

## The Impact of Mindfulness and Emotional Intelligence on Substance Dependence: A Comparative Study.

Auteur 1 : Meryem HILAL.

Auteur 2 : Rabii BARDADOUH.

Auteur 3 : Abdelhalim CHERQUI.

Auteur 4 : Hicham KHABBACHE.

**Meryem HILAL**, Laboratory of Applied Psychology, Language and Philosophy, Faculty of Letters and Humanities - Saïs, Department of Psychology, Sidi Mohamed Ben Abdallah University, Fez, Morocco

**Rabii BARDADOUH**, Department of Psychology, Sidi Mohamed Ben Abdallah University, Fez, Morocco

**Abdelhalim CHERQUI**, Laboratory of Applied Psychology, Language and Philosophy, Faculty of Letters and Humanities - Saïs, Department of Psychology, Sidi Mohamed Ben Abdallah University, Fez, Morocco.

**Hicham KHABBACHE**, Laboratory of Applied Psychology, Language and Philosophy, Faculty of Letters and Humanities - Saïs, Department of Psychology, Sidi Mohamed Ben Abdallah University, Fez, Morocco

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**Abstract**

**Background:** The phenomenon of drug addiction poses a threat to public health in Morocco, requiring a comprehensive understanding of the role of mindfulness in relation to emotional intelligence (EI) in the context of drug addiction in Fez (Morocco).

**Methods:** The study compared two groups: one group of 47 people aged 16 to 61 with substance dependence and another group of the same age without substance issues. Participants filled out a questionnaire about their background and took tests to measure their mindfulness and emotional intelligence. Data was collected over three months, and statistical methods were used to find differences between the two groups and to see how mindfulness and emotional intelligence relate to each other.

**Results:** The experimental group had much lower scores in mindfulness (11.17) and emotional intelligence (11.26) compared to the control group, which scored higher at 38.74 and 28.32, respectively. The statistical analysis showed clear differences between the two groups, indicating that lower mindfulness and emotional intelligence are linked to substance dependence. The findings also highlight how mindfulness affects emotional intelligence independently.

**Conclusion:** The results emphasize the value of integrating mindfulness and emotional intelligence training into substance addiction prevention and treatment programs. Enhancing these competencies may help reduce drug use. In Morocco, future research should investigate the relationship between mindfulness and emotional intelligence and their combined impact on substance misuse intervention.

**Keywords:** Mindfulness, Emotional Intelligence, Substance Dependence, Addiction Treatment, Comparative Study.

## Introduction

The global health issue of adolescent drug use is particularly acute in Morocco, which has witnessed an uptick in cocaine consumption (Rammouz et al., 2020; Omari et al., 2013); during COVID-19, many users reported decreased substance use in compliance with health guidelines (Toufiq, 2021). Emotional intelligence (EI), identified by Salovey & Mayer (1989) as the evaluation of emotions for practical application, encompasses the regulation of personal and others' emotions. In contrast, mindfulness facilitates the recognition and effective management of emotions (Kabat-Zinn, 2016). Existing research explores the interplay between mindfulness, emotional intelligence, and substance use, highlighting mindfulness's role in enhancing emotional intelligence and preventing addiction (Henning et al., 2021; Kun et al., 2019; Sancho et al., 2018; Tang et al., 2016; Bowen et al., 2010; Kabat-Zinn, 2016, 1990; cited by Khoury & Dionne, 2022). Additionally, a negative correlation exists between emotional intelligence and substance use, suggesting that individuals with higher emotional intelligence are less prone to drug use (Henning et al., 2021; Kun et al., 2019). Several studies emphasize that these mindfulness and EI also encompass affective, social, and metacognitive dimensions that go beyond the strict framework of cognitive skills (Tsai et al., 2024; Vilaverde et al., 2020; Tohme et al., 2020). Thus, the literature converges towards the idea that EI and mindfulness are both cognitive and emotional skills, with partially dissociable but interconnected mechanisms (Tsai et al., 2024; Trautwein et al., 2020; Raugh & Strauss, 2023).

This research seeks to investigate whether cognitive competency disparities exist between individuals with and without addiction issues, as well as to statistically assess the impact of mindfulness and emotional intelligence on addiction in Morocco. The study formulates the following research questions:

1. Are there notable disparities between individuals with addiction issues and those without regarding these cognitive competencies?
2. Furthermore, statistically speaking, what is the influence of Mindfulness and emotional intelligence within the framework of substance dependence among individuals residing in Morocco?

Accordingly, the main objective of this research is to promote and integrate mindfulness-based strategies into addiction treatment programs in the Moroccan context in order to strengthen emotional intelligence skills, particularly among adolescents struggling with substance use issues. This study aims to contribute both to the theoretical development of the concepts of mindfulness and emotional intelligence and to the practical implementation of strategies to combat substance abuse within Moroccan addiction treatment establishments.

Finally, the remainder of this article is structured as follows. Section 1 presents a review of the literature on mindfulness and emotional. Section 2 introduces the conceptual model, the research hypotheses and describes the research methodology, including the data collection process and the quantitative analytical approach used to compare the two study groups. Section 3 specifies the statistical analysis methods used. Section 4 presents the empirical results obtained from the statistical analysis. Section 5 discusses the findings in relation to existing literature and highlights their implications. Finally, the study concludes by outlining limitations.

## **1 Literature Review**

Mindfulness, which means paying attention to the present moment without judgment (Kabat-Zinn, 2009), has become an important tool in addiction therapy to help people become more aware of themselves, manage their emotions, and control their cravings, while emotional intelligence (EI)—the ability to recognize, use, understand, and manage emotions (Mayer & Salovey, 1997)—is increasingly recognized as important for dealing with the emotional difficulties of substance use disorders and recovery.

### **1.1 Mindfulness**

Mindfulness, derived from Buddhist practices and adapted for Western psychological frameworks, focuses on present-moment awareness and non-judgmental acceptance (Kabat-Zinn, 2009; Michel et al., 2019).

Research shows that higher levels of mindfulness, including the dimensions of conscious attention to the present moment, non-judgment and non-reactivity, are associated with less substance use, reduced craving and better emotional regulation in people with addictive disorders (Sieder et al., 2024; Liu et al., 2024; Jarret et al., 2023; Arnaud et al., 2023; Maloney et al., 2023; Bruder, 2021; Mutumba et al., 2021; Garland, 2021; Vilaverde et al., 2020). Mindfulness-based interventions (MBIs) appear to be particularly effective in reinforcing these traits and improving therapeutic outcomes, although some aspects, such as the "observe" dimension, show more nuanced associations depending on the substances and populations studied (Liu et al., 2024; Bruder, 2021; Vilaverde et al., 2020). In addiction situations, MBIs helps people step back from their thoughts, manage their feelings, and become more aware of themselves, which reduces the power of cravings and improves their ability to handle tough emotions without turning to drugs or alcohol (Segal et al., 2002; Chambers et al., 2009).

Early studies on mindfulness and addiction mainly focused on creating and testing Mindfulness-Based Relapse Prevention (MBRP), which is a version of Mindfulness-Based Stress Reduction (MBSR) and Mindfulness-Based Cognitive Therapy (MBCT) designed for people with

substance use disorders (Bowen et al., 2010). These early studies often showed that MBRP could effectively reduce relapse rates and substance use (Bowen et al., 2014).

Neurobiological studies also suggest that mindfulness modulates brain circuits involved in reward, executive control and stress management, thus contributing to relapse prevention Full text used (Arnaud et al., 2023; Oberleiter et al., 2022; Garland, 2021; Chin et al., 2020). However, the strength of the association varies according to clinical contexts, individual profiles and intervention modalities (Zhou et al., 2023; Roberts et al., 2023).

## 1.2 Emotional intelligence

The concept of emotional intelligence has rapidly developed since Reuven Bar-On's introduction of the Emotional Expression Quotient in the 1980s, advancing through Salovey and Mayer's theoretical model in 1990 and reaching prominence with Goleman's seminal 1995 work, "Emotional Intelligence" (Bar-On, 2000). In 1990, Joseph LeDoux explained that emotional intelligence involves how we react to feelings, mainly processed in the amygdala, which is different from how the cerebral cortex works (Chbat, 2002); emotions are quick and intense responses to important events, unlike moods (Salovey & Mayer, 1989). Mayer and Salovey's (1997) ability model identifies four dimensions of emotional intelligence: perceived emotions, used emotions, understood emotions, and managed emotions.

In the book review of Perloff (1997), Goleman's seminal research, while not explicitly focused on addiction, posits emotional intelligence as a pivotal factor influencing life success and well-being, particularly the abilities of self-regulation and interpersonal efficacy, which are crucial in the context of addiction recovery. Individuals with substance use disorders face significant difficulties in emotional regulation compared to healthy individuals (Stellern et al., 2023). Trinidad and Johnson (2002) established a negative correlation between emotional intelligence and adolescent smoking, indicating that elevated emotional intelligence may act as a protective mechanism against the onset of substance use. Tomczak's (2010) investigation revealed a notable inverse relationship between emotional intelligence traits and abilities and substance abuse, indicating that elevated emotional intelligence correlates with reduced substance use, and highlighting the unique yet interconnected aspects of these emotional intelligence dimensions when forecasting substance abuse. Recent studies have looked at how mindfulness relates to emotional intelligence, suggesting that being mindful can improve emotional intelligence and help with addiction recovery. For example, a study in Morocco found that mindfulness training helped nursing students become better at handling their emotions (Ksiksou et al., 2022), which could also help people with substance use problems (Garland, 2021).

The literature indicates a substantial correlation between mindfulness, emotional intelligence, and substance dependence, with both elements being pivotal in addiction susceptibility and recovery; however, the complex interactions among these factors, especially across varied cultural contexts, warrant further investigation. The current study plans to fill the gap in research by carefully comparing levels of mindfulness and emotional intelligence in people with substance dependence in Morocco to those in a healthy control group.

### **1.3 Positive effects and limits of mindfulness and emotional intelligence**

In the literature, several scientific studies demonstrate the positive effects of mindfulness on drug addiction. MBIs significantly reduce craving, relapse, anxiety, depression and substance use (Mutumba et al., 2021; Jarret et al., 2023). They improve emotional regulation, the valorization of natural rewards, self-efficacy and quality of life (Garland, 2021). Effects are observed in various settings (outpatient, inpatient, prevention) and for different substances (opiates, methamphetamine, cannabis, alcohol).

On the other hand, there is scientific evidence of the positive effects of EI on drug addiction. EI is associated with a lower prevalence of behavioral addictions and better management of negative emotions, stress, and impulsivity (Stellern et al., 2023; Garland, 2021; Tomczak, 2010). It plays a moderating and mediating role in the relationship between addiction and psychological distress, and promotes the adoption of positive adaptation strategies (Stellern et al., 2023; Ksiksou et al., 2022; Garland, 2021).

Although EI is negatively correlated with behavioral addictions, its causal role and impact on substance addictions remain unclear, and furthermore, studies suffer from a lack of distinction between trait and ability models, and most of them are cross-sectional, which limits the scope of their conclusions (Biolcati et al., 2025).

## **2 Methods**

The methodological approach of this research is grounded in a quantitative, comparative design that aligns with a positivist epistemological stance (the principles of positive psychology and mindfulness-based psychotherapy), which emphasizes the objective, empirical measurement of psychological constructs. By utilizing standardized psychometric instruments -specifically the Moroccan adaptation of the Emotional Intelligence Scale (WLEIS AL-MA) and the Mindful Attention Awareness Scale (MAAS)- the authors sought to capture quantifiable data regarding internal cognitive and emotional states. The mode of reasoning is distinctly deductive; the study begins by synthesizing existing literature on the protective roles of mindfulness and emotional intelligence to formulate three specific, testable operational hypotheses. To systematically test these hypotheses, the methodology relies on rigorous statistical analyses, including independent

samples T-tests to establish comparative baselines between the substance-dependent experimental group and the healthy control group, and simple linear regression to determine the predictive influence of mindfulness on emotional intelligence. This quantitative framework was purposefully chosen to enhance methodological rigor and establish statistically valid baseline measurements within the Moroccan context, avoiding the introduction of interventions to clearly isolate the deficits and relationships between these variables in individuals facing addiction. Ultimately, this data-driven approach aims to provide robust, objective evidence to justify the integration of targeted cognitive and emotional training into local addiction treatment protocols.

## 2.1 Research Problem

The prevalence of drug use in Morocco mirrors global statistics, with 4.1% having engaged with psychoactive substances, as highlighted by Rammouz (2020). A notable rise in cocaine usage and high cannabis use among students necessitates an investigation into the levels of mindfulness and emotional intelligence among those with substance use disorders compared to non-dependent individuals. This research aims to assess these constructs quantitatively in Fez, elucidating their relationship with substance dependency and conducting statistical analyses to explore the predictive role of mindfulness in emotional intelligence.

The operational hypothesis of this study is as follows:

Hypothesis 1: There are anticipated advantageous disparities in mindfulness metrics between the two population cohorts within the research, specifically for the control group.

Hypothesis 2: When looking at the two groups in the study, we expect to see a significant positive difference in emotional intelligence scores for the control group.

Hypothesis 3: There would be, statistically, a beneficial influence of mindfulness on emotional intelligence, depending on the two groups of the study's target population.

## 2.2 Importance of Researching the Topic

Studying how mindfulness and emotional intelligence affect substance dependence, especially by comparing different places like Morocco, is very important for a few key reasons:

- Addressing Elevated Relapse Rates: In light of the ongoing challenge posed by relapse in addiction treatment, it is imperative to identify and bolster protective factors such as mindfulness and emotional intelligence, which are essential for the formulation of more efficacious and sustainable interventions.
- This study helps us understand addiction better by looking at not just biological or behavioral aspects, but also the psychological and emotional health involved.

- Customized Interventions: Gaining insights into the specific deficits and strengths in mindfulness and emotional intelligence among individuals with substance use disorders can guide the creation of more individualized and targeted therapeutic strategies.
- Cultural Relevance: Conducting research in underrepresented locales such as Morocco is vital to guarantee that interventions are culturally pertinent and effective for heterogeneous populations.
- Generalizing outcomes from Western research without local validation may prove to be ineffective or potentially detrimental.
- Insights from this research could help develop preventive measures by spotting people at higher risk because of lower mindfulness or emotional intelligence, allowing for timely help.
- If these factors are proven to be important for protection, adding mindfulness and emotional intelligence assessments and interventions to current treatment methods could improve how resources are used and lead to better treatment results.

The proposed research question investigates whether substantial differences exist in mindfulness and emotional intelligence between 47 individuals with substance dependence and a matched control group in Morocco. This inquiry emphasizes the stable constructs of mindfulness and emotional intelligence, employing a comparative design to enhance methodological rigor and contextual relevance. By focusing on baseline measurements without the inclusion of interventions, the question aims to address significant gaps in the literature regarding this specific population and inform future targeted interventions.

### 2.3 Participants and Data Collection

We selected the study's target population as follows: The experimental group (**Figure 1**) included 47 people in Morocco (with five women, making up 10.63%, and two from Guinea) who are dependent on substances like cannabis, cocaine, and heroin and were chosen from patients looking for treatment at the addictology department of Ibn Al Hassan Psychiatric Hospital in the Hassan 2 University Hospital Center in Fez. The physicians in the department confirmed substance dependence. A notable 76.6% of the experimental group have exhibited patterns of substance dependence for a duration exceeding five years, whereas 23.4% have demonstrated addiction for less than five years. The department of substance dependence employs physicians. The control group (**Figure 1**), comprising 47 Moroccan individuals (with 18 women, accounting for 38.29%) without substance dependence, was selected from the employees (civil servants and subcontracting company workers) of University Hospital Centre Hassan II in Fez, along with their family members. The

experimental group exhibited an average age of 36.9 years, as documented. Within the experimental group, individuals aged between 16 and 31 constituted 51.1%, while the control group included 66% of individuals aged 17 to 47 (**Figure 2**). We conducted the research between March and May 2024, a period of three months. **We reviewed responses to the sociodemographic questionnaire and the Emotional Intelligence and Mindfulness scales in a database for later statistical manipulation.** We conducted the examination using various statistical programs, and the procedure for participant inclusion spanned three months.

#### **2.4 Procedure**

The execution of this study received authorization from the director of Ibn Al Hassan Hospital and the head of the addictology department. We meticulously adhered to the ethical standards of the research, which included obtaining informed consent from participants and safeguarding their confidentiality and anonymity. Patients in the experimental group of the Addictology Department at Ibn Al Hassan Psychiatric Hospital, which is part of the Hassan II University Hospital Centre in Fez, were asked to voluntarily take part in the study, whether they were fully hospitalized or just attending consultations. If they wanted to join, they were asked to inform a member of the healthcare team, who then passed the message to the student researcher. During data collection sessions organized with the medical and nursing staff of the Addictology Department, the sociodemographic questionnaire and the scales for measuring emotional intelligence and mindfulness were given to the individuals with addiction in person. Should they express a desire to participate, they were instructed to notify a member of the healthcare team, who subsequently relayed this information to the student researcher. The sociodemographic questionnaire, alongside the scales assessing emotional intelligence and mindfulness, was administered in a face-to-face manner to the group of individuals with addiction during data collection sessions that were coordinated in conjunction with the medical and nursing personnel of the Addictology Department. Conversely, members of the control group independently completed these questionnaires, having received preliminary guidance on the correct procedures for their completion. The answers from the sociodemographic questionnaire and the emotional intelligence and mindfulness scales were carefully organized and put into a database for later statistical analysis using SPSS software (version 22).

#### **2.5 Study Tools**

The investigation employed a questionnaire alongside psychometric measurement instruments for the variables under examination as its primary means of data collection. Following the study's aims, the researchers devised a sociodemographic questionnaire and implemented two scales to assess mindfulness and emotional intelligence. The instruments administered to each

participant consisted of three distinct components: the initial section encompassed a variety of items, including sociodemographic information (age, educational achievement, marital situation, housing type, and profession), alongside data regarding the duration of substance use and the specific types of psychoactive substances utilized. The second component of the measurement instrument tailored for this research was the Moroccan adaptation of the Emotional Intelligence Scale (WLEIS AL-MA). In contrast, the third component consisted of the Mindfulness Measurement Scale developed by Brown & Ryan (2003). As per El Ghoudani, Pulido-Martos, and Lopez-Zafra (2018), emotional intelligence (EI) has been extensively deliberated and scrutinized across various nations. Nevertheless, the assessment of EI in African and Arab communities has been constrained by the absence of standardized protocols for validating assessment instruments. For the Moroccan version, Alaoui et al. (2020) used the Arabic version of the WLEEIS scale (El Ghoudani et al., 2018) and changed some content to make it more suitable for teenagers. Throughout the adaptation process, adjustments were made to the response range and the wording of the components. In particular, they changed the response options from a seven-point scale to a four-point scale to make it clearer while keeping the main idea of the WLEIS AL-MA scale the same (Alaoui et al., 2020).

The WLEIS AL-MA SCALE consists of 15 items requiring approximately 5 to 10 minutes to complete. It can be administered individually or in a group setting, utilizing written or oral formats (Alaoui et al., 2020). A consensus regarding the accurate delineation and evaluation of mindfulness is lacking. Within scholarly literature, mindfulness has been delineated from diverse standpoints, resulting in over twenty self-report measures for gauging mindfulness levels (Khoury, Dionne, & Grégoire, 2019). Among the tools devised for evaluating mindfulness levels, the Mindful Attention Awareness Scale (MAAS) stands out, as it was explicitly created to gauge attention and awareness in one's daily adventures (Brown & Ryan, 2003). The MAAS is a simple self-assessment tool that accurately measures mindfulness in everyday activities, looking at both outside and inside experiences, and uses a six-point scale from "almost always" to "rarely." This instrument, which has undergone validation in France by Jermann et al. (2009), consists of 15 items that measure the extent of attention or inattention toward daily activities. A high score signifies an increased level of attentiveness. Brown and Ryan (2003) investigated various psychometric attributes associated with this scale, including reliability, validity, and responsiveness. According to the research by Brown and Ryan (2003), the MAAS mainly focuses on whether a person is paying attention and aware of what is happening right now, rather than looking at qualities like acceptance, confidence, compassion, gratitude, or other traits often associated with mindfulness. The criteria for inclusion in the

control cohort required the absence of substance dependency (including but not limited to tobacco, alcohol, illicit drugs, etc.).

On the other hand, people in the experimental group were not allowed to have any current mental health issues (which doctors said would not work for the study), learning disabilities, hearing problems, or if they chose not to take part in the study.

### 3 Statistical methods

We used the independent samples T-test to compare the average values and identify any differences between the two study groups. A straightforward linear regression analysis was performed using SPSS version 22 on the important variables found in the univariate analysis to see how mindfulness affects emotional intelligence and to check the relationship between mindfulness and the four parts of emotional intelligence. To check how reliable the emotional intelligence and mindfulness measurement tools are, we used Cronbach's alpha to see if they give consistent results. The stability coefficient of the emotional intelligence scale, as indicated by Cronbach's alpha, is 0.783. This finding validates the scale's substantial stability, enhancing confidence in its suitability for the intended population under study. Regarding the mindfulness scale, the Cronbach's alpha stability coefficient is reported to be 0.661. We achieved a notable Alpha Cronbach value of 0.772 after statistically removing item 1 and item 2.

## 4 Results

### 4.1 Hypothesis 1: Evaluation of differences in measures of Mindfulness between the two study groups

To assess the validity of this hypothesis, we calculated the arithmetic means along with their corresponding standard deviations, as presented in **Table 1**. The t-test was used to compare the two groups (experimental and control) to determine how important the difference is between their average scores on the mindfulness scale, with one degree of freedom (92). **Table 2** indicates statistically significant divergences at the 0.01 level between the experimental and control groups in the scores of the two study groups on the mindfulness measurement scale. The value of (T) was (-15.050) with a significance level of (0.000), and this value is statistically significant at the (0.01) degree. The p-value of Levene's test is 0.023, lower than 0.05, so there is an important distinction between the variances of the two groups. **Table 1** shows that the mean scores differ significantly, favoring the control group, which indicates that the experimental group has a low level of mindfulness. What **Figure 3** depicts is the significant difference in scores between the two study groups on the mindfulness scale in favor of the control group. The first hypothesis of this research suggested that participants in the control group would have superior scores on measures of mindfulness compared to the experimental

group. This hypothesis was confirmed, as the findings showed disparities in mindfulness levels favoring the control group.

#### **4.2 Hypothesis 2: Evaluation of differences in measures of emotional intelligence between the two study groups**

To evaluate the validity of this hypothesis, we calculated the arithmetic means and standard deviations, as presented in **Table 3**. The t-test was used for the two groups (experimental and control) to establish the importance of the disparities between the arithmetic means of the scores of the two study groups on the emotional intelligence scale with one degree of freedom (92). **Table 4** shows statistically substantial disparities at the (0.01) level between the experimental and control groups in the scores of the two study samples on the emotional intelligence scale. The value of (T) was (-14.585) with a significance level of (0.000), and this value is statistically significant at the 0.01 level. The p-value of Levene's test is 0.210, so it is 0.05, which means that the variances are not significantly different (i.e., the hypothesis of homogeneity of variance is satisfied). Significantly different from each other (i.e., the hypothesis of homogeneity of variance is satisfied). Comparing the means, we see that the differences favored the control group, and these results indicate that the experimental group has a low level of emotional intelligence (**Table 3**). **Figure 4** shows that the differences between the control and experimental groups in the scores on the emotional intelligence scale are high in favor of the control group. The second hypothesis of this research suggested that participants in the control group would have superior scores on the measurement of emotional intelligence than those in the experimental group. This hypothesis was supported by the findings, which showed differences in emotional intelligence levels, with the control group having a very high level.

#### **4.3 Hypothesis 3: Evaluation of the relationship between Mindfulness and emotional intelligence in the two groups**

We used simple linear regression to investigate the linear correlations between emotional intelligence and mindfulness, as shown in **Table 5** and **Figure 5**. The correlation is linear between the two variables, mindfulness and emotional intelligence, with a linear regression coefficient  $R^2$  of 0.749, which means that this correlation is perfectly positive linear. A significant regression of 0.749 was observed between these two variables, with a p-value of less than 0.0001, highlighting a strong and notable correlation between mindfulness and emotional intelligence. **Figure 6** of the data collected and analyzed using SPSS software clearly illustrates these results. In addition, it should be noted that this strong correlation of 0.749 shows the influence of mindfulness on emotional intelligence. The very high statistical significance ( $p < 0.0001$ ) further reinforces the importance of these results, suggesting that mindfulness may

function as a crucial contribution to the development of emotional intelligence, especially in drug users. The third hypothesis of this study suggests that mindfulness positively impacts intelligence, according to the two study groups. This hypothesis was partly verified, as the results show that mindfulness positively impacts emotional intelligence within the study's target population.

## **5 Discussion**

The results of this study confirmed the first two hypotheses: participants in the control group demonstrated significantly higher levels of Mindfulness and emotional intelligence (EI) compared to the experimental group. These findings are in agreement with previous research that promotes the development of Mindfulness and emotional intelligence skills. The third hypothesis, which proposed a positive impact of Mindfulness on EI, was partially verified. While the data indicated a positive relationship between these constructs, the effect was more pronounced in the control group than the experimental group, suggesting that substance dependence may weaken this relationship.

### **5.1 Mindfulness differences between groups – possible explanation and implications**

As conceptualized by Kabat-Zinn and others, mindfulness involves non-judgmental awareness of the present moment (Kun et al., 2019). In the experimental group, the significantly lower levels of mindfulness may reflect the detrimental impact of substance dependence on self-regulation and attention, as noted in previous studies (Tang et al., 2016). Mindfulness deficits could hinder individuals' ability to recognize and regulate emotional and physiological cues associated with addiction, thus perpetuating substance use behaviors. Consequently, addiction intensifies mindfulness deficits, while mindfulness-oriented interventions can harmonize various beneficial affective mechanisms to mitigate addictive behaviors and address the issue of addiction (Chang et al., 2023; Garland, 2021).

### **5.2 Emotional Intelligence differences between groups - possible explanation and implications**

Similarly, the experimental group's lower EI scores support findings that substance dependency is associated with poor emotional regulation and awareness (Henning et al., 2021). The reduced capacity to manage emotions effectively may increase vulnerability to substance misuse as individuals seek external means, such as drugs, to cope with negative emotional states. The control group's superior EI scores further underscore the protective role of EI in fostering adaptive coping mechanisms and psychological resilience, as highlighted by Goleman (Perloff, 1997).

### 5.3 Mindfulness and Emotional Intelligence relationship in the two groups

The partial verification of the third hypothesis highlights the nuanced relationship between mindfulness and EI. Research suggests that mindfulness can enhance emotional regulation by fostering awareness of emotional states without judgment, thus reducing emotional reactivity (Tang et al., 2021; Schutte & Malouff, 2011). However, in the experimental group, substance dependence might interfere with this process, making mindfulness less effective in improving emotional intelligence (Lorenzetti et al., 2023). The data of the control group align with those of Jiménez-Picón et al. (2021), which show that mindfulness and emotional intelligence are highly developed.

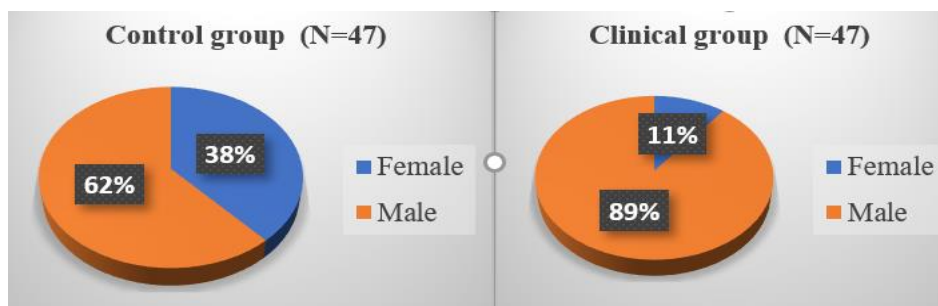
### 5.4 Implications for Addiction Treatment

Following the results of the study, which found low levels of mindfulness and EI in the addicted population, we propose adding MBIs to the therapeutic protocol for drug addiction in Morocco, since they have been scientifically proven to increase levels of mindfulness and emotional intelligence (Chmiel, 2024; Sieder et al., 2024; Liu et al., 2024; Chang, 2023; Jarret et al., 2023; Arnaud et al., 2023; Maloney et al., 2023; Bruder, 2021; Mutumba et al., 2021; Garland, 2021; Vilaverde et al., 2020).

The question why low levels of mindfulness and EI in the context of drug addiction in-depth studies in the Moroccan context. Longitudinal studies, could determine the causal relationship between low levels of mindfulness and EI with drug addiction. The results conclude that low levels of mindfulness and emotional intelligence should be taken into consideration in Moroccan therapeutic protocols, and why not open up to MBIs in the Moroccan medical context.

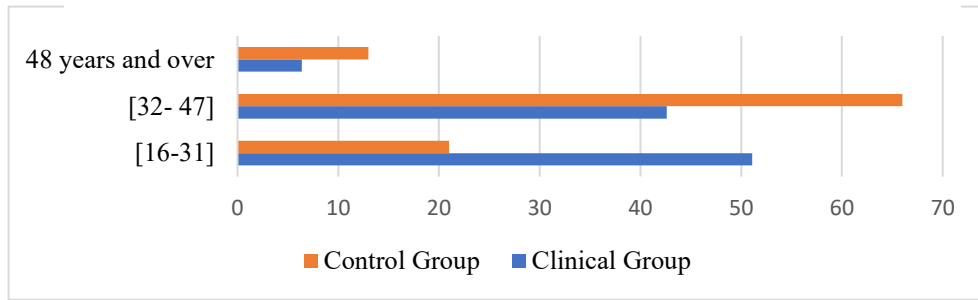
## 6 Figures

**Figure 1: Illustration of the gender composition of the two groups in the study's target population**



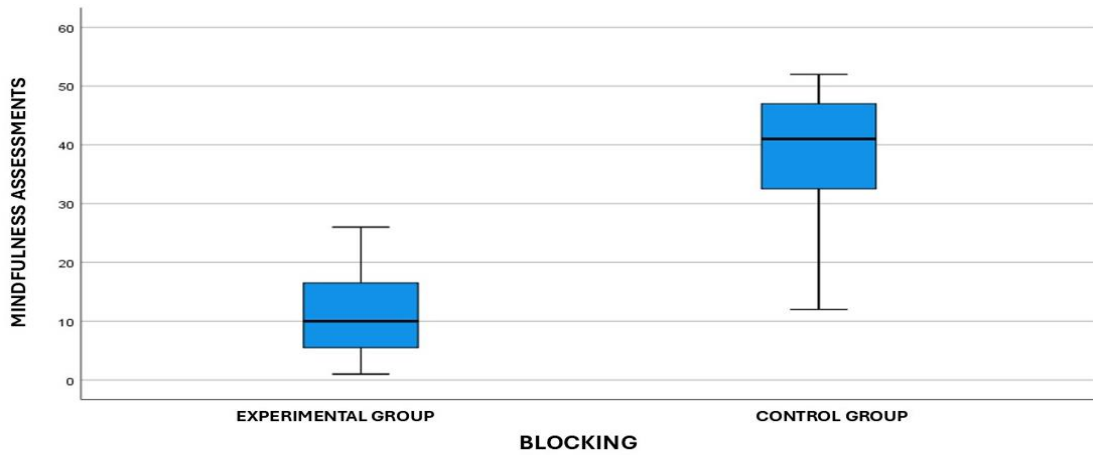
Source: Personal design based on data collected

**Figure 2: Illustration of the target population by age intervals**



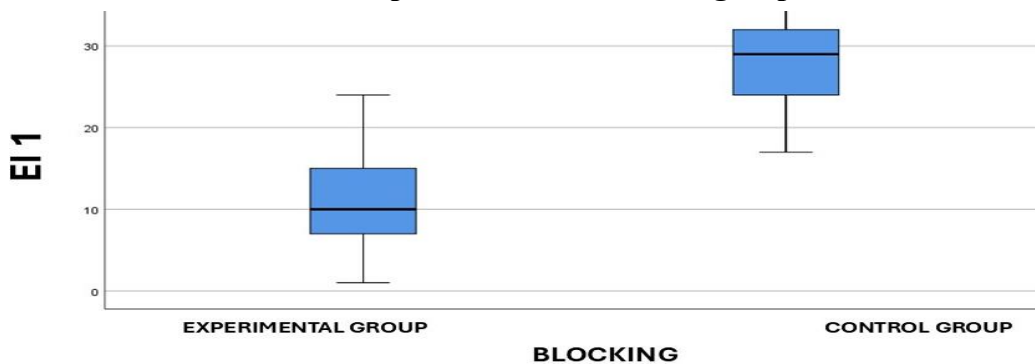
Source: Personal design based on data collected

**Figure 3: Level of Mindfulness (mindfulness composite in the figure) in the two groups (experimental and control)**



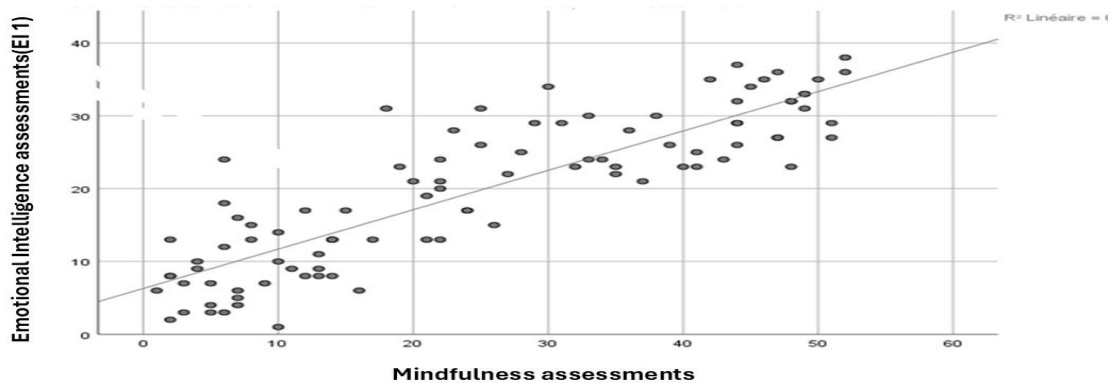
Source: Personal design based on data analyzed with SPSS software (version 22)

**Figure 4: Level of emotional intelligence (EI1 in the figure) in the experimental and control groups**



Source: Personal design based on data analyzed with SPSS software (version 22)

**Figure 5: Simple dispersion with adjustment curve for emotional intelligence (EI1 in the figure) and mindfulness (Mindfulness assessments in the figure)**



Source: Personal design based on data analyzed with SPSS software (version 22)

**7 Tables**

**Table 1: Mindfulness group statistics**

	GROUPING	N	Average	Standard deviation	Average standard error
Mindfulness	EXPERIMENTAL GROUP	47	11,17	7,281	1,062
	CONTROL GROUP	47	38,74	10,235	1,493

Source: Personal design based on data analyzed with SPSS software (version 22)

**Table 2: Independent samples test**

Levene's test for equality of variances					t-test for equality of means				
Mindfulness	F	Sig.	t	Df	Sig (bilateral)	Average difference	Std. standard	The confidence interval of the difference at 95%	
								Lower	Superior
Assumption of equal variances	5,329	0,023	-15,1	92	0,000	-27,574	1,832	-31,21	-23,936

Source: Personal design based on data analyzed with SPSS software (version 22)

**Table 3: Emotional intelligence group statistics**

	GROUPIN G	N	Averag e	Standard deviation	Average standard error
EI	EXPERIME NTAL	47	11,26	6,131	,894
	CONTROL	47	28,32	5,171	,754

Source: Personal design based on data analyzed with SPSS software (version 22)

**Table 4: Emotional intelligence independent samples test**

Levene's test for equality of variances					t-test for equality of means				
	F	Sig	t	df	Sig.(bilatera l)	Averag e differen ce	St. Standar d	The confidence interval of the difference at 95	
EI								Lower	Superio r
Assumption of equal variances	1,59 6	0,2 1	- 14,6	9 2	0,000	-17,064	1,17	-19,39	-14,74

Source: Personal design based on data analyzed with SPSS software (version 22)

**Table 5: Simple linear regression between Mindfulness and emotional intelligence**

Overview of models						
Model	R	R-two	R-two adjusted	Standard error of the estimate	Durbin-Watson	
1	,866 <sup>a</sup>	,749	,747	5,167	1,952	
a. Predictors: (Constant), Mindfulness						
b. Dependent variable: Emotional Intelligence						
ANOVA <sup>a</sup>						
Model		Sum squares	of DDL	Medium Square	F	Sig.
1	Regression	7345,281	1	7345,281	275,097	,000 <sup>b</sup>
	de Student	2456,464	92	26,701		
	Total	9801,745	93			
a. Dependent variable: Emotional Intelligence						
b. Predictors: (Constant), Mindfulness						

Coefficients						
Model		Non-standardised coefficients		Standardized coefficients	t	Sig.
		B	Standard error	Beta		
1	(Constant)	6,293	,973		6,470	,000
	Mindfulness	,541	,033	,866	16,586	,000

a. Dependent variable: Emotional Intelligence

**Source: Personal design based on data analyzed with SPSS software (version 22)**

## 5 Limitations of the Study

Despite successfully attaining its objectives, this study has certain limitations. Firstly, the findings came from a self-administered questionnaire, which might have led to misunderstandings of some questions, even though the student-researcher worked hard to explain certain ideas with the clinical group's care team, possibly influencing how the participants answered. Secondly, the Mindfulness Assessment Scale (MAAS) had six questions, which made it hard for the clinical group to answer, especially because addiction can affect how the brain makes decisions. The validity of the clinical group's responses was called into question despite the concerted efforts of the medical and nursing team to reassure and motivate the participants. Moreover, the absence of scientific validation for the MAAS scale within the Moroccan context may constrain its relevance and utility. Lastly, the convenience sampling employed was limited in scope and did not accurately reflect the entirety of the population, especially concerning substance abuse and gender dynamics.

## 6 Conflict of Interest

*The authors* affirm that they conducted the research without any commercial or financial relationships that could potentially create a conflict of interest.

## 7 Author Contributions

All authors equally contributed to preparing this article

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