs may act as risk factors that contribute to JOs' ongoing substance use, either due to contact with other JOs with more serious problems or due to limited opportunities for recovery and reintegration (Feldstein et al., 2014). Others, however, propose that being in a JDC reduces opportunities for substance use than they would otherwise have (Mauricio et al., 2009). The structured environment and formal supervision provided within the center can support quitting efforts (Feldstein et al., 2014). These contradictory results make difficult to determine with any degree of clarity how detention affects the use substance behavior of these JOs.

Therefore, it is crucial to address the issue of substance use among JOs receiving treatment in JDCs, as it is important to ensure that they continue not to use even after their release. This requires a more in-depth exploration of the dynamics that influences behavioral change to enable more effective interventions that help prevent a return to substance use among this population. In this undertaking, special attention should be paid to cannabis, as it is the most used substance among JOs.

Changes in health behavior involve a series of motivational, cognitive, and action processes that can lead to the adoption of healthy habits or quitting those that are harmful to one's health. Previous studies have aimed to identify the factors that predict or explain these behavior changes. Theories based on social cognitive models have analyzed the motivational processes that contribute to the intention to change, which is considered the most proximal precursor to behavior. These models also identify the volitional processes involved in initiation and regulation actions (León & Medina, 2002). These models have been shown to explain behavioral change processes among individuals who engage in harmful or abusive cannabis use (Medina-Anzano et al., 2021). One such model is the Health Action Process Approach (HAPA), developed by Schwarzer (1992, 2008) and Schwarzer and Fuchs (1995), which

aims to overcome the shortcomings of previous models that focused more on motivational processes rather than on volitional processes (Schwarzer & Luszczynska, 2008).

According to HAPA, the process of quitting harmful cannabis use involves two stages: motivational and volitional. During the motivational stage, risk perceptions must be generated that increase an individual's perceived vulnerability to the health problems associated with continued cannabis use and the serious consequences that ongoing harmful use may entail. It is also crucial to develop expectations regarding outcomes that help the individual view quitting cannabis use as being linked to more positive than negative consequences. Strengthening their beliefs in their own ability to stop using in a harmful way is also important. This first phase of HAPA holds that risk perceptions, outcome expectancies, and action self-efficacy contribute to fostering the intention to change one's behavior.

However, it is important to bridge the gap that exists between generating an intention to change and taking actual steps towards initiating and maintaining healthy behavior. According to HAPA, the individual enters the volitional stage the moment they begin planning when and how to initiate behavior change, how to avoid situations that pose a high risk of relapse, and how to exercise the necessary control to ensure the continuation of the new behavior. The processes involved in this phase include action planning, maintenance self-efficacy, and recovery self-efficacy.

The HAPA has been tested in a variety of different health behaviors, consistently supporting its theoretical assumptions. Previous research has primarily focused on predicting preventive behaviors for health improvement, such as engaging in physical exercise (Schwarzer et al., 2007; Sniehotta et al., 2005), regular breast self-examination (Luszczynska & Schwarzer, 2003), and preventive nutrition (Schwarzer & Renner, 2000). Other studies have explored health-compromising behaviors, such as smoking (Berli et al., 2015; Schwarzer & Luszczynska, 2008; Williams et al., 2011), low-risk, single-occasion drinking (Murgraff et al., 2003), and drink driving (Wilson et al., 2016). Most of these studies have been conducted with nonclinical populations, although some have included overweight patients and those with chronic diseases (Schwarzer & Luszczynska, 2008), as well as individuals with multiple sclerosis (Chiu et al., 2011).

Zhang et al. (2019) carried out a meta-analysis of previous research aimed at testing the predictions made by the model and exploring bias in the variability of the effects observed between the HAPA constructs. The results pointed to small-to-medium effect sizes for most constructs, except for risk perceptions and recovery self-efficacy, which showed only small effect sizes. Action self-efficacy demonstrated the strongest effects on health behavior through intentions and maintenance self-efficacy. The authors also found that the effects of these components were moderated by the specific type of target health behavior. Specifically, the effects of action self-efficacy on intentions and behavior were stronger for behaviors related to physical activity, while volitional self-efficacy (a construct that encompasses maintenance and recovery self-efficacy) showed stronger effects for eating habits. In this way, the HAPA offers a theoretical framework supported by empirical evidence for identifying the social cognitive predictors of health behavior changes.

The meta-analysis also examined the moderating effect of the type of sample used in each study, although no significant differences were found in terms of behavior prediction. In this sense, it is crucial to determine whether the predictions of the HAPA can be extended to a high-risk group such as JOs who have used cannabis before being sent to a JDC and who are expected to discontinue use and maintain abstinence after their release.

Consequently, the first objective of the study was to analyze the direction and predictive power of the constructs in the motivational phase of the HAPA over the intention of JOs not to use cannabis after their release from a JDC. It is important to emphasize that the study population consisted of minors who were still serving a

sentence in a JDC, making it impossible to assess the volitional stage. This limitation arises from the fact, at the time of the study, none of the participants had yet had the opportunity to engage in an unsupervised behavior.

The first hypothesis (*H1*) in the present study, according to the HAPA, states that the variables in the motivational stage (risk perceptions, positive outcome expectations, negative outcome expectations, and action self-efficacy) will explain the intention of JOs not to use cannabis after their release. Previous research, as mentioned earlier (Zhang et al., 2019), has found a relationship between these factors and intentions.

Drawing from the findings of Zhang et al. (2019), the second hypothesis (*H2*) is formulated, suggesting that action self-efficacy will have the strongest predictive power over intention. Several different studies have confirmed that this variable is the most reliable predictor of intentions to change one's behavior (Luszczynska & Schwarzer, 2003; Murgraff et al., 2003).

Past behavior has been found to be a significant predictor of future behavior (Hagger et al., 2016). Indeed, Zhang et al. (2019) included an analysis of past behavior, which led to the authors highlighting the importance of examining the indirect effects of this variable on subsequent behavior, through the different HAPA constructs. Previous studies have primarily investigated this mediating effect in the volitional phase. However, considering that intention is the most immediate antecedent of behavior (Murgraff et al., 2003; Schwarzer & Luszczynska, 2008; Wilson et al., 2016), it is reasonable to expect a similar relationship in the motivational phase. Thus, the third hypothesis (*H3*) posits that past behavior will explain intention, and the fourth hypothesis (*H4*) holds that the effect of past behavior on intention will be mediated by the motivational variables. To examine past behavior, variables such as problematic use, age of onset, and years of used were included on existing evidence indicating that JOs start using cannabis at a younger age and exhibit more problematic patterns of use (Duke et al., 2020; Olagunju et al., 2021; Ribas-Siñol et al., 2015; Vega-Cauchich et al., 2019).

Finally, the second objective in this study was to investigate gender differences. Although gender differences in HAPA components have been observed in previous studies (Wilson et al., 2016), no such analyses have been carried out to date in at-risk populations. However, substance use patterns and trajectories have been shown to differ according to gender (Chassin et al., 2016), suggesting the potential moderating effect of gender. Therefore, our fifth hypothesis (*H5*) posits that gender will moderate the effect of the HAPA motivational variables on JOs' intention not to use cannabis after their release.

Method

Participants

The study involved JOs who were taking their judicial measures in five JDCs in southern Spain. These minors were recruited between September 2021 and June 2022. The following inclusion criteria were considered for their selection: a) being under the age of 18 (14–18 years); b) having consumed cannabis (marijuana or hashish) before entering the JDC, either experimentally or abusively; c) having completed the observation phase in the JDC, in accordance with Spanish legislation, the Decreto 98/2015 [Decree 98/2015], issued on March 3rd; d) being in any type of regime (closed, semi-open, or open), with precautionary measures or a final sentence; and e) participating voluntarily in the study. Exclusion criteria were: a) presenting a diagnosis of psychopathological disorder; b) receiving treatment for substance abuse; c) exhibiting disruptive, antisocial or defiant behaviors that, in the opinion of the technical team in the center, could hinder their participation in the study.

A total of 103 JOs participated, with a mean age of 16.33 years ($SD = .94$), and 79.6% were boys. The average age of cannabis initiation was 12.25 years ($SD = 1.92$), and they had been consuming it on average for 4.08 years ($SD = 2.09$). Regarding the committed offense, 32% of the sample was interned for domestic violence-related crimes and 25% for crimes against property and socio-economic order. Additionally, nearly a quarter of them had committed more than one offense. The mean duration of the internment measures was 14.52 months ($SD = 7.96$), and they had spent an average of 5.98 months ($SD = 5.54$) in the JDC. The majority of JOs were either studying or had resumed their studies in the center (90%), and prior to entering the center they lived in a single-parent family (37.1%) or a nuclear family (30.9%).

These participants did not receive any type of material or other rewards.

Variables and Measurement Instruments

To test the hypotheses, *ad hoc* measures were developed to adapt them to the characteristics of the population and the objectives of the study, in addition to standardized instruments, with the permission of their authors. The variables and their measurement instruments were as follows:

Past Behavior

In this study this variable was measured through the following indirect variables.

Age of Onset. Participants were asked about the age at which they first used cannabis (marijuana or hashish).

Years of Use. This value was obtained by calculating the difference between the current age and the age of initiation of cannabis use.

Problematic Cannabis Use. The Cannabis Abuse Screening Test-CAST scale (the Spanish adaptation by Klemmova et al., 2009) was used. This instrument identifies individuals who are at higher risk of developing problems related to cannabis use. It also assesses problematic patterns of cannabis use, including nonrecreational use constructs (e.g., using alone), and intention to reduce cannabis use. The scale consists of 6 items that measure social consequences (e.g., problems with fights due to cannabis use), and health consequences (e.g., memory problems) on a Likert-type scale, with response options ranging from 1 = *never*, 2 = *rarely*, 3 = *occasionally*, 4 = *quite often*, to 5 = *very often*. The reliability of the scale scores in our sample was $\alpha = .68$, which is slightly lower than the reliability obtained in the Spanish adaptation ($\alpha = .72$).

Risk Perceptions

The perceived vulnerability of the participants resulting from cannabis use was measured using the question "How much risk to your health do you think you have if you use cannabis?". The questionnaire clarified that risk refers to the possibility of experiencing harm when engaging in specific activities. Participants rated perceived risk (1 = *no risk*, 2 = *low risk*, 3 = *moderate risk*, 4 = *high risk*, 5 = *I don't know*) for scenarios in which their use was one or two times per month, once a week, once a day, or more than twice a day. The reliability of the scale scores was $\alpha = .86$.

Outcome Expectancies

They are beliefs about the contingencies of cannabis use and its positive or negative consequences. Various studies have raised measurement issues regarding expectancies, highlighting the importance of considering contextual and social factors for a more

accurate determination of individuals' outcome expectancies (Wilson et al., 2016). To address this, an open-ended question was posed to participants to identify the positive and negative consequences of non-use behavior regarding cannabis. They were allowed to identify up to 6 consequences and rate their importance on a 5-point scale (1 = *not important* to 5 = *very important*). Subsequently, the responses were categorized into positive consequences (pleasant and favorable to non-use, e.g., "I have fewer problems") and negative consequences (unpleasant and unfavorable to non-use, e.g., "I cannot sleep") to facilitate analysis. In this categorization process, two researchers participated to reach interrater agreement. After coding the responses, the variables of positive and negative outcome expectancies were generated by calculating the total number of positive or negative consequences, weighted by their attributed importance.

Action Self-efficacy

It is an individual's belief in their ability to perform a specific action to achieve a particular goal (Schwarzer & Luszczynska, 2008). It is identified in the motivational stage of the model and plays a role in establishing the intention to engage in a specific behavior. Participants were directly asked "Are you certain that you will not use cannabis when the measure of detention in the center ends?". Participants responded on a 4-point scale ranging from 1 = *not at all certain* to 4 = *completely certain*.

Intention not to Use Cannabis at the End of the Detention Measure (Non-use Intention)

According to the HAPA, this refers to the readiness to perform a specific action at a future specified time and involves motivation towards a goal in terms of direction and intensity. In the questionnaire, participants were asked to rate the item "I intend to use cannabis when the measure of detention in the center ends" on a 7-point scale ranging from 1 = *no intention* to 7 = *definitely intend* to. It is important to note that the item phrased the behavior as "intention to use cannabis" to contrast it with the behavior of "not using", ensuring clarity in reading the item, although the analyses and discussion focused on the intention of non-use cannabis.

Sociodemographic and Control Variables

The survey also included questions related to sociodemographic factors (age, sex, cohabitation before entering the center, place of birth, and educational level). Data related to the offending behavior (type of offense, type of measure, and months of detention) were also collected.

Procedure

Data were obtained from a larger study aimed at evaluating the effectiveness of a selective prevention program for the use of cannabis among JOs in JDCs. These data correspond to the initial assessment of the participants before their enrolment in the program.

Spanish JDCs are managed by private entities through a bidding process by the Andalusian Regional Government [*Junta de Andalucía*]. Therefore, prior to starting the study, a collaboration agreement was signed between the University of Seville and the Regional Ministry of Tourism, Regeneration, Justice and Local Administration of the Andalusian government, granting the research team access to these centers. The project was presented to the responsible authorities of the JDC, and the recruitment procedure was agreed on for the JO sample, based on the inclusion criteria required for the study. Additionally, the most suitable way to collect information without disrupting the functioning of each center was established. The technical staff recruited the sample and obtained informed consent from the JOs and their legal guardians. Furthermore, the corresponding juvenile court was notified of the implementation of the study. Once the favorable opinion of the Research Ethics Committee of the *Virgen Macarena* and *Virgen del Rocío* Andalusian government university hospitals was obtained, the study was started.

The questionnaires were administered individually in paper format. A space located within the center was provided, with only one member of the research team present. The researcher introduced themselves to each minor, explaining the study's purposes, the voluntary nature of participation, and the guarantee of confidentiality and anonymity of the responses.

Data Analysis

Before performing the statistical tests, missing values in the database were handled using the mean imputation method for the following variables: risk perceptions (5), positive outcome expectancies (7), negative outcome expectancies (8), action self-efficacy (4), and use intention (5). Furthermore, the values of the use intention variable were reversed for better understanding of the data obtained (non-use intention). Normality and homoscedasticity assumptions for all study variables were assessed using the Kolmogorov-Smirnov and Levene tests, respectively. The results indicated that the data did not meet the necessary criteria to be considered normally distributed.

To test *H1*, *H2*, and *H3*, multiple linear regression analyses were performed using the stepwise entry method, and the effect size (f^2) was calculated using the GPower 3.1 software. For *H4* and *H5*, the PROCESS macro for SPSS (Hayes, 2022) was used with 10,000 bootstrap resamples and bias correction. Hypothesis 4 was examined through a mediation analysis (model 4), which was accepted if the confidence interval (CI) was statistically significant, meaning that the 95% CI did not include zero (Hayes, 2022). The percentage of mediation was calculated as the ratio of the indirect effect to the total effect ($ab/ab + c'$). Additionally, while the Sobel test has been criticized by Igartua and Hayes (2021), it was used to confirm the mediation effect. The Sobel test (Sobel, 1982) calculates the ratio between the point estimate and its standard error. The mediation effect was considered statistically significant if the Z-value in the Sobel test fell outside ± 1.96 at a two-tailed alpha of .05, and outside ± 2.58 at a two-tailed alpha of .01. On the other

Table 1. Contrast between Gender and the Variables of the Model

| | Men (<i>n</i> = 82) | Women (<i>n</i> = 21) | | | |
|--------------------------------|----------------------|------------------------|----------|----------|------------------|
| | <i>Mdn</i> (range) | <i>Mdn</i> (range) | <i>U</i> | <i>p</i> | Cohen's <i>d</i> |
| Risk Perceptions | 9.26 (18) | 9.26 (12) | 834.50 | .83 | 0.04 |
| Positive Outcomes Expectancies | 10 (25) | 10 (30) | 745.00 | .34 | 0.19 |
| Negative Outcomes Expectancies | 10 (30) | 7 (24) | 738.50 | .31 | 0.20 |
| Action Self-efficacy | 2 (3) | 2 (3) | 713.50 | .21 | 0.24 |
| Non-use Intention | 4 (6) | 3 (6) | 680.50 | .13 | 0.29 |

Table 2. Spearman's Rho Correlations of the Analyzed Variables

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|----------------------------------|--------|--------|------|--------|--------|--------|-------|------|
| 1. Age of onset | - | | | | | | | |
| 2. Years of use | -.85** | - | | | | | | |
| 3. Problematic Cannabis Use | -.06 | .09 | - | | | | | |
| 4. Risk Perceptions | .41** | -.31** | .13 | - | | | | |
| 5. Positive Outcome Expectancies | .18 | -.02 | .09 | .40** | - | | | |
| 6. Negative Outcome Expectancies | -.32** | .22* | .14 | -.30** | -.70** | - | | |
| 7. Action Self-efficacy | .40** | -.36** | .14 | .33** | .30** | -.29** | - | |
| 8. Non-use intention | .29** | -.24* | .04 | .33** | .32** | -.32** | .45** | - |
| <i>M</i> | 12.24 | 4.08 | 4.08 | 9.26 | 9.89 | 10.00 | 2.44 | 4.21 |
| <i>SD</i> | 1.90 | 2.06 | 1.55 | 3.77 | 8.28 | 7.64 | 1.05 | 2.27 |
| <i>N</i> | 103 | 103 | 103 | 103 | 103 | 103 | 103 | 103 |

* $p < .05$, ** $p < .01$.

hand, to verify *H5*, a moderation analysis (model 1) was conducted, which was confirmed if the interaction between motivational variables and gender yielded a significance level below .05.

Results

First, a preliminary analysis was performed to determine if there was any relationship between the gender variable and the variables of the HAPA. As shown in Table 1, no significant differences were found, and the effect sizes were either null or low.

On the other hand, Table 2 presents the correlations, means, and standard deviations of the main variables involved in the hypotheses proposed in our study.

To test *H1* and *H2*, a multiple linear regression analysis was conducted using the stepwise entry method to examine the effect of the set of motivational variables proposed by the HAPA on the non-use intention variable.

As shown in Table 3, the regression equation was statistically significant with $F(4, 98) = 8.39$, $p < .001$. The R^2 value was .25, indicating that 25% of the change in the non-use intention of JOs can be explained by the motivational variables of the HAPA. Specifically, the regression equation was $1.84 + 0.09$ (risk perceptions) $+ 0.01$ (positive outcome expectancies) $- 0.04$ (negative outcome expectancies) $+ 0.73$ (action self-efficacy). In other words, the intention not to use cannabis among JOs increases by 0.09 points for each additional point of risk perceptions, increases by 0.01 points for each point of positive outcome expectancies, decreases by 0.04 points for each point of negative outcome expectancies, and increases by 0.73 points for each point of action self-efficacy. These results demonstrate high

statistical power ($1 - \beta = .99$), and an effect size that approaches a high level ($f^2 = .34$).

Although the above data suggest that the action self-efficacy variable plays a primary role in explaining non-use intention, a stepwise multiple linear regression was performed to further confirm this point. As shown in Table 4, the variables action self-efficacy and negative outcome expectancies alone account for 23% of the variance in non-use intention. When considering action self-efficacy alone, it explains 19% of the variance, with a moderate effect size ($f^2 = .23$).

To test *H3* and examine the influence of past behaviors (age of onset of use, duration of use, and problematic use) on the non-use intention of JOs, a stepwise multiple regression was conducted. In this analysis, the only significant predictor of non-use intention among the past behaviors was the age of onset of cannabis use, with a low effect size, $F(1, 101) = 13.63$; $R^2 = .12$; $\beta = .41$; $p < .001$; $f^2 = .13$.

Considering this result, the proposed mediation model to test the *H4* only included the age of onset of use as the predictor of past behavior. In this model, all motivational variables in the model, except for positive expectations, had a significant mediating effect between the age of onset of use and the intention to use cannabis.

Regarding risk perceptions, its indirect effect was significant ($\beta = .08$, CI [.01, .19]). The Sobel test confirmed this mediating effect ($z = 2.02$, $p < .05$), suggesting that the effect of age of onset on non-use intention is mediated by 24% ($P_m = .24$) through the risk perceptions of JOs (see Table 5).

On the other hand, negative outcome expectancies obtained a significant mediating effect size of 20%, yielding a $\beta = .07$ (CI [0.0031, 0.1519]; Sobel $z = 2.25$, $p < .05$) on the relationship between age of onset and non-use intention (see Table 6).

Table 3. Multiple Regression Model with Stepwise Entry Method for the Effect of Motivational Variables from the HAPA on Non-use Intention

| Predictor Variables | $F(4, 98)$ | R^2 | β | Standard error | p | $1-\beta$ | f^2 |
|-------------------------------|------------|-------|---------|----------------|-------|-----------|-------|
| Model | 8.40 | .25 | 1.84 | .87 | <.001 | .99 | .43 |
| Risk Perceptions | | | .09 | .06 | .11 | | |
| Positive Outcome Expectancies | | | .01 | .03 | .69 | | |
| Negative Outcome Expectancies | | | -.04 | .04 | .25 | | |
| Action Self-efficacy | | | .73 | .20 | <.001 | | |

* $p < .05$, ** $p < .01$.

Table 4. Multiple Regression Model with Stepwise Entry Method for the Effect of Variables from the HAPA on Non-use Intention

| Predictor Variables | $F(2, 100)$ | R^2 | ΔR^2 | β | Standard error | p | $1-\beta$ | f^2 |
|----------------------------------|-------------|-------|--------------|---------|----------------|-------|-----------|-------|
| Model (1+2) | 15.04 | .23 | | 2.82 | .63 | <.001 | .99 | .30 |
| 1. Action Self-efficacy | | | .19 | .83 | .19 | <.001 | .99 | .23 |
| 2. Negative Outcome Expectancies | | | .04 | -.06 | .03 | .02 | .99 | .07 |

* $p < .05$, ** $p < .01$.

Table 5. Results of the Mediation Analysis of Risk Perceptions on the Relationship between Age of Onset and Non-use Intention

| Path | B | β | SE | t | p | CI 95% | |
|------------|------|-----|-----|------|-----|----------------|------|
| | | | | | | LL | UL |
| a | 0.72 | .36 | .18 | 3.94 | .00 | .36 | 1.09 |
| b | 0.14 | .23 | .06 | 2.34 | .02 | .02 | .26 |
| c' | 0.31 | .26 | .12 | 2.66 | .01 | .08 | .55 |
| ab | 0.10 | .08 | .04 | | | .01 | .19 |
| c | 0.41 | .34 | .11 | 3.69 | .00 | .19 | .63 |
| Sobel test | | | z | | SE | p ¹ | |
| | 2.02 | | .05 | | | .04 | |

Note. SE = standard error; CI 95% = confidence interval of 95%; LL = lower limit; UL = upper limit; ¹two-tailed probability; Pm = Percentage of mediation = $ab/c = .24$.

Table 6. Results of the Mediation Analysis of Negative Outcome Expectancies on the Relationship between Age of Onset and Non-use Intention

| Path | B | β | SE | t | p | CI 95% | |
|------------|-------|------|-----|-------|-----|----------------|---------|
| | | | | | | LL | UL |
| a | -1.35 | -.34 | .37 | -3.58 | .00 | -2.1006 | -0.6029 |
| b | -0.06 | .27 | .02 | -2.17 | .03 | -0.1204 | -0.0054 |
| c' | 0.33 | -.21 | .12 | 2.81 | .00 | 0.0967 | 0.5600 |
| ab | 0.08 | .07 | .04 | | | 0.0031 | 0.1519 |
| c | 0.41 | .34 | .11 | 3.69 | .00 | 0.1912 | 0.6354 |
| Sobel test | | | z | | SE | p ¹ | |
| | 2.25 | | .03 | | | .02 | |

Note. SE = standard errors; CI 95% = confidence interval of 95%; LL = lower limit; UL = upper limit; ¹two-tailed probability; Pm = Percentage of mediation = $ab/c = .20$.

Table 7. Results of the Mediation Analysis of Action Self-efficacy on the Relationship between Age of onset and Non-use Intention

| Path | B | β | SE | t | p | CI 95% | |
|------------|------|-----|-----|------|-----|----------------|--------|
| | | | | | | LL | UL |
| a | 0.20 | .37 | .05 | 3.98 | .00 | 0.1026 | 0.3066 |
| b | 0.77 | .36 | .20 | 3.78 | .00 | 0.3649 | 1.1733 |
| c' | 0.26 | .21 | .11 | 2.26 | .02 | 0.0313 | 0.4806 |
| ab | 0.16 | .13 | .07 | | | 0.0476 | 0.3329 |
| c | 0.41 | .34 | .11 | 3.69 | .00 | 0.1912 | 0.6354 |
| Sobel test | | | z | | SE | p ¹ | |
| | 2.77 | | .05 | | | .00 | |

Note. SE = standard errors; CI 95% = confidence interval of 95%; LL = lower limit; UL = upper limit; ¹two-tailed probability; Pm = Percentage of mediation = $ab/c = .38$.

Finally, the motivational variable of action self-efficacy obtained a larger mediation size compared to the others (Pm = 38%) in explaining the relationship between age and intention. This can be seen in Table 7, where β_{ab} was .13 (CI [0.0476, 0.3329]; Sobel $z = 2.77, p < .01$).

Table 8. Results of the Moderation Analysis of Gender on Motivational Variables and Non-use Intention

| Moderating/Motivational Variable | β | SE | t | p | LL | UL | |
|--|--------------------------|------|-------|-------|---------|---------|--------|
| Risk Perceptions (RP) | | | -1.15 | .25 | -0.5657 | 0.1513 | |
| | Gender (G) | -.75 | .51 | -1.45 | .15 | -1.7695 | 0.2729 |
| | RP x G | .34 | .14 | 2.33 | .02 | 0.0506 | 0.6339 |
| Action Self-efficacy (AS) | | | -0.41 | .68 | -1.4014 | 0.9232 | |
| | Gender (G) | -.43 | .50 | -0.85 | .40 | -1.4249 | 0.5731 |
| | AS x G | .93 | .45 | 2.08 | .04 | 0.0421 | 1.8089 |
| Higher-order unconditional interaction tests (Hayes, 2022) | | | | | | | |
| | Change in R ² | F | df1 | df2 | p | | |
| RPxG | .04 | 5.42 | 1 | 99 | .02 | | |
| ASxG | .03 | 4.32 | 1 | 99 | .04 | | |

Note. SE = standard errors; LL = lower limit; UL = upper limit.

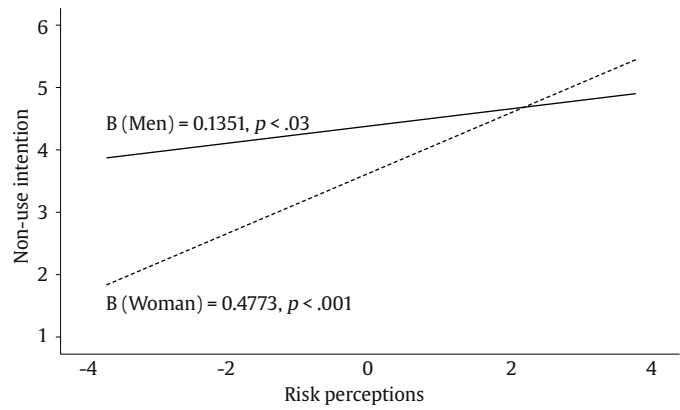


Figure 1. Moderating Effect of Gender on the Relationship between Risk Perceptions and Intention not to Use Cannabis.

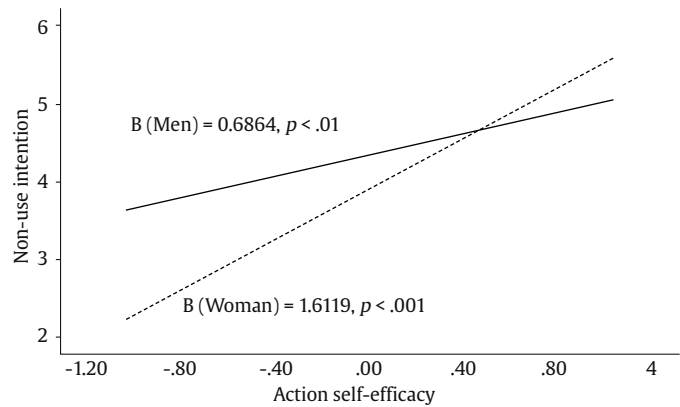


Figure 2. Moderating Effect of Gender on the Relationship between Action Self-efficacy and Intention not to Use Cannabis.

The final hypothesis (H5) aimed to examine the potential moderating effect of gender on the relationship between the motivational variables of the HAPA and the intention not to use cannabis in JOs. To explore this, a moderation analysis was conducted, revealing that the variables of risk perceptions ($\beta = .34, p < .05, CI [0.05, 0.63]$) and action self-efficacy ($\beta = .93, p < .05, CI [0.04, 1.80]$) had a significant differential effect on non-use intention based on the gender of the JOs (see Table 8). Specifically, it was observed that the impact of both risk perceptions and action self-efficacy on intention was greater for women than for men. In other words, the increase in risk perceptions and action self-

efficacy among women led to a greater increase in their intention not to use cannabis (see [Figures 1 and 2](#)).

Discussion

The present study provides evidence of the applicability of the motivational stage of the HAPA ([Schwarzer, 1992, 2008](#)) for predicting JOs' intention not to use cannabis after their release from a JDC. Taken together, the motivational variables accounted for 25.5% of the variance observed in non-use intention, indicating a medium-to-large effect size. This effect size is higher than the one reported by [Zhang et al. \(2019\)](#). Furthermore, action self-efficacy alone explained 19% of the variance.

[Schwarzer and Luszczynska \(2008\)](#) pointed out that this model is primarily suited for an adult population. However, our findings confirm that, at least in terms of the motivational stage, it is also applicable to JOs with a high-risk profile. These results align with previous findings related to health-risk behaviors (see [Wilson et al., 2016](#)). Therefore, we can conclude that motivational processes play a crucial role in the intention of JOs to change their health-related behavior.

To develop an intention not to use cannabis upon their release from the JDC, JOs need to perceive themselves as vulnerable to the negative health consequences of cannabis use and believe that continuing to use may lead to further legal issues. A study carried out with young smokers found no association between risk perception and intention to reduce smoking. The authors argued that the long-time lapse between smoking in adolescence and the onset of diseases such as lung cancer during late adulthood might affect the formation of intentions ([Schwarzer & Luszczynska, 2008](#)). Nevertheless, our study observed that risk perceptions were associated with intention when JOs experienced the negative consequences of their substance use for themselves.

Regarding outcome expectancies, our findings indicate that positive outcome expectancies strengthen the intention not to use cannabis, whereas negative outcome expectancies have the opposite effect. This suggests that the JOs in our study were considering the potential benefits beyond the immediate negative consequences of quitting, such as reducing health risks, avoiding legal troubles, improving family relationship, and addressing challenges in the school environment. Moreover, our results reveal that action self-efficacy is the most powerful predictor of the intention not to consume cannabis. It is possible that the forced abstinence imposed during their detention served as a direct experience of the target behavior, contributing to the development of expectations for successful change ([Bandura, 2001](#)). Therefore, outcome expectancies and self-efficacy play crucial roles in perceiving the potential benefits and building the confidence to initiate behavior change.

In the analysis of the effect of past behavior on intention, only age at onset was found to have a significant association, with an effect size close to medium. Specifically, the earlier the participants had begun using cannabis, the weaker their intention to quit in the future. These findings can be better understood if risk perceptions, negative outcome expectancies associated with quitting, and action self-efficacy are viewed as mediating variables. JOs who initiated cannabis use at a younger age and exhibit higher resistance to change tend to have a diminished perception of the risks involved in their behavior, anticipate more negative consequences if they stop using cannabis, and have less confidence in their ability to continue not using after their release.

These findings align with those reported by [Tolou-Shams et al. \(2021\)](#), who conducted a prospective study with first-time justice-involved youth to identify predictors of cannabis use. In their study, the authors discovered that young individuals who reported

initiating cannabis use before the age of 13 displayed stronger intentions to continue using drugs and held more favorable beliefs about this behavior. They also found that youngsters who were the most at risk of initiating drug use after having problems with the justice system were those who expressed a stronger intention to use drugs, had more positive expectations regarding cannabis use, and demonstrated lower levels of self-control.

The lack of significant direct or mediating effect of problematic use and its duration on intention is consistent with findings from another study conducted with young adult offenders ([O'Grady, 2022](#)). In that study, the authors examined the relationship between the severity of drug use and readiness to change alcohol and drug use behaviors, but no significant association was found between the two variables. However, it is important to note that other studies cited in this paper did identify significant relationships. We agree with the authors' suggestion that further research is required to clarify these contradictions.

Finally, our findings indicate that gender moderates the direct effects of risk perceptions and action self-efficacy on intention. Specifically, when these motivational variables were low, female JOs expressed a weaker intention not to use after their release than their male counterparts. Conversely, when the level of these variables was high, the effect on intention was stronger among female offenders than among male offenders. In other words, risk perceptions and self-efficacy had a more motivating effect on women than on men.

The differential effect of these motivational factors may provide an explanation for the distinct usage trajectories observed between men and women ([Chassin et al., 2016](#)). Moreover, other studies have reported that women tend to benefit more than men from the care and treatment services provided in JDCs ([Welty et al., 2017](#)). The results of the present study shed light on the cognitive mechanisms that underlie this differential response.

The main limitation of the present study is its focus solely on the motivational variables of the HAPA that are involved in the target behavior (intention not to use cannabis after being released from the JDC), without incorporating (for the reasons outlined earlier) the social cognitive variables that are directly involved in the process of actually engaging in the target behavior (the behavior of not use cannabis after serving their sentence and being released). However, it is important to note that according to social cognitive models, intention involves a conscious decision to act and serves as a precursor for action. Individuals with a clear and specific intention to act are more likely to adopt specific measures to achieve their goals ([Luszczynska & Schwarzer, 2003](#); [Murgraff et al., 2003](#)).

Limitations

The use of self-reports with JOs is also usually considered a limitation, since this population is often reluctant to provide information due to their legal situation ([Tolou-Shams et al., 2021](#)). This may have been the reason for the low internal consistency value obtained on one of the scales, and the results associated with this variable should be interpreted with caution. Another limitation associated with the measurement is the decision to measure outcome expectancies using an open format. This was driven by the lack of specific standardized instruments designed for this population, and existing instruments lacked sufficient psychometric guarantees ([Tolou-Shams et al., 2021](#)).

Lastly, the study's cross-sectional nature is another limitation, although mediation and moderation analyses were conducted using the PROCESS macro to gain deeper insight into the variables underlying the behavior under study. Nonetheless, longitudinal designs are more appropriate for exploring causal relations within a specific time frame.

Implications and Conclusion

The findings of the present study have important implications for promoting continued non-use cannabis among JOs after their release from JDCs. It would be expected that being detained would help JOs establish a connection between the events that led them to have problems with the justice system and their use of cannabis. It is important to note that these results are specific to the population of JOs who cannabis users before were being sent to a JDC and experienced forced abstinence while serving their sentence. Future research should explore whether these findings are applicable to other populations, such as youth on probation, who have different levels supervision and opportunities for use cannabis.

Following the proposals made by the HAPA, it is crucial to recognize that intention alone does not guarantee action. JOs need to enhance their ability to cope with risky situations and overcome the environmental barriers by adopting adaptive and healthy strategies. Action planning can be a valuable resource to support JOs in their efforts to quit cannabis use and strengthen their commitment to follow through with their intention, even in the face of challenges or barriers.

Continuing research is essential to determine how the predictions in the volitional stage of the HAPA (action control, initiation, maintenance, and relapses, taking environmental barriers and limitations into account) can be applied to JO population. Additionally, it is important to investigate how both past behavior and gender influence eventual outcomes. It would also be valuable to consider the possibility that these effects are reciprocal rather than unidirectional, as suggested by Berli et al. (2015). This means that higher levels of motivational and volitional processes may lead to behavioral change, while engaging in the desired behavior may in turn strengthen motivational and volitional processes, enhancing action control. Future research should explore this reciprocity.

In terms of practical implications, it is key to address the limitations associated with the predominant focus substance use problems in the juvenile justice system, which primarily aims at addiction treatment. These approaches have been observed to overlook the specific needs of JOs and their low adherence to the treatment once the judicial sentence has been served (Feldstein et al., 2014). There is a scarcity of preventive programs within justice environments (Funk et al., 2020) despite being recognized as necessary and falling under the responsibility of the justice system (Sales et al., 2018). Furthermore, it is important to note the lack of programs that are sensitive to the needs of female juvenile offenders (Javdani & Allen, 2016).

The findings of this study highlight the impact of early onset of cannabis use on the intention to abstain from using after release. This suggests that it is critical to implement prevention measures that target the vulnerable youth population to avoid the initiation of cannabis use at an early onset age. Additionally, providing early intervention for minors who have already started using cannabis and come into contact with the justice system is essential to prevent potential adverse outcomes. Preventive actions should be taken to minimize the likelihood of JOs resuming cannabis use after release from JDC.

The present study provides guidelines for the development of effective preventive interventions that promote the adoption of healthy behaviors through the modification of the motivational processes associated with a higher risk of substance use after the end of the forced abstinence during detention. These interventions should focus on increasing risk perceptions, fostering positive as opposed to negative expectations related to not using, and boosting the confidence of JOs in their own ability to quit. Based on these motivational processes, interventions should provide opportunities for vicarious experiences of success, foster self-reflection to increase risk awareness, provide JOs with coping strategies for high-risk

situations, and enhance their ability to make action plans that anticipate and overcome setbacks and failures.

In conclusion, this study identifies the motivational variables that are important for understanding the intention of JOs to refrain from use cannabis. These findings should serve a guide for developing prevention programs implemented that can be implemented within JDCs to strengthen JOs' intention to abstain from cannabis use after they have served their sentence.

Conflict of Interest

The authors of this article declare no conflict of interest.

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