From Roots to Recovery: How Addiction Type Shapes the Path to Healing

Minja Tomić

S3956083

Department of Psychology, University of Groningen

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Group number: 25

Supervisor: Martin Manchev

Second evaluator: prof. dr. Oliver Weigelt

In collaboration with: Ana Andreeva, Josephine Haas, Leyla M. O. Friedrichsen, Noa I. A.

Begeman, and Pius J. Ravenborg.

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Abstract

Do personal beliefs about the root of one's addiction influence beliefs about recovery, and does type of addiction affect this relationship? The present study investigates whether physiological or psychological root beliefs are associated with perceived ability to recover, and whether type of addiction (substance-based, behavioural, or both) moderates this relationship. Fifty-two adults reporting at least one type of addiction completed a self-report questionnaire assessing perceived root of addiction, perceived ability to recover, and type of addiction. Initial regression analyses indicated that a psychological root of addiction was linked to greater confidence in one's ability to recover, although the strength of this relationship was relatively weak. Furthermore, incorporating the type of addiction into the model rendered the effect of root beliefs non-significant. Instead, reporting one type of addiction (either substance-based or behavioural) predicted a lower perceived ability to recover compared to reporting both types. No significant interactions emerged between root beliefs and addiction type. These findings indicate that individuals are more concerned with the type of their addiction than with its underlying causes. Future research should concentrate on refining the items that assess root beliefs, improving reliability and ensuring more substantial findings.

Keywords: substance-based addiction, behavioural addiction, recovery, free will, determinism, locus of control, self-efficacy

From Roots to Recovery: How Addiction Type Shapes the Path to Healing

Has addiction gotten lost in translation? The linguistic history of this word suggests that early usage primarily implied a strong desire, passion, and attachment to something worthy of dedication (Rosenthal & Faris, 2019). Over time, this strong desire and passion have evolved into associations with flawed control. What is remarkable in this development is that the original meaning linguistically has not disappeared, resulting in addiction holding two opposite meanings simultaneously – one of devotion and another of loss of freedom. Yet, this duality seems to have gotten lost in translation in the modern world, where addiction has become synonymous with compulsion, impulsivity, and an inability to resist (Koob et al., 1998). Addiction has become a forbidden fruit, which, if consumed, leads to harmful consequences. Up to 7 per cent of the world's population has, at some point in their lifetime, struggled with addiction (World Health Organization, 2024, pp. xii, 54). While that percentage might seem small, it amounts to approximately 400 million people. The evident prevalence of such a fickle nature warrants further explanation of its prominence. Addiction consistently presents substantial health and clinical challenges, profoundly affecting individuals, families, and societies due to its significant economic, medical, and emotional costs (Burnette et al., 2019; Cunningham et al., 2011; Kvaale et al., 2013). Furthermore, addiction attracts public perception and scrutiny, influencing attitudes towards it that shape stigma, the willingness of individuals with an addiction to seek treatment, and the success of rehabilitation (Hoyt & Burnette, 2020; Thege et al., 2014).

Defining Addiction

Despite its linguistic history and due to its sheer complexity, science has embraced numerous differing definitions of addiction. Nevertheless, the existence of many definitions does not imply a consensus on which interpretation fits best. Frankly, it is a fascinating juxtaposition that such a complex state is equally preferable in its vaguest form. The reason

behind this is the avoidance of stigmatising and contempt-fuelled vocabulary, among other factors, and the acknowledgement that a universal definition is unlikely to emerge (Rosenthal & Faris, 2019). In this paper, we define addiction as a "progressive narrowing of things that bring pleasure" to an individual (Huberman, 2021, 33:40). Breaking down this definition is no easy task, as describing pleasure in its essence has proven challenging. Dr. Lembke (Huberman, 2021) highlights this difficulty, emphasising that pleasure in the context of addiction is not merely "catching a high" but ultimately an attempt to eliminate the pain. When considering the latter, it seems plausible that the pleasure derived from driving addiction is connected to the states experienced before engaging with an addictive source. However, it is not that simple, as differing views exist on addiction and where it fundamentally stems from. These differing views may be the most crucial reason behind the complicated nature of defining addiction (Russell et al., 2010). This paper will delve deeper into the two schools of thought regarding the roots of addiction, aiming to uncover the significance of personal belief on recovery.

On one side of addiction lies a physiological root. This school of thought holds a strong belief that addiction is biologically determined, defined as a brain disease caused by neurochemical imbalances, which diminishes one's control and fosters dependency on an addictive source (Kvaale, 2013; Russell et al., 2010). The physiological root views addiction as a chronic condition of the brain, where high impulsivity and compulsivity can lead to destructive consequences. If the root of addiction is physiological, it implies that addicted individuals have little to no agency over the addictive source, meaning that the addiction takes control over the addict and not vice versa. This perspective adopts our definition of addiction, albeit limitedly, explaining that the dopaminergic mechanism in the brain can describe the progressive narrowing of pleasurable experiences. Addiction creates a disbalance in power-pain homeostasis, lowering the dopamine threshold from its original baseline, suggesting that

addiction is a brain disease (Koob et al., 1998; Volkow & Boyle, 2018). The ultimate

understanding of pleasure in addiction is interwoven with pain due to intense chemical

changes. However, the significance of an individual's psychological and environmental states

that drive the pursuit of pleasurable experiences is often neglected (Campbell, 2010).

On the other side of addiction lies a psychological root. This school of thought

approaches addiction with a stance of free will, proposing that individuals have a behavioural

choice that is influenced by psychological factors, such as coping with emotional distress or

social and environmental conditions (Baumann et al., 1982). This view effectively addresses

Dr. Lembke's concerns about the difficulty of defining pleasure. If pleasure, in its essence, is

not about reaching the "high" that the addictive source deceptively promises, rather than

escaping a painful emotional or environmental state, it can be argued that an individual's

choice led to the onset of addiction. As such, addictive sources, whether substances or

behaviours, are thought to help regulate psychological states (Khantzian, 1997). The inability

to tolerate and manage personal vulnerabilities and traumas leads to "self-medicating."

Individuals recognise their inner hardships and seek a temporary "fix" that uniquely addresses

a specific trigger at that moment. The psychological root provides addicts with agency and

control over their addiction, highlighting the optimistic manifestations of healing and

challenging the concept of addiction as solely a brain disease. Presenting these two schools of

thought raises the question of why an individual's definition of addiction and its perceived

different roots matter for their ability to recover from it. This paper will further introduce

significant instruments for understanding beliefs on addiction and recovery, potentially

inviting a plausible answer to this question.

What happens when one states, "once an addict, always an addict"? Ultimately, one

implies that an addict's journey to everlasting recovery leads to a dead-end street. This

deterministic and definitive lack of control coincides with the physiological root of addiction.

However, what if addiction is not a life sentence but a chapter in a story of change? Russell et

al. (2010) showed that if addiction is seen as a choice, it will promote a heightened personal

responsibility and can enhance recovery motivation. Possessing free will allows for

deliberately modifying behavioural patterns over time. Conversely, they warn that free will

may also lead to increased self-blame, potentially sabotaging recovery. Nonetheless, when an

addict has the agency to make future choices, they may feel that they can recover, in contrast

to what has been proposed by the physiological root. In other words, this individual has an

internal locus of control (Ersche et al., 2012). This allows addicts to believe that they have

power within themselves that will help them fight against addiction. When the locus of

control is focused on external circumstances, individuals feel no control over their addiction,

supporting the physiological argument of brain disease. It is essential to recognise that

previous research indicated an internal locus of control to be correlated with improved

recovery outcomes, as individuals perceive a greater personal influence over their addiction

(Baumann et al., 1982; Ersche et al., 2012). This relates to self-efficacy and signifies an

individual's unwavering belief in their capacity to remain motivated in their recovery. Kadden

and Litt (2011) demonstrated that heightened self-efficacy significantly predicted recovery

success. We must highlight the following to address why defining addiction, its perceived

roots, and the concept of recovery are essential. Firstly, believing that addiction is biologically

determined can reduce self-blame, but it may also foster pessimism regarding recovery

(Kvaale et al., 2013). Secondly, viewing addiction as a choice can boost perceived self-

efficacy, but it might increase self-blame and stigma (Burnette et al., 2019; Cunningham et

al., 2011). Finally, how one perceives the root of addiction significantly influences one's

perceived ability and motivation to pursue effective rehabilitation (Kadden & Litt, 2011).

Taken together, these findings provide a solid foundation for the current paper, suggesting a

diagonal connection between one's belief in the root of their addiction and their belief in

recovery. Therefore, this paper aims to understand how differing views on addiction can guide the recovery process and the belief in the possibility of rehabilitation. To investigate whether an addict's beliefs influence recovery, this paper proposes: The perceived root of addiction (physiological or psychological) will affect how individuals perceive their ability to recover (ranging from lower ability to higher ability). Additionally, this paper suggests that individuals who believe in the psychological root of addiction will have a higher perceived ability to recover. Contrastingly, individuals who believe in the physiological root of addiction will have a lower perceived ability to recover.

Type of Addiction

Thus far, it has been proposed that defining addiction matters, but does it matter what type of addiction it is? Interestingly, if one goes back to the early definitions of addiction, the only type of addiction that fits the dual meaning of it is gambling; its alluring promise conflicted with the oppressive grip of this addiction (Rosenthal & Faris, 2019). However, definitions of addiction in the modern world mainly focus on the misuse of substances (Volkow & Boyle, 2018). As such, this paper defines the type of addiction as an addictive source based on substances, such as alcohol and drugs, behaviours, like gambling and gaming, or a combination of both substances and behaviours. This distinction proposes that whether an addict struggles with substances or behaviours might be crucial in how they perceive their addiction, further influencing their treatment and recovery process (Coelho et al., 2022; Thege et al., 2014). In addition, it is known that once a person becomes addicted to an addictive source, their dopamine baseline decreases, increasing the risk of developing other addictions in the future (Sussman et al., 2010; Thege et al., 2016). Therefore, it is essential that this paper investigates the potential for comorbidity between addictive sources and whether having multiple addictions hinders recovery. Conversely, if the type of addiction is irrelevant, the dopaminergic mechanism in the brain provides an explanation. It is known that

the mechanism involved in the brain's response to addiction is uniform, indicating that regardless of the source of addiction, the chemical reaction occurring in our brain remains consistent (Huberman, 2021). Although the physiological processes might be the same, the psychological processes seem to differ, as individuals tend to perceive substance-based addictions as more addictive than behavioural (Thege et al., 2014). The belief that one is more addictive than the other implies a duality of perceived roots. Studies further provide evidence that substance-based addictions reinforce the physiological perspective of brain disease, shaped by lower self-efficacy, an external locus of control, and deterministic beliefs. Khantzian (1997) acknowledges the physiological aspects of substance dependence but demonstrates that the choice of substances may not be random. They argue that individuals self-medicate by selecting specific substances (e.g., opioids) believed to be uniquely suited to particular emotional distress (e.g., anger). Consistent with psychological perspectives, behavioural addictions are often linked to flaws in judgement and an inability to cope with overwhelming circumstances, reinforcing beliefs that individuals may stay in control of their addictions. Thege et al. (2014) highlight that the perceived ease of overcoming behavioural addictions is due to associating behavioural dependence with personal choice, internal locus of control, and boosted self-efficacy. As research offers insight into dualism in addiction, this paper will explore whether the type of addiction moderates the relationship between beliefs of onset and recovery. Therefore, the second hypothesis posits: The nature of addiction–whether substance-based, behavioural, or both–will influence how individuals perceive the root of addiction as well as their perceived ability to recover from it. This paper suggests that individuals with behavioural addiction(s) are likely to believe in a psychological root and have a greater perceived ability to recover. The complete model, along with its key variables, is illustrated in Figure 1, which visualises the two main hypotheses of this study and

highlights potential correlations between the levels of the independent and dependent variables.

In practice, the findings of this paper can enhance treatment interventions and public health initiatives that promote behaviour change. By demonstrating a deeper understanding of the role of belief in rehabilitation, the relationship between the roots of addiction and individual beliefs can be clarified, thereby refining addiction theory.

Figure 1

Moderation of Type of Addiction on Perceived Root and Perceived Recovery
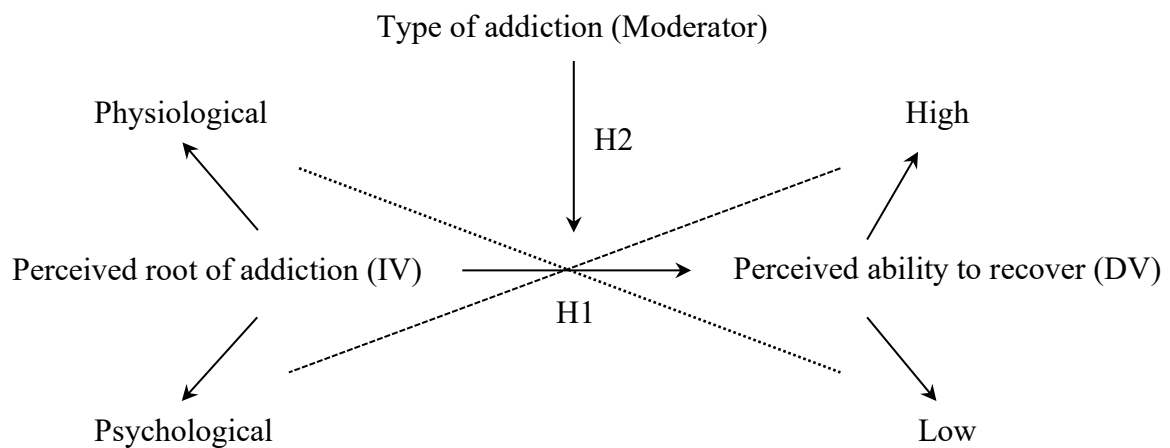
Note. H1 = Hypothesised direct relationship (horizontal line). H2 = Hypothesised moderation effect (vertical line). Skewed arrow lines represent the levels of the independent variable (IV) and the dependent variable (DV). The dotted line indicates a correlation between a physiological root and lower perceived recovery; the dashed line indicates a correlation between a psychological root and higher perceived recovery.

Methods

Participants and Design

This study employed convenience sampling, wherein participants completed an online self-report questionnaire voluntarily. The sample consisted of 144 participants, of whom 92 were excluded due to partial completion or high item non-response, as well as ethical

disqualifications, including declined informed consent and undisclosed age and sex. Thus, the final sample included 52 participants, comprising 21 males and 31 females, with ages ranging from 19 to 63 ($M = 25.31$, $SD = 8.96$). A cross-sectional and correlational design was employed, focusing on quantitative analysis with the perceived root of addiction as the independent variable, split into physiological and psychological levels. The perceived ability to recover was defined as the dependent variable and analysed on a continuous scale, ranging from lower to higher perceived ability. While the primary research incorporated a wide array of moderating variables, this paper centred exclusively on 'type of addiction'. This moderator was categorised into three levels: substance-based, behavioural, or both types of addiction.

Procedure and Data Collection

The current study underwent an ethical review and received full approval to ensure compliance with the bachelor's thesis research standards at the University of Groningen (PSY-2425-S-0086; see Appendix A). Participants were sampled from the personal contacts of students conducting this research, including fellow students studying at the University of Groningen, family and friends, and anyone who received the invitation link to complete the self-report questionnaire. No screening or eligibility checks were applied before filling out the survey; however, there was an age limit of 18 years, and participants had to self-identify as addicts. If either of these conditions was not met, or if there was a non-response, it resulted in exclusion.

Before the study began, all participants received an information sheet outlining the research (see Appendix B). This document explained the aims of the study, that participation was voluntary, any potential risks, and how their data would be managed. It specified that information would be collected anonymously, securely stored, and used solely for this research, in accordance with ethical and legal standards. After reviewing this sheet,

participants provided their informed consent, confirming that they understood the study's

objectives, procedures, and their rights.

The participants received a self-report questionnaire comprising 53 items, accessible

via a link to the Qualtrics (see Appendix C) online platform where the questionnaire was

developed and finalised. Upon opening the link, participants were informed about the purpose

and aim of the current study through the information sheet, which detailed the reasons for

receiving the questionnaire and requested informed consent before proceeding to six

demographic items (including age and sex, as well as addiction history) and ultimately to the

main items assessing the independent, dependent, and moderating variables.

Measures

The current study excluded variables such as length of addiction, coping strategies,

social support, spirituality, and shame, which are moderators within the broader scope of

research to which this study belongs; however, these variables were not measured for the

primary analyses of this paper. Each of these variables was assessed with several items in the

questionnaire. The following number of items was excluded from this paper: two items

measuring the length of addiction, four items measuring coping strategies, four items

measuring social support, three items measuring spirituality, and five items measuring shame.

Thus, a total of 18 items were excluded.

Perceived Root of Addiction

Nineteen items were used to measure the perceived root of addiction, serving as the

predictor in this study. One physiological item (item 15) and one psychological item (item 11)

were self-written, while the remainder were sourced from established scales (DePierre et al.,

2013; Luke et al., 2002; Schaler, 1995). Participants indicated their beliefs about the root of

their addiction for each item using a 5-point Likert scale (1 = *strongly disagree* to 5 = *strongly*

agree). Nine items were used to measure the physiological root of addiction, representing the

first level of the independent variable (e.g., *"Addiction is a result of chemical imbalances in the brain"*). The reliability of the items measuring this level was low ($\alpha = .38$). In comparison, 11 items were employed to measure the psychological root of addiction, corresponding to the second level of the independent variable (e.g., *"Addiction is a matter of personal choice"*). Upon further investigation of the reliability, item 37 was excluded from the primary analysis due to its negative impact on this measure ($\alpha = .49$), resulting in a 10-item measure of the psychological level. Once excluded, the reliability of the items improved, although the new score remained moderate at best ($\alpha = .59$). A probable reason for the low alpha values for both levels of the independent variable may be due to the phrasing of the items, as this paper sought to avoid demand characteristics in participants' responses.

Perceived Ability to Recover

Twenty-seven items were used to measure the perceived ability to recover, which served as the dependent variable in this study. Eighteen items were excluded from this section because two questions controlled for self-identity as an addict, and 16 measured other moderating variables and were therefore irrelevant to this paper. Consequently, a total of nine items remained ($\alpha = .69$), which were adapted from Beck's Hopelessness Scale (Beck et al., 1974), Addiction Belief Inventory Scale (Luke et al., 2002), and the Addiction Belief Scale (Schaler, 1995). Participants indicated their responses for each item on a 5-point Likert scale (1 = *strongly disagree* to 5 = *strongly agree*), which represented their beliefs about possible recovery outcomes (e.g., *"I am making good progress on my recovery journey"*). All items of the dependent variable were measured on a continuous scale from low to high.

Type of Addiction

Two items were used to measure the moderating variable of type of addiction. The first item was a multiple-choice statement with three possible answers asking participants to indicate the type of addiction they have been experiencing by selecting either "substance

related (e.g., drugs, alcohol, nicotine, etc.)", "behavioural (e.g., gambling, phone use, sex, shopping, etc.)", or "both, substance and behavioural." This item was included in the moderator analysis. The second item was a short-answer statement that asked participants to consider their addiction and specify what they feel they are addicted to, allowing them to mention more than one addiction. This item was not included in the moderator analysis but was used as qualitative support instead. It was deliberately designed in a short essay format, as it was essential for participants to articulate their self-perceived addiction. This would enable comparison with their answer in the first item, measuring this moderator and controlling for discrepancies. Both items served to categorise the type of addiction and demonstrate the possible comorbidity between them.

Analytical Procedure

JASP 0.19.3 (Intel) was used for data analysis. A regression analysis with an interaction term was conducted to measure the relationship between the independent variable (perceived root of addiction), the dependent variable (perceived ability to recover), and the moderating variable (type of addiction), which were treated as two hypothesised measures. The regression analysis examined the first hypothesised relationship between perceived root of addiction and perceived ability to recover, and an interaction term was added to evaluate the second hypothesised effect of type of addiction on the independent and dependent variables.

For Hypothesis 1, the linear regression model was examined to establish whether the relationship between perceived root of addiction and perceived ability to recover was statistically significant. The independent variable was dummy-coded as Root_Dummy (1 = *psychological*, 0 = *physiological*), and the dependent variable was measured on a continuous scale, ranging from lower to higher perceived ability to recover.

For Hypothesis 2, the interaction term was added to the regression model to assess whether type of addiction had a statistically significant effect on the relationship between perceived root of addiction and perceived ability to recover. The moderating variable was dummy-coded as M_Substance (1 = *substance*, 0 = *otherwise*) and M_Behavioural (1 = *behavioural*, 0 = *otherwise*) for the first two levels, respectively. The third level of the moderator was set as a reference group (0 0 = *both*).

Upon running the initial interaction analysis, multicollinearity was evaluated with the variance inflation factors (VIF). The interaction terms (Root x Dummy) showcased high collinearity values (VIF > 10), which prompted the mean-centring of Root_Dummy before recomputing the interactions. In the final models, all VIF factors were satisfactory (VIF < 5).

Results

Preliminary Analyses

Following the transfer of raw data into JASP, a preliminary analysis was conducted. As linear regression was used to analyse the data, it was essential to check that this method's assumptions were met. The first assumption was the normality of residuals, which was checked by visually inspecting the Normal Q-Q plot of regression residuals (see Appendix D1). The normality assumption was satisfied, as residuals followed a normal distribution. The second assumption was the homoscedasticity, which was checked by examining the scatterplot of residuals against predicted values (see Appendix D2). The homoscedasticity assumption was satisfied upon inspection of the scatterplot, as the residuals exhibited a vertical spread around zero, with no discernible pattern. The final assumption was multicollinearity, which was checked by inspecting the regression output for variance inflation factors (VIF). After mean-centring the dummy variables and interaction terms, this assumption was satisfied as a visual inspection of the new regression output confirmed satisfactory factors (VIF < 5).

The means and standard deviations of the dummy predictors and the response variable are presented in Table 1. Moreover, Table D3 (see Appendix D) shows the correlations between each of the variables.

Table 1

Descriptive Statistics

	M	SD
Perceived_Recovery	33.08	5.10
Root_Dummy	.81	.40
M_Substance	.27	.45
M_Behavioural	.46	.50

Note. Dependent variable = Perceived_Root; Analytic sample size was $N = 52$; Root_Dummy: 1 = psychological, 0 = other; M_Substance: 1 = substance-based, 0 = otherwise; M_Behavioural: 1 = behavioural, 0 = otherwise.

Main Analyses

A three-model regression analysis was conducted to test the main effect of perceived root of addiction (1 = psychological, 0 = physiological) on perceived ability to recover, incorporating the moderating variable type of addiction, with the level 'both' set as the reference group. Model 0 only contained the centred dummy variable (Root_C) of the main predictor. Model 1 was used to add the dummy variables Substance-based versus Both (M_Substance) and Behavioural versus Both (M_Behavioural). Model 2 added the centred interaction terms corresponding to the moderator dummies, where the first interaction measured perceived root and substance addiction (Root_C x Int_Sub_C) and the second interaction measured perceived root and behavioural addiction (Root_C x Int_Sub_C). Table 2 shows an overview of the model fit summary statistics.

Table 2

Model Summary - Perceived_Recovery

Model	R	R^2	Adjusted R^2	RMSE
M_0	.22	.05	.03	5.03
M_1	.41	.17	.12	4.80
M_2	.47	.22	.13	4.75

Note. Dependent variable = Perceived_Recovery. M_0 includes Root_C; M_1 includes Root_C, M_Substance, M_Behavioural; M_2 includes Root_C, M_Substance, M_Behavioural, Int_Sub_C, Int_Behav_C.

The perceived root (Root_Dummy) alone accounted for 5% of the variance in perceived recovery, $R^2 = .0.5$, $F(1, 50) = 2.54$, $p = .12$. Even after centering, the centered root (Root_C) was not a significant predictor, $\beta = .22$, $t(50) = 1.59$, $p = .12$. After adding the two type of addiction dummies, Model 1 explained an additional 12% of variance, $\Delta R^2 = .12$, $\Delta F(2, 48) = 3.47$, $p = .04$. The complete model showed significance, $F(3, 48) = 3.25$, $p = .03$, $R^2 = .17$. The dummy-coded behavioural addiction versus both (M_Behavioural) predicted lower perceived recovery, $\beta = -.42$, $t(48) = -2.64$, $p = .01$. Contrastingly, the dummy-coded substance-based addiction versus both (M_Substance) and the root predictor did not reach significance, ($|ts| \leq 1.42$, $ps \geq .16$). Including the interaction terms to the model produced a non-significant increase in explained variance, $\Delta R^2 = .05$, $\Delta F(2, 46) = 1.47$, $p = .24$; nonetheless, the complete model remained significant $F(5, 46) = 2.55$, $p = .04$, $R^2 = .22$. When examined on their own, neither moderating interaction reached significance (Int_Sub_C: $\beta = .27$, $t(46) = 1.46$, $p = .15$; Int_Behav_C: $\beta = .39$, $t(46) = 1.56$, $p = .13$). However, the moderating effect of a person having a behavioural addiction versus both (M_Behavioural) remained significant, $\beta = -.45$, $t(46) = -2.84$, $p = .007$.

Although neither interaction terms were found to be statistically significant before and after centring, Figure D4 shows the pattern of the slopes for each level of the moderating variable against the independent and dependent variables (see Appendix D). For participants who reported experiencing both types of addiction (reference group), having a psychological root was linked to lower perceived recovery. For participants who reported only a behavioural addiction, the relationship was less negative, whereas for participants who stated only a substance-based addiction, the slope was positive. Nevertheless, due to non-significant interactions, the trends shown in Figure D4 should be interpreted tentatively.

The complete coefficients are displayed in Table D5 (see Appendix D), whereas Figure 2 shows the unstandardised regression coefficients of this model.

Figure 2

Path Analysis Model of Associations Between Perceived Root of Addiction, Type of Addiction, and Perceived Ability to Recover
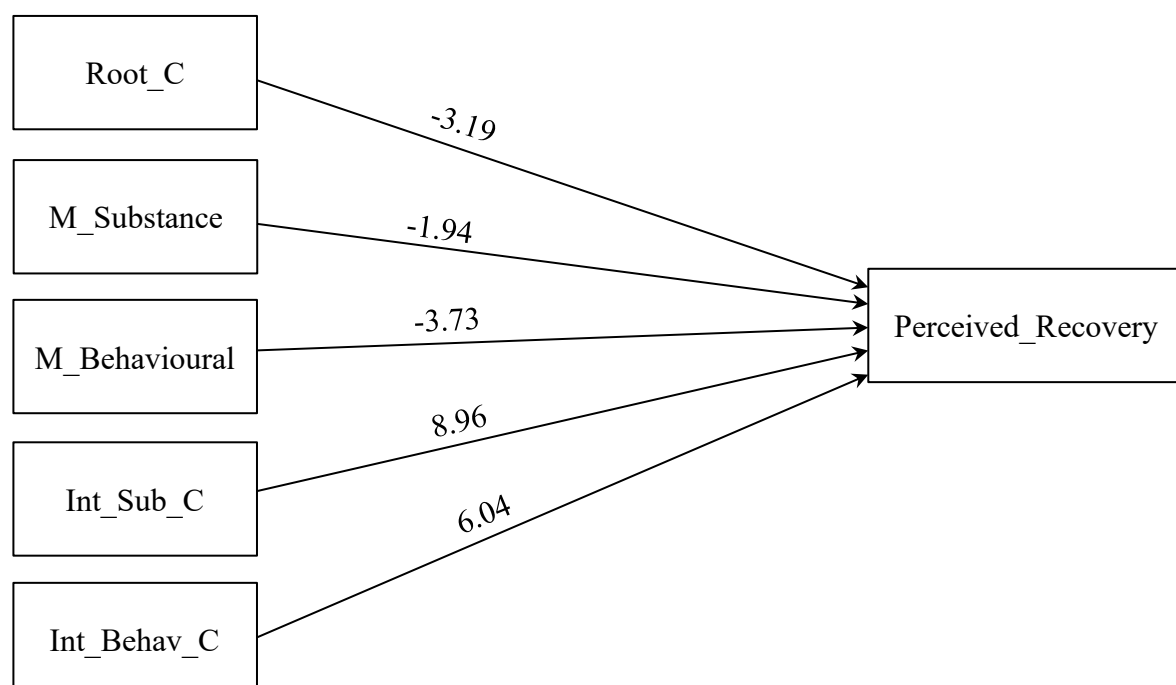
Note. Root_C = perceived root of addiction, mean-centred; M_Substance = dummy variable substance-based (1) versus both (0); M_Behavioural = dummy variable behavioural (1) versus

both (0); Int_Sub_C = interaction term Root_C × M_Substance; Int_Behav_C = interaction term Root_C × M_Behavioural. Each arrow is labelled with the corresponding unstandardised linear regression coefficient.

Discussion

The context of this paper raises the question of whether addiction has gotten lost in translation. The linguistic background of addiction suggests that the negative connotations surrounding this condition were not initially perceived in such a way (Rosenthal & Faris, 2019). Through its complex side effects, both individual and societal, it became increasingly more difficult to rightfully define addiction, resulting in the ongoing debate concerning its origins. This is due to two conflicting natures hiding behind addiction: one physiological and one psychological. Studies have found that believing in one root over the other can influence an individual's motivation towards recovery pursuit (Hoyt & Burnette, 2020). As such, this paper hypothesised that perceived root of addiction (physiological or psychological) would affect how individuals perceived their ability to recover (H1), and that type of addiction one identifies with (substance-based, behavioural, or both) would moderate this relationship (H2). Additionally, it was suggested that a psychological belief would lead to a higher recovery ability, and that a physiological root would result in a lower ability to recover. Subsequently, it was mentioned that individuals who had a behavioural addiction were likely to believe in a psychological root and therefore have a higher perceived ability to recover.

Neither of the hypotheses proposed by this paper received full empirical support. Specifically, perceived root of addiction did not significantly predict perceived ability to recover, nor did type of addiction significantly moderate this relationship.

Interpretation of Key Findings

Firstly, the initial results indicated that participants who believe in a psychological root of their addiction also hold stronger beliefs in their perceived ability to recover. Albeit

weak, this finding aligns with the previous research on root beliefs in recovery. Khantzian (1997) proposed that individuals self-medicate as a way of coping with negative emotional states or distressing environmental conditions, suggesting that recognising addiction as psychologically rooted provides individuals with agency and consequently a greater sense of control in recovery. However, the complete findings of this study revealed that the relationship between psychological root beliefs and higher perceived recovery ability diminished entirely when moderated by addiction type. Specifically, if an individual's root belief is overshadowed by the type of addiction they face, this could lend greater support to the physiological school of thought. Volkow and Boyle (2018) argue that addiction is fundamentally neurobiological and consistent across addictive sources due to its shared dopaminergic mechanism. This suggests that physiological factors may provide greater support for recovery outcomes, independent of individuals' beliefs. Alternatively, if perception proves inconsequential on its own, this may support the notion posited by Thege et al. (2014). They emphasise that different types of addiction (substance-based or behavioural) inherently differ in perceived controllability and societal stigma, which directly influences confidence in recovery. In other words, it is plausible that the type of addiction itself determines perceived ability to recover more effectively than underlying root beliefs. Thus, rather than diminishing the significance of perceived root beliefs entirely, these findings suggest that the type of addiction moderates, perhaps even mediates, the relationship between root beliefs and the ability to recover.

Secondly, individuals who only reported having one type of addiction, either substance-based or behavioural, exhibited less confidence in their ability to recover than those reporting both types. In other words, reporting both substance-based and behavioural addictions was associated with a higher perceived ability to recover. This finding is counterintuitive, particularly since the current literature disagrees with our results.

Behavioural addictions are considered more manageable and less chronic than substance-based addictions, owing to a greater confidence in one's ability to overcome such addictions. (Coelho et al., 2022; Thege et al., 2014). Nonetheless, a possible explanation for why both types of addiction demonstrated a higher perceived ability to recover may be that when an individual works to overcome one addiction, the increased motivation and self-efficacy can have a positive impact on other addictions with which the individual might be struggling. Another reason could be self-perception of how "difficult" or "easy" some addictions may be to recover from. A qualitative glance at the dataset showed that most participants who indicated having both types of addictions included phone use (n = 12), smoking (n = 6), and drinking (n = 4). A high phone use comes with the perks of the modern world, and the prevalence of tobacco and alcohol can be connected with socially acceptable behaviour. Due to the vague definition of addiction proposed in this paper, participants were free to write down any addiction that they self-identified with. This paper did not control for the severity of addictions, thus potentially contaminating this interaction.

  Lastly, the previous finding showed that having both addictions indicated a higher belief in recovery. Interestingly, this result can be explained by the uniform mechanism of the dopaminergic system. According to Huberman (2021), regardless of the addictive source, be it substance-based or behavioural, the brain responds via similar neurochemical pathways, primarily involving the dopamine reward system. Consequently, experiencing both behavioural and substance-based addictions may give individuals a clearer insight into the shared neurochemical triggers of their behaviours. This knowledge could help them adopt broader, more holistic approaches to recovery instead of focusing solely on individual addictions separately. Campbell's (2010) critique underscores this argument by suggesting that a clear grasp of neurological uniformity in addiction can alleviate the sense of helplessness often linked to physiological root beliefs. It also fosters optimism by

demonstrating that recovery from one addiction may positively influence success in overcoming another.

Practical Implications

The findings of this paper propose several practical implications. Given that individuals reporting both types of addiction perceived greater ability to recover, rehabilitation centres might explore clients' prior experiences with addiction and recovery to identify strengths. Tailoring interventions to reinforce coping mechanisms acquired across different types of addiction could further improve recovery self-efficacy. Conversely, individuals presenting with only one type of addiction, who demonstrated relatively lower confidence, may benefit from techniques aimed at increasing personal agency and promoting internal locus of control (Ersche et al., 2012; Kadden & Litt, 2011). Specifically, reframing root beliefs to promote a balance between acknowledging external factors (e.g., genetic predisposition) and enhancing internal control (e.g., free will) could mitigate hopelessness and bolster engagement in recovery facilities. Furthermore, providing educational resources that explicitly address how believing in one's ability to change can be beneficial, regardless of whether addiction is fundamentally a disease, may be advantageous.

Nevertheless, several reasons suggest caution in applying these implications broadly. Namely, the relatively small and homogeneous sample (primarily young adults, recruited through convenience sampling) significantly limits the generalisability of the findings to broader populations typically encountered in clinical practice. Additionally, the weak internal consistency of measures used in this research, particularly for assessing perceived root beliefs, poses a substantial challenge to confidently informing clinical interventions directly from the present findings. Finally, the lack of severity measures for the reported addictions further restricts the practical utility of these insights, as treatments tend to be tailored based on

defined criteria and severity (Thege et al., 2014). While this research provides theoretical

guidance, any interpretation of these recommendations should be approached with caution.

Limitations and Future Directions

Certain limitations impede the interpretability of these results. First, the non-response

bias was high in this study. Out of 144 participants, only 52 answered the complete

questionnaire and therefore contributed to the data collection (36%). This can be attributed to

several factors. One explanation is that none of the questions were made mandatory, meaning

that if only one question was answered and the questionnaire was subsequently closed, that

response would be saved. This was noticeable as a plethora of participants stopped halfway

through the questionnaire, which explains the high attrition rate. Future studies could address

this concern by implementing mandatory responses for all questions. Likewise, many

participants did not respond to the demographic items, including questions regarding the type

of addiction. This further decreased the sample size and limited the interaction analysis of this

study. An explanation of why some participants decided not to name their addictions could be

attributed to guilt, shame, or giving socially desirable answers.

Next, all participants were sampled using a convenience sampling technique, which

could have limited the generalisability. The mean age of all participants was 25 years. This

can be attributed to the fact that the majority of participants were from the researchers'

personal circles. Therefore, the motivation to complete the questionnaire may have been

skewed. This paper also did not control for sex or gender, and the final sample was composed

of 60% females. Previous studies showed that substance-based addictions are more prevalent

in older males, and their under-representation in this research may restrict the applicability of

the findings. This possibly contributes to the low number of participants who reported a

substance-based addiction ($N = 14$). Future research might consider controlling for the

implications of gender on root beliefs, as well as conducting random sampling instead of convenience sampling.

Then, internal consistency for some scales, particularly the subscale assessing the physiological root of addiction, was relatively low, raising questions about overall reliability. This could be due to high overlap between physiological and psychological questions, as well as the incorrect use of the reverse-coding technique. Another explanation is that the participants were laypersons unfamiliar with the theoretical concepts of physiological and psychological roots, which may have resulted in misunderstandings of specific questions. Future research could adapt complete scales that test the measures in this study and that have confirmed high reliability values. When using personal questions, researchers should employ simple and common phrasing to avoid misunderstandings.

Finally, the initial correlation between perceived root belief and perceived ability to recover was low. One plausible explanation can be seen in the number of participants who indicated a specific root belief. Only 10 participants were coded as having a physiological root belief, which may have contributed to the imbalance in these findings. Increasing the sample size could enhance the overall correlation between root beliefs and recovery ability, as a larger sample pool might show a higher variation in the perceived root of addiction. Moreover, a higher variation could lead to a stronger correlation in one direction. Another explanation might be the high conceptual overlap between physiological and psychological beliefs. The results presented in this paper indicated that many participants' responses showed both root beliefs at mid-to-high levels. This challenges the current literature, raising the question of whether an individual can hold both root beliefs simultaneously.

Conclusion

Has addiction gotten lost in translation? This paper suggests that the answer is nuanced. Addiction has not been entirely "lost," but it is often reframed in ways that

overlook critical and deeper aspects of individual experiences. Specifically, although a perceived psychological root belief initially appeared to enhance the perceived ability to recover, the type of addiction ultimately negated this effect. Participants with both substance-based and behavioural addictions reported higher confidence in their ability to recover than those with only one addiction type. In simple terms, the type of addiction appears to play a crucial role in recovery from addiction. This study highlights the importance of translating scientific knowledge into detailed, person-centred language. This is achieved by recognising the need to consider physiological factors (e.g., chemical imbalances) while also reinforcing individual agency and free will. Furthermore, it is essential to identify possible recovery options associated with having multiple addictions, as this paper proposes a potentially beneficial influence of treating more than a single addiction at once. By refining the discussion of addiction, individuals can feel both understood in their struggles and empowered to pursue recovery.

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Appendix A

Data archiving form (to be filled out by students)

Note: This form is to be used for ***data that are collected for teaching purposes***. If you intend to publish the data (only possible with the supervisor's approval), please refer to the BSS Data Management Protocol for instructions on what to include in a Publication Package. This data archiving form details important characteristics of the project and the project members and specifies how data were collected, by whom they were collected, and where they are stored. The form should be saved by the supervisor on the Y drive as part of the Research Package. Supervisors who don't have a folder yet or have other questions about data storage can contact the Heymans institute's contact person:

https://myuniversity.rug.nl/infonet/medewerkers/gmw/onderzoek/conduct-research/data-management/

Project Specifics

Title of research project: BA Thesis: Roots of Addiction: Causes & Healing

Name PI: Martin Manchev

Ethics committee application was sent out on: 19.04.2025

Protocol number/Research code: PSY-2425-S-0341

Approval date: 07.05.2025

Contribution made by each researcher, including the PI

Name:	*Role:*

Martin Manchev	Devising the project; organizing the project.
Josephine Haas	Data collection; data analysis; interpretation of data.
Noa I. A. Begeman	Data collection; data analysis; interpretation of data.
Ana Andreeva	Data collection; data analysis; interpretation of data.
Leyla M. O. Friedrichsen	Data collection; data analysis; interpretation of data.
Minja Tomic	Data collection; data analysis; interpretation of data.
Pius J. Ravenborg	Data collection; data analysis; interpretation of data.

Data collection and storage

In this section you should specify how and when the data were collected and where it is stored. Indicate whether an online questionnaire, paper and pencil test, Qualtrics, or other means were used. If the data were collected on site (e.g., lab space in the Heymans building), indicate where they were collected. Indicate what is stored on the supervisor's sub-folder at Y:\staff\gmw\HI\... and what is stored elsewhere. Note: Raw data such as E-prime files should be stored on Y. If an online questionnaire was used (for example Qualtrics), store the exported excel or SPSS file with the raw data on Y. Paper and pencil tests and other non-digital material may be stored separately or scanned and saved on Y. Consent forms should be stored separately from the research data on Y. The key that links privacy sensitive data to the research data should also be stored separately. If testing was conducted on site (instead of online), a detailed log, specifying the date and time, the name of the researcher who conducted the test, and the number of the participant who was tested, should be saved on Y. If students conduct the research, they are responsible for maintaining a digital log file.

Where and how were the data collected: Data was collected online, via the Qualtrics-made questionnaire, in the period between 06.05.2025. and 02.06.2025.

What is stored on Y:\staff\gmw\HI\...:

Informed consent forms are stored at:

Key that links privacy sensitive data to the research data is stored at:

Other material (please specify) is stored at:

Storage of materials used in the project

Note: All digital research material (or materials that can be scanned) that is needed to replicate the research should be stored on Y. This includes:

- Questionnaires, stimuli, research plans for the project, instructional texts, experiment leader protocols, video material, software for simulation studies, computer scripts, a description of equipment used, etc.

- Any source references made to material published elsewhere must be accurate and sufficiently specific.

Please indicate which materials are stored on Y:

Appendix B

Information Sheet

Why do I receive this information?

You have been invited to participate in the following research project on addiction. Addiction can take many shapes and forms, but for the purposes of this research, we have chosen to divide it into two subsets: 'Substance Abuse' (e.g. smoking, drinking etc.) and 'Behavioural' (e.g. excessive phone use, gambling etc.) addiction. If you are reading this, it means that you consider yourself a self-identified addict in some shape, form or degree (irrespective of its intensity) – making you eligible to take part in the study. The research is a part of a Bachelor thesis project within the University of Groningen.

The research is ran by the Principle Investigator, Martin Manchev and his research team of bachelor students, consisting of: Josephine Haas, Leyla Friedrichsen, Pius Ravenborg, Noa Begeman, Ana Andreeva and Minja Tomic.

The project began in February 2024 and is scheduled to be completed by the end of July 2025.

Do I have to participate in this research?

Participation in the research is entirely voluntary. However, your consent is needed. Therefore, please read this information carefully. Ask all the questions you might have, if for example, you do not understand something. If, for whatever reason, you decide not to participate – you do not need to explain why and there will be no negative consequences for you. You have this right at all times, including after you have consented to participate in the research.

Why this research?

The purpose of this research is to uncover the underlying beliefs self-identified addicts have about their own addiction. We hope that by doing that, we can aid the better understanding of addiction altogether, and of course, ultimately – how to help individuals in dealing with it.

What do we ask of you during the research?

From a participant's viewpoint, the steps of the research are quite simple. After completing this informed consent form, you will be granted online access to our questionnaire. After completing it, your contribution to the research is done. The contents of the questionnaire will mainly revolve around the topic of addiction, alongside some brief demographic questions.

What are the consequences of participation?

Although participating in this survey may have no direct benefits for you, the potential for indirect benefit is great, and thus – non-quantifiable. For example, at the very least, merely the direct engagement with such a topic can prove immeasurably beneficial to a self-identified addict. Additionally, you will be given the opportunity to reach out and receive additional information on addiction, after having completed our study. You can do so by emailing the Principal Investigator of the research, Martin Manchev, at (m.n.manchev@rug.nl).

A perceived disadvantage of participating in our research might be the potential arousal of unwanted emotions during one's reflective process on their own addiction. To combat this, participants will be granted the possibility to 'blow off some steam' and be debriefed by the research team, to help aid with the potential mental discomfort.

How will we treat your data?

The purpose of the data processing revolves strictly around education and training purposes, in this case – the completion of a Bachelor Thesis in Psychology. Sensitive data, such as age, gender, socioeconomic status, type and length of addiction etc., will be collected in a pseudonymized manner. The only direct link-back to your data will be your respective identification number. No overtly-identifiable data will be collected (name, address etc.). The raw data will be collected and stored on the Qualtrics server link. Due to the non-publishable nature of this study and its educational purpose essence – the data will not be backed up after the theses' completion. Only the research team will have access to the data and only during

the duration of the thesis project. The end-date of that duration is July 31st, 2025. None of the collected data will be made public, or available for reuse for scientific purposes.

As a participant, you have the exclusive right to access, rectify or erase the data you have provided until the end of the study. You can do so by emailing the principal investigator directly (please see paragraph below for contact details) stating your desire to withdraw your data and providing the participant number you were given at the end of the study. As previously mentioned, your data will be erased immediately after the study's completion in any case.

What else do you need to know?

You may always ask questions about the research: now, during the research, and after the end of the research.

You can do so by emailing the Principal Investigator at (m.n.manchev@rug.nl) or phoning them on (+31 6 14 41 67 82).

Do you have questions/concerns about your rights as a research participant or about the conduct of the research? You may also contact the Ethics Committee of the Faculty of Behavioural and Social Sciences of the University of Groningen: ec-bss@rug.nl.

Do you have questions or concerns regarding the handling of your personal data? You may also contact the University of Groningen Data Protection Officer: privacy@rug.nl.

Consent Form

Please read the three statements below and indicate whether you consent to take part of this research.

- I have read the information about the research. I have had enough opportunity to ask questions about it.

- I understand what the research is about, what is being asked of me, which consequences participation can have, how my data will be handled, and what my rights as a participant are.

- I understand that participation in the research is voluntary. I myself choose to participate. I can stop participating at any moment. If I stop, I do not need to explain why. Stopping will have no negative consequences for me.

  o   I do not consent.

  o   I consent.

Appendix C

Participant Questionnaire

Age

1. How old are you?

Sex

2. What is your sex?

    o   Male

    o   Female

Type of Addiction (Moderator)

3. Please indicate the type of addiction you have been experiencing

    o   Substance-related (e.g., drugs, alcohol, nicotine, etc.)

    o   Behavioural (e.g., gambling, phone use, sex, shopping, etc.)

    o   Both substance and behavioural

4. I consider my addiction to be… (Please specify what exactly you consider yourself to be addicted to. If you are addicted to more than one thing, feel free to also mention that).

Length of Addiction (Moderator)

5. How long have you considered yourself to be an addict for?

6. Have you ever had any prolonged periods of abstinence in the past?

    o   Yes, for less than 3 months.

    o   Yes, for more than 3 months.

    o   Yes, for over a year.

    o   No

General – Below you will find a series of statements. Please indicate the extent to which you agree or disagree with each statement by selecting the option that best represents your general opinion, ranging from "Strongly Disagree" to "Strongly Agree."

7. Addiction is a physiological disease. (*Physiological root*)

8. Addiction is a matter of personal choice. (*Psychological root*)

9. The causes of addiction lie in the body, not in the mind. (*Physiological root*)

10. Addiction is the result of chemical imbalances in the brain. (*Physiological root*)

11. A person can mentally override their physical addiction. (*Psychological root*)

12. The fact that addiction runs in families means that it is a genetic disease. (*Physiological root*)

13. Addiction is a result of poor decision making. (*Psychological root*)

14. Addicts cannot be held responsible for their addictions. (*Physiological root*)

15. Addiction is an 'all-or-nothing' disease. A person cannot be a 'temporary' addict. (*Physiological root*)

16. Despite all else, addicts are ultimately responsible for their addictions. (*Psychological root*)

17. A person can overcome addiction and be healed forever. (*Psychological root*)

18. An addict must battle their addiction every day in order to succeed over it. (*Physiological root*)

19. Addiction is a sign of personal weakness. (*Psychological root*)

20. Addiction is the result of bad luck, genetically speaking. (*Physiological root*)

21. "Once an addict – always an addict." (*Physiological root*)

Personal – Below you will find a series of statements. Please indicate the extent to which you agree or disagree with each statement by selecting the option that best represents your view of yourself, ranging from "Strongly Disagree" to "Strongly Agree."

22. I would describe myself as an addict. (*Control*)

23. Being an addict is a central part of who I am. (*Control*)

24. I seek acceptance and comfort from people close to me. (*Moderator – Support*)

25. I share my feelings about personal struggles with people close to me. (*Moderator – Support*)

26. In challenging times, I seek out concrete help from people close to me (i.e., financial aid). (*Moderator – Support*)

27. I like to get practical advice from people close to me on how to tackle my problems. (*Moderator – Support*)

28. I am personally responsible for my addiction. (*Psychological root*)

29. Addiction is a way of life I rely on to cope with the world. (*Psychological root*)

30. I use my addiction to deal with personal problems. (*Psychological root*)

31. I use my addiction because I like it. (*Psychological root*)

32. I feel like I can learn to control my addiction. (*Perceived ability to recover*)

33. I feel like I will have to fight my addiction for the rest of my life. (*Perceived ability to recover*)

34. I feel like I can beat my addiction once and for all. (*Perceived ability to recover*)

35. I am making good progress on my recovery journey. (*Perceived ability to recover*)

36. It is unlikely that I will ever recover. (*Perceived ability to recover*)

37. If I can decide and put my mind to it, I believe I can recover from my addiction. (*Perceived ability to recover*)

38. Even if I decide to overcome my addiction, the chemical imbalances in my brain will not let me. (*Perceived ability to recover*).

39. I can find my own way out of addiction without outside help, given the opportunity. (*Perceived ability to recover*)

40. I feel that my life is guided by a deeper sense of meaning or purpose. (*Spirituality*)

41. I believe that something greater than myself plays a role in my life. (*Spirituality*)

42. I spend time reflecting on my personal values and what they mean to me. (*Spirituality*)

43. If I could somehow miraculously get rid of my addiction tomorrow, I would.

   (*Psychological root*)

44. I experience shame in relation to my addiction. (*Shame*)

45. I feel as if I am somehow defective as a person, like there is something basically

   wrong with me. (*Shame*)

46. At times, I feel so exposed that I wish the earth would open up and swallow me.

   (*Shame*)

47. I feel as if I have lost control over my body functions and my feelings. (*Shame*)

48. Feelings of shame help and motivate me to improve myself. (*Shame*)

49. I made or am making a plan of action to deal with my addiction. (*Coping*)

50. When I struggle with my addiction, I concentrate my efforts on doing something about

   it. (*Coping*)

51. I try to look at my addiction in a different light, to make it seem more positive.

   (*Coping*)

52. I accept that I have an addiction and that it cannot be changed. (*Coping*)

53. In the future, I expect to succeed in my recovery. (*Perceived ability to recover*)

Appendix D

Figures and Tables

Figure D1

Q-Q Plot Standardised Residuals
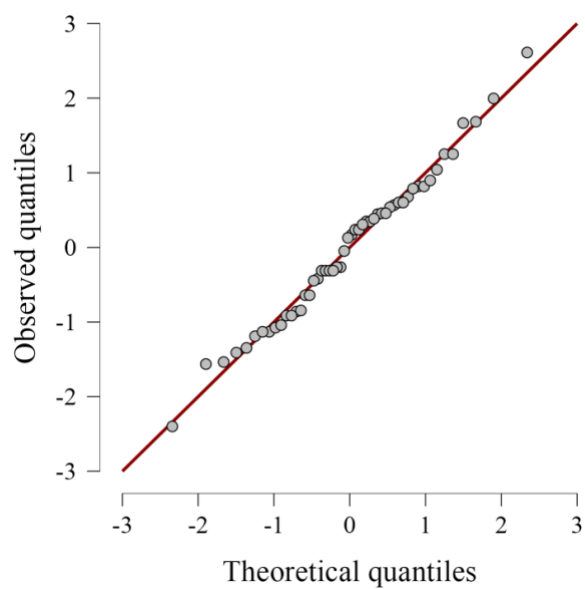
Note. The Normal Q-Q Plot of Standardised Residuals indicates normality, as all points are

settled along the line.

Figure D2

Scatterplot Residuals vs. Predicted
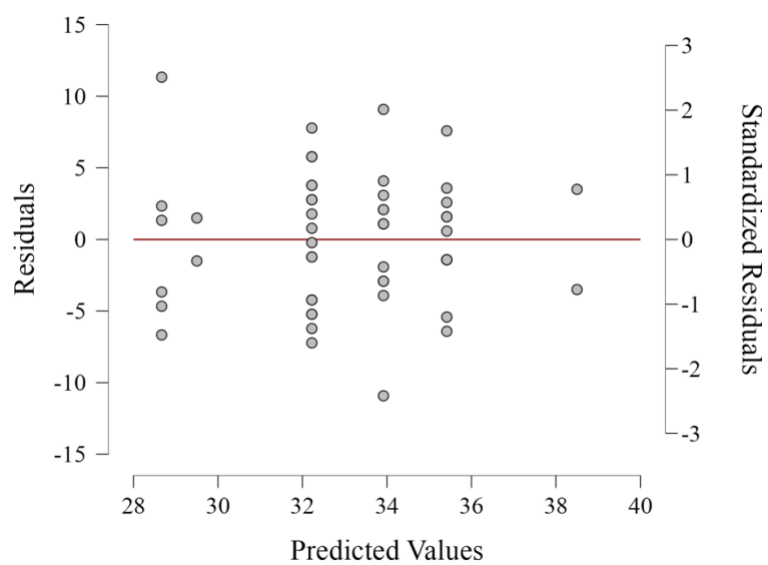
Note. The Scatterplot of Residuals versus Predicted Values shows no violation of

homoscedasticity, as there is no visibly apparent pattern.

Table D3

Correlation

	Perceived _Recovery	Root_Dummy	M_Substance	M_Behavioural
Perceived_Recovery	1.00	.22	.03	-.32
Root_Dummy	.22	1.00	.08	-.14
M_Substance	.03	.08	1.00	-.56
M_Behavioural	-.32	-.14	-.56	1.00

Note. Dependent variable = Perceived_Root; Root_Dummy: 1 = psychological, 0 = other;

M_Substance: 1 = substance-based, 0 = otherwise; M_Behavioural: 1 = behavioural, 0 =

otherwise.

Figure D4

Interaction of Perceived Root of Addiction and Type of Addiction on Perceived Ability to
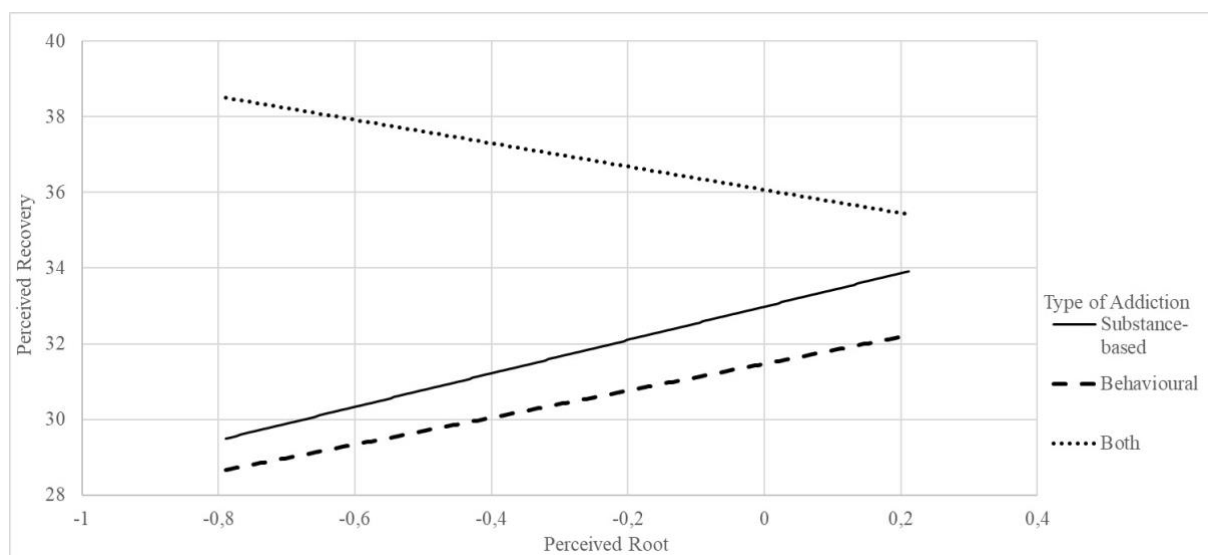
Recover

Note. Perceived Root = Root_C; Type of Addiction = Addiction_T; Perceived Recovery =

Perceived_Recovery.

Table D5

Coefficients

Model		B	SE	t	p	95% CI LL	UL
M₀	(Intercept)	33.02	.70	47.32	< .001	31.62	34.43
	Root_C	2.82	1.77	1.59	.12	-.73	6.37
M₁	(Intercept)	35.70	1.29	27.74	< .001	33.11	38.29
	Root_C	2.31	1.70	1.35	.18	-1.12	5.73
	M_Substance	-2.57	1.81	-1.42	.16	-6.22	1.07
	M_Behavioural	-4.28	1.62	-2.64	.01	-7.54	-1.01
M₂	(Intercept)	36.07	1.29	27.86	< .001	33.46	38.67
	Root_C	-3.08	3.63	-.85	.40	-10.39	4.22
	M_Substance	-3.08	1.83	-1.69	.10	-6.77	.60
	M_Behavioural	-4.60	1.62	-2.84	.007	-7.86	-1.34
	Int_Sub_C	7.50	5.13	1.46	.15	-2.83	17.83
	Int_Behav_C	6.64	4.27	1.56	.13	-1.95	15.23

Note. Dependent variable = Perceived_Recovery.