Exploring the Roots of Addiction and Their Ability to Affect Recovery Perception

Eva van den Bosch

S4643003

Department of Psychology, University of Groningen

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Supervisor: Martin Manchev

Second evaluator: Dr. Anita Keller

In collaboration with: Mira Halbe, Annabella de Oliveira, Leanne Smit, Emilia Gediga, and Hieke Dijksterhuis.

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Abstract

This study explores the relationship between the root of addiction (physiological or psychological) and an addict's perceived ability to recover, while also investigating whether the type of addiction (substance or behavior) has a moderating effect on this. An online questionnaire was distributed via a convenience sample to assess this. The final sample consisted of 54 self-identified addicts. A correlational research design was employed with a linear regression analysis on the quantitative data that was collected. The results showed a significant positive correlation between physiological roots of addiction and a low perceived ability to recover. The relationships regarding psychological roots of addiction turned out to be insignificant, as well as the effects of the moderator. These findings give evidence for a predictive value of a physiological root of addiction on perceived ability to recover, but further research is needed to explore the role of psychological beliefs and addiction type in recovery outcomes.

Keywords: Addiction, Physiological and Psychological Roots, Type of Addiction, Substance Addiction, Behavioral Addiction, Recovery Perceptions

Exploring the Roots of Addiction and Their Ability to Affect Recovery Perception

It is widely understood what addiction is, how it works, what neurochemicals are making one stay addicted, and what the consequences are in the life of an addict. Yet, one important question stays unanswered. Why are people addicted? In 2016, approximately 2.000 people in the Netherlands identified as gaming-addicts. Later, in 2021, nearly 55.000 individuals sought treatment for substance addiction (DRUGSinfo, 2024). What drives this large group to start and persist their addiction? Why are so many people willing to sacrifice their lives for the pleasure that the addiction gives them? In essence, what are the roots of addiction? Numerous attempts have been made to answer the latter question, resulting in the development of two schools of thought on the matter. Before delving into these schools of thought, namely, the physiological and psychological view, it is important to be clear about the definition of addiction. The term "addiction" has been defined in various ways. Some sources describe it as a returning craving for something despite its destructive consequences (Zou et al., 2017), while others define it as a lack of self-control or an overwhelming desire (Koob et al., 2019). Although these definitions share common features, they also differ significantly, making it difficult to find a harmonious consensus. For the purposes of this paper, the following definition is proposed: a progressive narrowing of the things that bring you pleasure. This definition acknowledges all expressions of addiction, but they are often categorized into two types. The distinction is made between behavioral addiction, where pleasure comes from engaging in a certain behavior (e.g., gambling, sex, or phone use), and substance addiction, which includes a dependence to an external chemical (e.g., nicotine, drugs, alcohol). According to behavioralists, addiction occurs whenever a habit progresses into an obligation (Alavi et al., 2021). This definition also emphasizes that any stimulant or behavior can become compulsive.

The first school of thought, a physiological perspective, approaches the root of addiction by arguing that addiction is a psychiatric disease; a compulsive, involuntary condition (Foddy, 2010). This means that once you become an addict, the neural pathways in your brain always will remain addicted. Your brain gets wired to tell you to maintain the addiction, and you must fight everyday against this compulsion. Neuroimaging techniques can support this theory. For instance, Zang et al. (2017) provided MRI, fMRI, and PET scans that showed images of receding grey matter in critical brain regions, associated with reward, motivation, and decision making. Next to this, dopaminergic systems show significant dysregulations, containing fewer receptors and transporters of this reward-regulating neurotransmitter. The consequence of this imbalance is experiencing a lessening pleasurable feeling associated with the addictive behavior. Resulting in the need for progressively more of the same stimulant to achieve the desired effect.

If this philosophy were true, the best possible treatment would be relatively straightforward. Suggesting that it is purely physiological, meaning that the actions of the mind are a direct consequence of the brain's neurochemistry, the best treatment should also be neurochemical: a medication. A pill against addiction. The current absence of this treatment could very well be an argument supporting the opposing school of thought. Given that a purely physiological solution for treating addiction remains elusive, how can we be sure this approach represents the whole truth? More insight in the physiological school of thought could potentially be helpful for improving the physiological treatment methods for addiction.

Although this "addiction-pill" does not yet exist, the clinical treatment of addiction nowadays is still built on this disease-model. To illustrate, the DSM-5 classifies addiction as a substance-use-disorder (American Psychology Association, 2021), implying that addiction is a psychiatric disease. Viewing it as a disease may reduce some stigma surrounding addiction, by shifting the responsibility away from the addict (Frank & Nagel, 2017). This could make it

easier for a person struggling with addiction to seek help, as they may feel less shame. Additionally, the addicted person might experience less guilt, believing they were not the one in control, but rather their disease was. This concept is known as an external locus of control, attributing certain actions and consequences as being out of one's personal control. This removes the responsibility from the addict and places it onto external factors, like fate or social influences (Das et al., 2024). However, this perspective on addiction opens the door to new forms of moral judgment. Some argue that framing addiction as a brain disease undermines the development of self-control in addicts. As a result, addicts may be seen as incapable of taking control of this condition, potentially harming their self-esteem (Frank & Nagel, 2017).

To sum up, the physiological school of thought answers the previous-stated question, why are people addicted, by stating that people are addicted because the neurochemical balance in their brain is disturbed. Dopaminergic systems exhibit disruptions and grey matter is reduced in area's related to reward, motivation, and decision-making (Zang et al., 2017). These imbalances are stronger than their self-control and that leads to the behavioral patterns associated with addiction.

The opposition of the former philosophy suggest a psychological view. Followers of this school of thought state that addiction is rooted in psychological mechanisms, rather than physiological ones. They believe that free will can override the influence of neurochemical imbalances on behavior, with free will being a central concept in this school (St Quinton, 2022). In the former school, addiction is viewed as something that is automated. In this field, however, there still is room for addicts to make their own choices. Addicts can make a choice to use drugs or throw another gamble because of the immediate satisfaction, disregarding the long-term consequences. They may be influenced by cravings, but they remain capable to make this choice (Foddy, 2011).

This is also associated with an internal locus of control. That is the belief of an individual that certain action and consequences in their live are attributable to themselves (Das et al., 2024). An internal locus of control would in this context mean that the addict believes that their addiction is a consequence of the action they decided to engage in. The addict feels that the responsibility lies within themselves in this case and that they are the one to blame. This attribution might invite judgement from others if they also see the addict as the one responsible (Frank & Nagel, 2017). As previously mentioned, the stigma surrounding addiction might hinder the recovery process, as addicts can become fearful or too ashamed to find fitting treatment. On the other hand, when a person thinks that they inflicted the addiction on themselves, they may also feel more confident in stopping the addiction themselves. Since the mind of an addict is in control, and not a brain-disease. In other words, the amount of self-efficacy potentially has an effect on their perceived ability to recover. Self-efficacy refers to an individual's self-confidence in their ability to reach a goal. In this case, to resist the addiction, even when faced with environments or situations that could be triggering (Das et al., 2024). A study by Rajani et al. (2021) agrees with this association. They found a negative relationship between self-efficacy beliefs and craving, which means that higher levels of self-efficacy were related with less craving.

If the root of addiction does rest in the psychological field, the best treatment should follow this thought. According to Carl Gustav Jung (2012), addiction cannot be treated and healed in the same way as physical wounds. While the body can heal itself from injuries, the mind does not have the same ability, despite the brain's plasticity (Fenton & Wiers, 2017). For example, an experience of a traumatic event cannot be erased, even though someone can try talking about it in therapy or take medication. The event still happened. According to Jung's theory, the key to healing the mind is letting go of the problem (Jung, 2012). A problem persists as long as it is seen and labelled as a problem. In other words, the problem only exists

when it's given the value of one. Once this value is being let go, the problem will also no longer be there. The same applies to addiction. When this theory is implemented on addiction, recognizing the free will an addict owns makes it possible for them to choose to let go of their addiction. When the addiction loses its hold on the individual and is released, space is created for healthier habits to take root.

The two mentioned perceptions regarding the root of one's addiction might have influence on an addicts' sense of being capable to recover. As said before, most modern-day addiction treatment is based on the physiological school of thought, but naturally not all addicts view their addiction as a disease. Therefore, to guarantee the best treatment, it should align with the addicts' beliefs about their addiction. Additionally, viewing addiction as physiologically rooted might lead to a sense of lost control, but could also reduce feelings of shame, encouraging individuals to seek help more readily. Believing in a psychological root of addiction may boost feelings of self-efficacy and free will but could also decrease the willingness to seek appropriate treatment. These influences shape an addicts' perceived ability to recover.

Essentially, the crux of the debate between schools of thought revolves around what is in control: the mind or the brain, and which of the two influences the other. In other words, both schools of thought claim to have temporal precedence. Both sides present strong arguments, as discussed earlier. However, instead of focusing on which came first, it may be more useful to consider what the addict believes is the root of their addiction and how that belief influences their potential for recovery. The aim of this study is to answer the following research question: Do an addict's beliefs about the roots of addiction influence one's perceived ability to recover from it? Based on previous literature, the prediction is that addicts who attribute the roots of their addiction to psychological factors will report a higher

perceived ability to recover compared to those who attribute addiction to physiological factors.

To dive deeper, we want to research if the type of addiction influences this relationship. Addiction is, as aforementioned, often categorized into two main types, substance addiction and behavioral addiction (Hollander, 2006). Behavioral addiction includes activities such as sex, gambling, or internet use, while substance addiction involves a drug, nicotine, or alcohol dependency. The biggest difference between these two types is the dependence of external chemicals in substance addiction. Although, looking inside the brain, these types of addiction are quite similar. The regions in your brain responsible for maintaining an addiction, mainly being the striatum, amygdala, and hippocampus (Volkow & Boyle, 2018), look and act similar in the brain of a gambling addict versus a drug addict. The reward-systems that are activated when engaging in addictive behavior remain indifferent to the external stimuli (Flayelle et al., 2022). Thus, physiologically speaking, they seem to engage the same neural pathways. However, they should not be assessed and treated the same, according to a Flayelle and her colleagues (2022). They argue that using substance addiction-criteria to diagnose and treat behavioral addiction is not the most effective way of tackling the problem, and that it would be more appropriate to approach behavioral addiction with a psychological view. This categorization of addiction will be playing a moderating roll in this study, differentiating behavioral and substance addiction. Substance addicts might feel powerless due to the dependency of a chemical, leading to less perceived ability to recover (Marlatt et al., 1995). Also, behavioral addictions are more often attributed to personality characteristics (Von Der Heiden & Egloff, 2021). This study aims to answer the following question regarding this: Does the type of addiction moderate the relationship between one's beliefs about the root of their addiction and their perceived ability to recover from it? In light of the aforementioned literature, we further speculate that behavioral addicts will be more

likely to attribute their addiction to psychological factors and will report a higher perceived ability to recover compared to substance addicts, who will be more likely to attribute their addiction to physiological causes.

The answers to these research questions might benefit society by improving treatment to better align with the addicts' belief of their addiction. Raising awareness amongst addicts of the differentiation between schools of thought may help them find treatments best fitting with their beliefs. It might enhance motivation and engagement in the treatment, leading to a more successful completion. Furthermore, extra research on this topic will expand the current theory and it will broaden existing knowledge about perspectives of addiction.

An attempt is going to be made to try to shape an answer to these questions by interviewing self-identified addicts about their beliefs regarding the root of their addiction and prospects of their recovery. A questionnaire is going to be distributed between self-identified addicts, containing questions that measure beliefs about addiction and perceived ability to recover. The following section details the methodology and design of this study.

Method

Participants and Design

The participants consider themselves as self-identified addicts. A total of 104 participants responded to the online questionnaire, using the Qualtrics platform. The participants were found by a convenience sample, based on the researchers' social circles. After consideration, 50 participants were excluded from the analysis because they did not successfully complete the entire questionnaire, or they did not give their informed consent. Therefore, the definitive sample consisted of 54 participants. 29 (53.7%) of them were female and 25 (46.3%) of them were male. The participants ages ranged between 20 to 64 years old (M_{age} = 28.16, SD = 10.59). From all the participants, 57.41% says to be addicted to a substance. The other 42.59% says to be behaviorally addicted. This study employed a

correlational research design with a linear regression analysis on the quantitative data that was collected. The root of addiction was used as the independent variable. The participants perceived ability to recover was the dependent variable, and as a moderator the type of addiction (substance or behavioral) was looked at.

Procedure

The study was approved by the Ethical Committee of the Faculty of Behavioral and Social Sciences at the University of Groningen (EC-BSS). The participants were found in the following way: The researchers used their own social networks to approach self-identified addicts and invite them to complete the questionnaire of 41 items online. Before the study began, participants were asked to give their informed consent, confirming that they understood and agreed to the following things: the study's purpose, the procedures involved, potential risks, privacy considerations, the voluntary nature of participation, and how the collected data would be used.

Participants began by answering seven demographic questions, which included age, gender, type and duration of addiction, and socioeconomic background factors. Following this, they completed 34 statements designed to assess various aspects of addiction, such as their levels of identification with addiction, beliefs about its causes, and perceptions of recovery. These statements were rated on a 5-point Likert scale ranging from “Strongly Disagree” to “Strongly Agree.” The first 15 of these statements represent the participant’s general opinion of the aforementioned aspects of addiction. The remaining 19 statements represent the participants view of themselves as addicts. Lastly, participants had the chance to be debriefed and were thanked for their time and participation.

Measures

Beliefs About the Root of Their Addiction

Physiological Roots. A total of nine statements were used to measure the belief about a physiological root of addiction. This means, viewing addiction as a result of a psychiatric disease with a neurochemical foundation. To illustrate, "The fact that addiction runs in families means that it is a genetic disease" is one of the statements that measures the belief of a physiological root. A 5-point Likert scale was used to assess the statements (1= Strongly Disagree, 2= Disagree, 3= Neutral, 4= Agree, 5= Strongly Agree). The statements measuring physiological belief were selected from three existing questionnaires, with the most suitable ones chosen and adapted to align with the objectives of this study (DePierre et al., 2013; Luke et al., 2002; Schaler, 1997).

Psychological Roots. A total of nine statements were used to assess the belief in a psychological root of addiction. This perspective views addiction as a consequence of, and attributable to, an individual's own choices and actions. The same 5-point Likert scale was used to measure statements such as "Addiction is a matter of personal choice.". The statements measuring this belief were picked from two existing questionnaires and revised to bring into line with the objectives of this study (Luke et al., 2002; Schaler, 1997). Cronbach's α for the variable Roots of Addiction was $\alpha = 0.573$.

Perceived Ability to Recover

The perceived ability to recover was assessed with eleven statements using the 5-point Likert scale. The perceived ability to recover refers to the amount of confidence and hope the addict feels to be able to overcome their addiction. One of the statements that was used to assess this was "In the future, I expect to succeed in my recovery". The eleven statements were chosen from existing questionnaires and modified to align with the aims of this study (Bandura, 1997; Beck, 1988; DePierre et al., 2013; Luke et al., 2002; Schaler, 1997).

Perceived ability to recover closely parallels hopelessness, as both aim to capture an individual's feelings about their future and their belief in their own capabilities. Therefore,

Beck's Hopelessness Scale (1988) was very useful to assess this variable and it protects the results for any comorbidity. Cronbach's α for the variable Perceived Ability to Recover was α = 0.364.

Type of Addiction

Participants identified their type of addiction by selecting one of two categories: substance addiction or behavioral addiction. This variable was included as a moderator in the analysis to explore potential differences in how addiction type influences perceptions of its causes and recovery.

Results

Preliminary Analyses

A linear regression analysis was conducted to explore the relationship between our variables and moderator. The first step involved verifying that the assumptions of regression were not violated. Firstly, normality was assessed by inspecting the Q-Q plots (see Figure 1 in the Appendix). The presence of a straight line in the plot indicated that the residuals were normally distributed. Second, a scatterplot was examined to evaluate the homoscedasticity of residuals. A lack of an apparent pattern suggested the absence of heteroscedasticity (see Figure 2 in the Appendix). Subsequently, the same scatterplot was used to assess the linearity of the relationship between the variables. Based on the presence of a straight pattern in the scatterplot, it was determined that the relationship between the root of addiction and the perceived ability to recover was linear (see Figure 2 in the Appendix). Furthermore, VIF-scores were observed and did not find evidence of multicollinearity, as they were below 5 (VIF = 1.00). Finally, the independence of residuals was evaluated using the Durbin-Watson statistic, with a value of 2.02 indicating that independence was met. To conclude, during the assumption analysis there was no evidence found that disturbs the assumptions of a linear regression, as they were all met.

Table 1 provides the means, standard deviations, and correlations for the study variables. The variables showed mostly positive correlations with one another, except for the correlation between a physiological root of addiction and a high perceived ability to recover (r = -.09, p = .543). The correlations did not seem to be significant, except the correlation between a physiological root of addiction and a low perceived ability to recover (r = .31, p = .022). Table 2 specifies the frequency statistics of this study's moderator.

Table 1

Descriptive Statistics of Dependent and Independent Variables, and Correlations Between Variables

Variable		N	M(SD)	1	2
Independent Variable: Root of Addiction	1. Physiological	54	2.86 (0.52)		
	2. Psychological	54	3.39 (0.61)		
Dependent Variable: Perceived Ability to Recover	3. High	54	3.81 (0.64)	-.09 (p = .543)	.20 (p = .152)
	4. Low	54	2.72 (0.79)	.31 (p = .022)	.04 (p = .775)

Table 2

Frequency Statistics of Moderator

Type of Addiction	Frequency	Percent	Cumulative Percent
Substance Addiction	31	57.41	57.41
Behavioral Addiction	23	42.59	100
Total	54	100	

Main Analyses

Two analyses were conducted in JASP (Version 0.19.2) to test the study's hypotheses. The first hypothesis was examined using two simple linear regression analysis. The first linear

regression ran between ‘low perceived ability to recover’ and the independent variable (psychological and physiological root of addiction). The second linear regression ran between ‘high perceived ability to recover’ and the independent variable. The results partly support the proposed hypothesis, indicating a significant positive relationship between a ‘low perceived ability to recover’ and the belief of a ‘physiological root of addiction’, $R^2 = .99$, $F(2, 53) = 2.79$, $\beta = 0.31$, $p = .023$. The R^2-value suggests that approximately 99% of the variance in the variable Low Perceived Ability to Recover is explained by the variable Physiological Root. On the contrary, insignificant relationships were found between ‘physiological roots of addiction’ and ‘high perceived ability to recover’, $R^2 = .05$, $F(2, 53) = 1.23$, $\beta = -0.08$, $p = .544$, and ‘psychological roots’ with both ‘high’, $R^2 = .05$, $F(2,53) = 1.23$, $\beta = 0.20$, $p = .155$, and ‘low perceived ability to recover’, $R^2 = .99$, $F(2,53) = 2.79$, $\beta = 0.04$, $p = .756$.

To assess the moderating hypotheses a linear regression analysis with a moderation analysis was ran. The results of the moderation analysis were not in line with the proposed hypothesis, meaning that, in this study, the type of addiction did not influence the relationship between the independent and dependent variable. The found interaction effects (Psychological Root × Addiction Type and Physiological Root × Addiction Type) were statistically insignificant for both ‘Low’ and ‘High Perceived Ability to Recover’ Specifically, the results were as follows:

Low Perceived Ability to Recover:

- Psychological Root: $\beta = 0.69$, $SE = 0.35$, $p = .376$
- Physiological Root: $\beta = 1.03$, $SE = 0.43$, $p = .222$

High Perceived Ability to Recover:

- Psychological Root: $\beta = -0.06$, $SE = 0.31$, $p = .943$
- Physiological Root: $\beta = 0.93$, $SE = 0.38$, $p = .304$

It can be concluded that the type of addiction does not have a moderating effect on whether the beliefs about the root of addiction influence the perceived ability to recover.

Discussion

Theory on addiction and treatment are rather extensive, yet it remains a global issue, with tens of thousands seeking treatment in the Netherlands each year (DRUGSinfo, 2024). The purpose of this study was to further broaden this theory, by finding out if the belief about the Root of Addiction has influence on an addicts' Perceived Ability to Recover. Prior to the study, it was suspected that beliefs in a Physiological Root would correlate with a lower Perceived Ability to Recover, and Psychological Roots with a higher Perceived Ability to Recover. Additionally, it was proposed that Addiction Type could influence this correlation, with substance addiction linked to a Physiological Belief and lower Perceived Ability to Recover, while behavioral addiction might lead to a Psychological Belief and higher Perceived Ability.

After completing the study and analyzing the data, the results did support all the hypotheses. Only one relationship was found to be significant: a Physiological Root of Addiction and low Perceived Ability to Recover. A moderate positive correlation was observed, indicating that a Physiological Root of Addiction is moderately associated with a low Perceived Ability to Recover. No evidence was found to support the idea that a Psychological Root of Addiction predicts a high Perceived Ability to Recover. Furthermore, no supporting evidence was found for the Psychological Belief to predict a low Perceived Ability to Recover, nor that Physiological Roots predict high Perceived Ability to Recover. This does correspond with the previous literature, since these findings were not expected. Moreover, no evidence was found to support the hypotheses regarding Type of Addiction. Both substance and behavioral addiction interacted insignificantly with the other variables, suggesting no differences in beliefs of addiction and recovery between the two types.

Previously discussed literature already explained these findings, by accentuating the similarity of dopaminergic systems in both types of addiction and the brain's indifference between the two types. Nevertheless, it goes against the prior expectation that substance and behavioral addicts would differ in their views on Roots of Addiction and Perceived Ability to Recover.

These results mostly contradicted the expected outcomes based on literature. The definitive sample that was used for this study consisted of 54 participants, slightly exceeding the rule-of-thumb minimum of 50 participants (Green, 1991). A larger sample size might have given different and more accurate results.

Psychological Roots of Addiction were initially expected to predict a high Perceived Ability to Recover, based on previous literature, but this was not reflected in the results. One possible explanation for this could be that the addicts who attribute their condition to Psychological Roots have a low Perceived Ability to Recover due to the fear of losing the social connections their addiction provides. To illustrate, addictive behaviors are often shared in social groups, like smoking or online gaming with friends. Peer pressure is found to be a big and common cause of social networking addiction (Kim & Lim, 2021). Additionally, research has shown that environmental cues can trigger intense cravings; for instance, cocaine addicts experience strong cravings when exposed to videos of environments associated with their substance use (Kilgus & Pumariega, 1994). Participants in the current study may feel that recovery requires avoiding peer pressure and environmental triggers, which could result in losing their social circles. Thus, while these individuals may acknowledge a Psychological Root of Addiction, their Perceived Ability to Recover might remain low due to the fear of potential loss of their social environment.

Furthermore, it is possible that the results did not align with the hypotheses because of the subjective nature of the target group: self-identified addicts. During questionnaire distribution, people were invited to participate if they identify as an addict, regardless of the

substance or behavior. The study did not operationalize the term "addict," leaving participants to rely on their own interpretations. This likely led to variation in how participants identified as addicts. Additionally, the prevalence of certain addictions, such as phone use or smoking, may have skewed the sample. Common addictions like these were likely overrepresented compared to less common ones, such as heroin or sex addiction. As a result, the sample may not adequately represent the broader population of addicts, limiting the generalizability of the findings.

Results regarding the moderator did align with the previous literature, but not with the expectations that were drawn prior to the data collection. One possible explanation could be the way the question was framed in the questionnaire. Participants were asked to choose one type of addiction, with no option to select both. This posed a problem for individuals who identify with both behavioral and substance addictions, as they were forced to choose just one. This limitation could have affected the results, especially given the high comorbidity between the two types of addiction (Freimuth et al., 2008), such as the big comorbidity and overlap between gambling addiction and smoking (Grant & Chamberlain, 2013). While most addicts may define one primary addiction, this raises the question of whether there is such a thing as an addictive personality. To state that there is an addictive personality type is rather controversial, but there are some common personality traits observed in addicts, like impulsivity and sensation-seeking (Roberts, 2019). This limitation to not be able to identify as an addict of both types might explain the opposing results in this study. An alternative questioning should have been used to prevent this overlap.

Another possible explanation for the moderator not presenting the expected influence is what previous literature already stated. The brain does not distinguish between different types of addiction. Although substance addicts experience withdrawal differently than behavioral addicts due to their dependence on external chemicals that alter baseline levels of

neurotransmitters like dopamine, these differences may not fully separate the two. Research suggests that substance and behavioral addictions share neurobiological similarities, including overlapping dopaminergic systems (Chen et al., 2017). Both types of addiction also share similar imbalances between the brain's impulsive and reflective systems, which typically regulate decision-making, inhibitory control, and predicting future consequences of a behavior. When these systems get disrupted by addiction, they change behavior by facilitating craving, poor decision-making, impaired impulse control, and deficits in self-regulation (Christie & Bechara, 2020). Thus, in neurochemical terms, behavior and substance addiction appear to be similar. For example, one neuroimaging study found resemblances in experienced craving between sexual behavior addiction and substance addictions (Kraus et al., 2016). With this considered, it is fair to say that the brain does not know what the rest of the body is addicted to. Thus, the results support previous literature, and future research should not expect a difference between the two types. Moreover, this finding can be used as an argument for the physiological school of thought because it shows that alterations in brain systems are present in every form of addiction. These alterations in the brain are often long-lasting or permanent and get progressively worse if the addiction persists (Torregrossa et al., 2011). It corresponds with the physiological argument that once you become an addict, the neural pathways in your brain will remain an addict. However, the psychological school of thought does not ignore these neural alterations but argues that the mind can override them using willpower. This school could argue that if neural systems are similar across the two types, free will may also serve in similar ways. So, the indifference between the types of addiction can be used as an argument supporting the physiological perspective, but does not succeed as a counterargument against the psychological school of thought.

One part of the expectations did show significant results: the hypothesis that Physiological Roots of Addiction predict low Perceived Ability to Recover. Addicts who

attribute their condition to physiological factors essentially acknowledge in the questionnaire that they view their addiction as a disease. This recognition may lead them to take their condition seriously and become very aware of the problem. This awareness could have led to feeling pressure to do something about it. As mentioned before, addicts who attribute their addiction to physiological causes do tend to agree with an external locus of control (Das et al., 2024), believing that they are not responsible or in control of what happens to them. When faced with something beyond their control, the natural response is often to seek help. Some participants may have felt internal pressure to address their condition, especially if they had not yet sought help. If no action is taken, they might perceive the persistence of their condition as their own fault rather than the disease's fault, which contradicts the core belief of the external locus of control. This conflict between attitudes and behavior can cause an uncomfortable feeling, called cognitive dissonance, and is often associated with feelings of shame (Yousaf & Gobet, 2013). To mask this shame to others, participants might have given socially desirable answers, and therefore scored well on high Perceived Ability to Recover. Moreover, participants were collected using a convenience sample from the social networks of the researchers. Knowing the researcher could be another reason as to why participants possibly gave socially desirable answers.

In short, it is possible that this study's results were observed because of the relatively small sample size, the social aspect of addiction having influence, the subjective nature of self-identified addicts, the high comorbidity between addiction types, the similar neural systems of the types, low variance among participants, and the use of a convenience sample. To control for these limitations, future research should include a larger sample size, add context-related questions regarding participants' addiction to gain more information on the social aspects, define the term 'addict' to participants, allow the option to identify as both substance- and behaviorally addicted, not expect a difference between behavioral and

substance addiction, and employ a random sampling method to increase variance and reduce socially desirable responses.

Conclusion

To conclude, much is already known about addiction, such as how it works in the brain and what consequences typically follow this lifestyle. Yet so much is still to be discovered. The aim of this study was to explore the relationship between the Root of Addiction and an addict's Perceived Ability to Recover, while also investigating whether the Type of Addiction affects this. It contributes to deepen the existing theory about addiction and may present new perspectives on addiction that aim to help improving treatment. The corresponding research question attempted to answer was: Do an addict's beliefs about the roots of addiction influence one's perceived ability to recover from it? Based on the results of this study, it can be concluded that the beliefs regarding addiction-roots did not have the expected influence on the addict's perceived ability to recover.

Despite not having found revolutionary results, it is still valuable to conclude that behavioral and substance addiction do not significantly differ. For future research this is holds great value, because it saves resources otherwise used to study both addiction types separately. Additionally, the shared mechanisms between behavioral and substance addictions create a fused group of individuals, bridging the gap between the two types. The expansion of this group can make it easier for addicts to connect with peers who share similar feelings and experiences, nurturing mutual support and potentially benefitting recovery when integrated into treatment programs. Secondly, to understand and attribute addiction to either of the two roots creates a more optimistic view on struggling addicts. Spreading awareness on these roots provides more room for compassion and hopefully takes away some prejudice against addiction, making it easier and less shameful for addicts to seek help. If addicts can reach treatment and recovery more easily, that would take a large burden off of the health care

system, considering how widespread this issue is. Consequently, that would benefit society. Research on this topic remains unfinished, but this study does lay another brick in the pathway to right direction.

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Appendix

Figure 1

Q-Q Plot Standardized Residuals

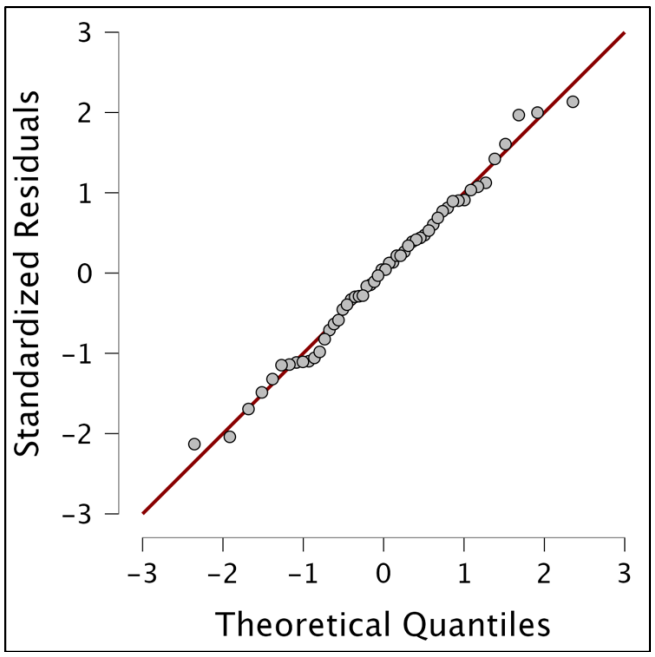

Figure 2

Scatterplot Perceived Ability to Recover against Root of Addiction